

TEACHERS' BELIEFS ON SUCCESSFUL  
IMPLEMENTATION OF TECHNOLOGY  
IN AN INTEGRATED LEARNING  
SYSTEM AS AN ALTERNATIVE  
TEACHING METHOD

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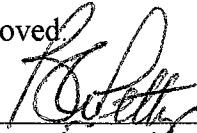
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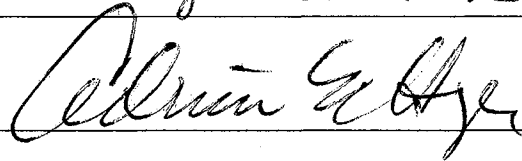
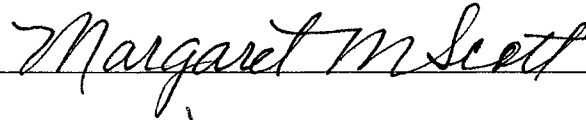
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Dissertation Approved



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## CHAPTER I

### INTRODUCTION

Integrated Learning Systems (ILSs) in education are not new. In fact, they have been around long enough for educators to discover that in most cases they have not done what was promised by the vendors, which was to raise test scores. Studies have been conducted to investigate where the problems lie. The deficient area appears to be in the implementation of the ILS program (Becker, 1992).

According to Fullan (1991) implementation is a detailed process with numerous factors operating at each phase. It is not a linear process but one in which events from one phase can feed back to alter decisions made at a previous stage, which then goes on to work their way through in a continuous interactive way. Hawkins and Macmillan (1993) believe full implementation may take as long as five or six years.

The implementation of educational change involves a "change in practice" (Fullan, 1991). Fullan also states that three changes for teachers are at stake in implementing any new program or policy. The first change is the use of new or revised materials (direct instructional resources such as curriculum materials or technologies). The second change is the possible use of new teaching approaches (new teaching strategies or activities). The third change is the possible alteration of beliefs (for example, pedagogical assumptions and theories underlying new policies or programs p. 37). These dimensions of change are essential if educational change is to be achieved. Fullan believes that educational change depends on what teachers do and think. He stated, "The conditions of teaching appear to have deteriorated over the past two decades. Teachers have become devalued by the

community and the public. With all the demands made of teachers and the conditions of society it is difficult for a teacher to have a satisfying work experience. For educational change to happen, teachers must understand themselves and be understood by others. To understand teachers means to understand the routine, overload, and limits to reform (p. 117)." Fullan's book on educational change contained the following passage that was written by a high school teacher (Wigginton, 1986, p. 191).

Teachers routinely have to teach over one hundred forty students daily. On top of that, we have lunch duty, hall duty, home room duty. . . We go to parents' meetings, teachers' meetings, county-wide teachers' meetings, school board meetings, and state teachers' conferences. We staff the ticket booths and concession stands at football and basketball games. We supervise the production of school plays, annuals, newspapers, dances, sports events, debates, chess tournaments, graduation ceremonies. We go on senior trips. . . . We go on field trips to capital buildings, prisons, nature centers, zoos, courtroom trials. We choke down macaroni and cheese and USDA peanut butter at lunch (and have to pay for it). We search lockers during bomb threats. We supervise fire drills and tornado alerts. We write hall passes, notes to the principal, the assistant principal, parents and ourselves. We counsel. We wake up every morning to the realization that the majority of our students would far rather be some place else. On top of that everyone's yelling at us--state legislatures, parents and SAT scores. . . . To add injury to insult, college and universities are getting all huffed up and grumpy and indignant over the increasingly poor preparation of the

students we're sending them. Well, just who do they think taught us how to teach? How much support, and prestige do they accord their own schools of education (p. 118)?

Teaching demands much from teachers in terms of daily maintenance and student accountability. These demands leave little time for planning, constructive discussion, thinking, and just plain rewards and time for composure (Fullan, 1991, p. 119). Fullan states that only by recognizing the negative conditions can we understand what makes change work for teachers (p. 120). The daily demand on teachers also drains their energy and leaves little energy and time to learn new teaching strategies with technology. Larry Cuban (1995) notes that teachers have slowly added some technologies but not others to their teaching methods. This is the great argument between how outside experts view teaching and learning and what is useful and how practitioners [teachers] view these things. Policy makers and administration view technology one way while teachers view it another. This has led many techno-enthusiasts' complaints that teachers are resistant to change. Cuban notes that teachers are concerned about efficiency but not in the same sense as the school officials. He states that facing the tough realities of classrooms requires an efficient expenditure of a teacher's time and energy. He notes what teachers are concerned with: Is it simple enough for me to learn quickly? Can it be used in more than one situation? Is it reliable or does it break down often? How much time and energy do I have to invest to learn how to use it and keep up with future changes? How does it compare with the return for my students? Technology does not meet teachers' efficiency test. In Cuban's article, "Deja Vu All Over Again," he shows teachers as believing in

technology as just another program handed down the bureaucratic line and that it will soon die out just as a million others have.

This brief introduction helps to understand where teachers are at present. How do teachers have time to implement a new program? What do teachers' believe about technology? The purpose of this study is to validate Fullan's (1991) theory on educational change by investigating teachers' beliefs on successful implementation of technology in an integrated learning system as an alternative teaching method. The areas of implementation to be investigated are the planning stage, developmental training stage, and follow-up support stage. The literature in these three phases is essential for investigating teachers' beliefs through the full implementation process. Interviews were conducted with five public school teachers having a wide range in age, experience, and educational degrees. An explanatory case study, using a focused interview based on Yin's (1994) method is used to study teachers' beliefs. The data will be compared to Fullan's theory to prove or disprove it.

### Background

A review of the literature shows successful technology schools that have used the ILS and other technology. They claim the ILS has raised their test scores. Other schools are disclaiming success and complaining about specific situations in their schools. The first complaint states that teachers are not included in the initial planning stage to create a "buy in" effect. The second complaint claims that teachers are not given enough time to go through a developmental process for change. The last complaint indicates that teachers

are not provided appropriate training to implement the program and are not given adequate follow-up support after achieving a certain level of proficiency (Cook, 1994).

The consensus of the literature indicates that few formal studies of ILS implementation have been conducted and only a handful of articles has been written about implementation practices (Van Dusen & Worthen, 1992). Hativa and Becker (1994) agree that little research is available to inform us of the ILSs actual effect on teaching and learning, despite its wide use in schools today. There is little research to guide the designing of optimal software for an ILS. We need to study the ILSs already in use, how they work, their cognitive, affective, behavioral, and social effects, the advantages of using them, and relevant problems.

The implementation of technology has been a significant part of the public education curriculum. Since the early nineteenth century, inventors and promoters of new technologies have promised more efficient schools and more productive teachers and students. As a result, in the 1870's, urban school reformers had introduced the age-graded school with its self-contained classroom. A uniform curriculum was divided into segments for each grade having a daily schedule of classes with annual promotion and retention. The outcome was equivalent to an assembly line. From early day blackboards to the present day computers, business and technology seem to dictate what teachers teach. The record does indicate this fact throughout America's educational history. Lack of consultation with teachers creates an impending crisis and proposes a machine as the solution. (Cuban, 1995)!

Thornburg (1994) and White (1992) agree that much of the opposition to the ILS is based on the assumption that machines are bad and humans are good. Kinnaman (1994)

discusses the future of technology and how it will change education. We must change the predominant structure of America's schools in order for schools to take advantage of the power of technology. It still functions as an institution of mass production.

As a public school educator, having used the technology of an integrated learning system, I have been made aware of what is happening to technology in the schools. Computers are purchased with large sums of money and teachers are told to use the technology with their curriculum. Miraculously, teachers are supposed to be experts with the equipment and integrate all the new materials into the curriculum (Chrisman, 1992; Finkel, 1992). Some teachers want to access technology, but do not have time in their daily schedules to become computer literate. The ILS is used as a "fun thing" while the teachers use the extra time in the computer lab to grade papers. The literature reveals the problem of technology implementation to be in the preplanning stage, developmental training stage, and follow-up stage. Administration must focus on how teachers feel about new programs, or the struggle to get the latest technology into the classrooms will continue.

### Plan of Study

Chapter Two presents the review of the literature and research in the three phases of implementation according to Fullan (1991). Phase one, adoption, is the initial process that leads up to and includes the decision to adopt change. Phase two, implementation, is the initial use of computers or attempting to put an idea into practice. Phase three, continuation, refers to whether the change gets built in as an ongoing part of the system or disappears because of the decision to discontinue.

Chapter Three describes the method used to collect the data for the study. It presents the explanatory case study method using the focused interview by Yin (1994). Yin's method was used to interview and transcribe the data. The interviews were conducted with five practicing teachers having a wide range of experience, knowledge and age. The interviewees were selected by their principals. In addition, this chapter provides a profile of each of the persons interviewed for this project.

Chapter Four is the presentation of the data obtained during the interviews. The interviews revealed what teachers believe about successful implementation of technology. The teachers revealed their beliefs about the implementation process within their school, the type and amount of training, instructional changes required to integrate the ILS, and the follow-up support. Additional information delineates how the teachers utilize this technology with existing curriculum.

Chapter Five is an analysis of the data. This chapter analyzes patterns that emerge from the interviews as compared with Fullan's (1991) theory on educational change. Pattern-matching logic is the mode of analysis.

Chapter Six is a summary of the findings and conclusions, implications for research, and the practice and teacher preparation stage. Also summarized are recommendations for further study, and final comments. This chapter reveals what the respondents' believe regarding the key elements of a successful implementation plan for an ILS program.

## Significance of the Study

Explanatory case studies investigating teachers' beliefs on the implementation of technology are rare in educational research. Few research studies exist that are relative to teachers' beliefs concerning implementation of an integrated learning system (Hativa & Becker 1994, p. 82). Van Dusen and Worthen (1992) found that only a handful of articles pertain to research studies on implementing ILSs. They concluded that further studies should be done to study the effects of the ILS, the advantages and the problems. The following quotation is from the preceding article.

Given that ILS implementation can have a dramatic impact on student and teacher outcomes, and the fact that so few schools seem to be implementing their ILS well, it would be imprudent for any ILS research study to be conducted without measuring the level of ILS implementation (p. 23).

Many studies have been conducted concerning the use of the ILS and its effects on student behavior. Over the past several years, several groups of researchers, primarily in Israel and the United States, have designed studies and collected data providing insight into different areas of the ILS. The studies encompassed the impact of the ILS on many areas of learning and teacher involvement. Studies have been conducted on methods of implementation and their effects on student outcomes and teacher responsibility using the ILS (Hativa & Becker, 1994, p. 9). Van Dusen and Worthen (1992) state, "The implementation will only be improved as school personnel become aware of the hindrances



that prevent good implementation and the facilitation strategies that can overcome these hindrances."

Understanding the beliefs and practices of teachers on the implementation of an ILS would be valuable when implementing new educational technology training, inservice workshops, or continuing education. The purpose of this project is to study teachers' beliefs of successful implementation of technology of an ILS and compare the results with Fullan's (1991) theory. Five classroom teachers were interviewed and the data were compiled, examined and analyzed.

As long as business and technology dictate what is to be taught, and administration demands how it should be implemented, teachers will continue to resist new technology. "The message to everyone outside the role [of teaching] is: understand the phenomenology of teachers as a necessary precondition for engaging in any change effort with them (Fullan, 1992, p. 131)." Teachers can use technology to produce better students and a better educated society if teachers are first understood.

More and more schools are using peer teachers to instruct other teachers in the use of technology available to the school. Within the school, collegiality among teachers, as measured by the frequency of communication and mutual support, was a strong indicator of implementation success (Fullan, 1991, p. 131). While college classrooms provide many educational theories, they do not provide the actual hands on experience (November & Thornburg, 1993). Teachers, with hands on experience, are the ones to question about the implementation of the ILS. Research utilizing teachers, can provide insight for others to create affective implementation plans using the ILS.

## CHAPTER II

### REVIEW OF THE LITERATURE

#### The ILS: Its' Promise and Problems

Integrated learning systems (ILSs) are integrated hardware and software management systems that use computer based instruction in core subjects (Bailey, 1992). The system usually incorporates (a) assessment and placement, (b) direct instruction, (c) monitoring of student progress and adjustment of instruction, and (d) generation of progress reports (Maddux & Willis, Walker, 1992, 1993).

ILSs are one of the fastest growing and largest markets for school technology. They have moved from drill and practice programs to the latest capabilities of accessing Internet through various linking packages (Sherry, 1992). Oklahoma schools are allowed to purchase Josten's ILS software with state textbook money (Kinnaman, 1992).

There are many reasons for the big boom of ILSs. It was thought to be a "panacea" for schools that exhibited low achievement test scores and high drop out rates. It was also believed that ILSs could solve the academic problems of public schools. The thought existed among business and industry that the "automation" of teaching would improve the "product" of education (Maddux & Willis, 1992).

The evidence from existing evaluations of programs using ILSs indicated that the systems have not achieved their expected potential. Their use has not appeared to be consistently raising measured student achievement in reading, math and language as was expected from students using high quality software on a regular basis (Becker, 1992).

An ILS is not a panacea nor does it provide a total answer. Each ILS has a specific design to deliver curriculum in different formats in an integrated package. Curriculum integration is left to the teacher. Continued monitoring of the students' progress and use of the ILS is essential. Intervention by the teacher in the child's learning requires the teacher's presence while the children are using the system. The teacher must integrate the ILS instruction with other methodology (Shockley, 1992; Blickhan, 1992).

Becker (1992), who reviewed more than thirty (30) studies on the effectiveness of ILS programs on student achievement, concluded that there was wide variability in effectiveness and the effects on achievement were only modest. Becker, who participated in a large scale evaluation of ILS implementation, was disappointed with the performance of the ILS. He believed the reason ILSs were not reaching their potential was that teachers used them for drill and practice.

The variety of curricular programs, computer platforms, and educational populations served by ILSs have prompted the need to develop guidelines for proper implementation. Josten's Learning Corporation (educational software developing company) developed specific ILS guidelines because they believe appropriate implementation was the most critical factor in positive learning outcomes (Shore & Johnson, 1992). According to Fullan (1991) implementation is the process of putting into practice an idea, program, or set of activities and structures new to the people attempting or expected to change.

The 1990 Educational Products Information Exchange (EPIE) ILS Report concluded that although users were positive about ILSs, these systems were under-implemented in schools so that the maximum educational benefits were not realized

(Shores & Johnson, 1992). Maddux and Willis (1992) stated that treating ILSs as replacements for well trained teachers is a common error of implementation. With this attitude, implementation is not likely to change as rapidly as circumstances in the school and society change.

### Fullan's Theory and The Literature

#### Phase I

The remaining portion of the review of the literature will be divided into three phases to compare to Fullan's (1991) theory on educational change. According to Fullan, most researchers see three broad phases to the change process. Phase I is the initial or adoption stage. This phase consists of the process that leads up to and includes a decision to adopt or proceed with a change (p. 47).

In order for teachers to feel a part of the implementation process, they must share in the experience (Chrisman, 1992; Hertzke, 1992; Linnell, 1994). Fullan (1991) noted that over the past thirty years the assumption exists that involving some teachers in curriculum or program development would facilitate implementation because it would increase acceptance by other teachers. The majority of teachers knew that only a few had been included and they were not truly involved in the process (p.52). Glickman (1991) also noted these assumptions.

A study done by Chris Cook (1994) on factors affecting implementation, found the school climate had a high impact on the level of implementation. Two of the factors

regarding school climate were: goals that were clearly communicated by the principal; and teacher participation in the decision to adopt the ILS.

Cook (1994) also discussed under which factors the school climate is the most influential. He stated that the most critical time to invest in developing a strategic implementation plan is before the ILS is installed. The plan identifies clear goals and assigns specific roles and responsibilities to all key players. This is also a critical time when teachers need to be involved in decisions regarding what programs will be adopted and for what purpose.

## Phase II

Phase II is the actual implementation process that involves the first experience of attempting to put an idea into practice (Fullan, 1991, p. 47). Fullan quotes Cuban (1988) as stating that, "How can it be that so much school reform has taken place over the last century, yet schooling appears pretty much the same as it always been (p. 32)?"

Fullan (1991) cited Marris (1975) as saying that it does not matter whether the change is voluntary or imposed, all real change involves loss, anxiety, and struggle. Failure to recognize this phenomenon as natural and inevitable has meant that we try to ignore important aspects of change and misinterpret others (p. 31).

Fullan (1991) also cited Schoan (1971) who developed the same theme. All real change involves passing through the zones of uncertainty. . . the situation of being at sea, of being lost, of confronting more information than you can handle (p. 31).

Fullan (1991) also stated that real change, whether desired or undesired, represents a serious personal and collective experience characterized by ambivalence and uncertainty. If change succeeds it can result in a sense of mastery, accomplishment and professional growth (p. 32).

Fullan (1991) also noted that change is a highly personal experience. Every teacher who will be affected by change must have the opportunity to work through this experience in a way in which the rewards at least equal the cost (p. 127).

According to Fullan (1991) the implementation of educational change for teachers involves a change in practice. There are three components involving teachers in implementing any new program. They are: (1) the possible use of new or revised materials, (2) possible use of new teaching approaches and (3) the possible alteration of beliefs. All three aspects of change are necessary because together they represent the means of achieving a particular educational goal. Fullan says that a teacher may change in only one or two aspects and not all three and the objective would still not be achieved (p. 37). In an article by Miller and Olson (1994) teachers agree that using technology changes the way they teach. An article by Monson and Monson (1993) states that the new role for teachers is to create their own curriculum.

Fullan (1991) believes that educational change programs have an objective reality that may be appropriately definable with beliefs, teaching practices and resources they encompass. Changes in beliefs are very difficult. Changing a person's beliefs challenges the core values held by the individual regarding the purposes of education. Moreover, beliefs are often not explicit, discussed or understood, but rather are buried at the level of unstated assumptions. The development of a clear belief system is essential. This system

provides a set of criteria for overall planning and a screen for shifting valuable from not so valuable learning opportunities that inevitably arise during instruction (recall Bussis et al., 1976). Fullan thinks the best way to deal with changes in beliefs is to address the changes on a continuous basis during implementation. Changes can be most effectively discussed after teachers have had some behavioral experience in attempting new practices (p. 42).

Rosen and Weil (1994) have identified some changes teachers must confront as they attempt new practices in using the computer. The computer fears include: (a) anxiety about current or future interactions with computers technology; (b) negative global attitudes about computers, their operation or the societal impact; and (c) specific negative cognitions or self critical internal dialogues during actual computer interaction or when contemplating future computer interaction.

Cook (1994) and Spotts and Bowman (1993) also found in their studies on factors affecting implementation that the amount of interaction and collegiality among teachers regarding the ILS, used encouragement of experimentation and risk-taking and the presence of a local hero who spearheads efforts to make an ILS work. Cook also discussed that staff development plans should include formal training by consultants and opportunities for teachers to work together, coaching each other on relevant problems and creating a supportive collegial work environment.

Hawkins and Macmillan (1993) and Linnell (1994) report that key factors associated with successful integration of the ILS were personal enthusiasm and investment of individual teachers. Other key factors were planning time for technology-enhancement as part of the school day and a school structure and culture that encourages experimentation.

The article by Dwyer, Ringstaff, and Sandholtz (1991) noted a successful technology program. The Apple Classrooms of Tomorrow (ACOT) study incorporated what the ILS programs appear to be lacking. Other articles by Van Dam (1994) and Vockell and Sweeney (1994) also incorporated some of the same concepts as the ACOT study, but the ACOT study seem to be more comprehensive overall. Dwyer et al. and the ACOT Project studied a group of elementary and secondary teachers over a three year period. The classrooms were equipped with computers, scanners, printers, modems, laserdisk, video players, CD-ROM drives and hundreds of software titles. Numerous manipulatives were made available within the school setting. The operating principle was to use the technology that best supported the learning goals across the curriculum. The article described the inner conflicts of teachers as they attempted using technology in education. It also stated that teachers maintain deep beliefs in the traditional classrooms where they spent years as students and later as teachers. What they found was the more things change in the educational world, the more teachers must confront their beliefs about learning and the efficacy of their instructional activities. Their theory was that teachers go through a developmental stage to reach successful implementation of technology. Initially, teachers focused on the computers and software. Little thought was given to instruction, student task and assessment. The increase in the number of computers drastically changed the physical environment of the classroom. However, the way students learned remained unchanged. Eventually new patterns of teaching emerged as the teachers progressed through different stages of development via a training program. In the entry stage teachers faced computers with little or no experience but with trepidation and excitement.



During the adoption stage teachers used the new electronic technology to support traditional text-based drill and practice instruction. Still there was no significant improvement in student performance.

The adaptation stage integrated technology into the traditional classroom practice. Lecture, recitation and seatwork were still the dominant forms of student tasks. These activities were supported with the use of word processors, databases, graphic programs and computer assisted instruction packages. The teachers reported that the students produced more work at a faster pace.

The appropriation stage depended on the teachers' personal mastery of technology because some have better access to technology than others. McCarthy (1993) also noted that teachers need access to technology thereby working through their uncertainties when reaching the production stage. As a teacher reached this stage his/her role began to shift noticeably, and new instructional patterns emerged.

Dwyer et al. (1991) also found at both elementary and secondary schools that teamed project-based learning activities opened up opportunities for teachers to step back and observe the result of their own pedagogic shifts. Teachers noticed their students' highly developed skills with technology and ability to learn on their own. They observed their students moving away from competitive work patterns toward collaborative ones. Strommen (1995) agrees with Dwyer et al. that technology is one of the best ways to get students working together in the classroom. Strommen wrote that Roger Johnson, co-director of the Cooperative Learning Center at the University of Minnesota, stated, "It is ridiculous to bring in new technology and use inappropriate traditional strategies with it." The most important change at the appropriation stage was the increasing tendency of

teachers to reflect on teaching, question old patterns, and speculate about the causes behind changes they were seeing in their students. Jones (1995) reports a school in Clear View, California that has an exciting vision for technology. Their school principal states, "We view computers as manipulatives--tools to promote thinking and educational risk-taking on the part of the students and teachers."

When the ACOT teachers began the entry stage they believed technology would make their jobs easier and more efficient. The ACOT staff found two conditions that were essential for educational reform. (1) Teachers must be given an opportunity to reflect on their own beliefs about learning and instruction and to develop a sense of the consequences of an alternative belief system. (2) Administrators must be willing to implement structural or programmatic shifts in the environment for teachers who are instructionally evolving.

Dwyer et al. (1991) also argued that change is evolutionary and suggested an incremental approach to implementation. They recommended support for teachers in the developmental process change as they move from stage to stage. Initially, teachers' needs centered on their concerns over the hardware, software and disk drives. Technical training was the key ingredient to successful implementation. Progressing through the evolutionary process, teachers needed opportunity to confront their actions and examine their motives. This allowed teachers to extrapolate and reflect on the consequences of their choices, decisions, and actions. Instructional change can only proceed with the change in beliefs about instruction and learning.

### Phase III

Phase III, the continuation or institutional phase, refers to whether the change is built in as an integral part of the process or is discontinued (Fullan, 1991, p. 48). Fullan also states that continuation is an extension of the implementation phase in that the new program is sustained beyond the first year or two. The outcome can refer to several different types of results and can be thought of generally as the degree of school improvement about given criteria. Results could include improved student learning and attitudes, new skills, teacher or school personnel attitudes, or improved problem-solving capacity of the school as an organization ( p.48).

Fullan (1991) notes that Berman and McLaughlin (1978, pp.166-83) found projects not implemented effectively were discontinued and only a minority of those implemented were continued beyond the federal funding. The reasons given for ending the implemented program were; lack of interest or inability to fund "special projects" with district funds, lack of money for staff development, and support for continuing and new teachers (p. 88).

Fullan (1991) cites that Huberman and Miles (1984) noted that continuation of a program depends on whether or not the change gets embedded into the structure. Program continuation also depends on generating a critical mass of administrators and teachers who are both skilled and committed to the change. Concern is also directed toward establishing procedures for continued assistance and support of new teachers and administrators (p. 89).

Fullan (1991) notes that continuation is the third phase in a planned change process. Each phase must be carefully thought out from the beginning and continually thereafter. One of the biggest problems with continuation is the staff and administrator turnover. Very few programs plan for the orientation and in-service support of new members who arrive after the program begins (p. 90).

Fullan (1991) uses Crandall and associates (1986) and Hall and Loucks (1977) writings to help understand the true continuation process. The process "begins with the individual user not even interested in attending to the innovation, but ends with the user so proficient that he or she is riding new winds, modifying the original innovation so that it in fact works better or even looking for a practice that represents an improvement over the one just mastered." Improvement is a continuous process of renewal (p. 90).

Schools that engage in major restructuring efforts are interested in going beyond the original projects. To move beyond the phase of institutionalizing and to develop the long-lasting continuation phase deeper changes will have to evolve. Educational change is possible but change is a process not an event (Fullan, 1991, p. 100).

Van Sciver (1995) discussed in his article how his school decided to take a proactive step instead of a reactionary step. The beginning plan was written and rewritten many times. The first workshop was a "change workshop" to set the environment for the school and faculty. Funding was the next issue to be addressed. The school planned to access various federal grant writing approaches. However, reliance on federal grants is not a surety. Funding in the form of private grants exceeded more of those at the federal level. Because of the school's strategic technological plan and vision, they saw dreams come true for an almost state of the art technology program.

Jessica Siegel (1995) has completed the first national survey of staff development for technology in schools. She stated that staff development for technology is a lot like the axiom of putting money away for a rainy day. When the rainy day comes the money is not there. What administration intends to do with staff development for technology training never becomes a reality. Henry Jay Becker, a researcher at the University of California, estimated the cost of developing technology expertise in teachers may be greater than hardware and software (Tally & Grimaldi, 1995).

After looking at America's schools, Siegel (1995) found there is a lot more talk than action when it comes to staff development for technology training. Following an intensive survey, she found that very little of the technology budget was for teacher training. Less than one third of the respondents did not spend any money on training. When asked to describe their latest staff development for technology, sixty-six percent of the respondents said the workshops were on specific hardware and software, rather than how to use the technology as a tool to expand and enrich the curriculum. Most respondents were dissatisfied with the training. Both participants and trainers agreed that lack of time, inadequate hands-on practice, and insufficient follow-up were weaknesses of the program.

Siegel (1995) also wrote that another respondent identified levels of training for the teachers at their school. Level one prepared teachers to use hardware and software. Level two teachers were trained to be able to evaluate software for classroom use. Level three teachers discussed how to integrate software into their curriculum and how it will help change what they are doing in the classroom. This phase concluded with teachers training teachers in small groups.

Siegel (1995) also discussed four components of technology staff development that schools are not providing: time, access, money and leadership. Extended day staff development is usually unsuccessful because it becomes infrequent. Staff development experts argue that training should be a regular part rather than an addition to a teachers' day. To claim ownership of technology teachers must have it available to them at night and on weekends.

The real showdown of staff development for technology comes when the talk turns to money. Siegel's (1995) survey showed that a few schools plan to spend more of the technology budget on staff development in the future. The schools that spent nothing still plan on spending nothing and the successful schools are still being successful because of the plan already in progress.

As all the studies in the literature point out, successful technology programs have included teachers from the planning stage. Program implementation continues with regular teacher training in a developmental process and with appropriate training for the technology. The teachers received follow-up training after achieving certain levels of efficiency. Although the ACOT study was supported by the Apple Computer Company, the implementation of the technology seems to be a complete working plan. The ACOT training staff continued training the teachers until they felt comfortable and secure with implementing the technology (Dwyer et al., 1991). The teachers in an ILS program need an opportunity to express their views also. Just placing computers and technology in the classroom or lab and doing a training workshop now and then does not ensure successful implementation of an ILS or any technological tool (Chin & Hortin, 1993).

## Summary

Consensus of the literature indicates the successful implementation of any new instructional technology program requires a detailed plan. However, while all ILS vendors may provide an implementation plan with their product, the literature notes there may be something lacking within these plans.

The first problem area appears to be within the preplanning stage in which the teachers have not been included to create a "buy in" effect. The second problem begins in the training stage of the implementation. Teachers are not being trained in a developmental process or appropriately trained to implement the program. The last problem area appears to be insufficient follow-up training for teachers after they achieve a certain level of proficiency.

According to Fullan's (1991) theory on educational change, implementation of many kinds of programs is unsuccessful. The same perception is true of some technology programs in today's schools. Fullan describes three phases to the educational change process. Phase I, adoption, consists of the process that leads up to and includes a decision to adopt or proceed with a change. Phase II, implementation (usually the first 2 or 3 years) involves the first experiences of attempting to put an idea or reform into practice. Phase III, continuation (takes 3 to 5 years), refers to whether the change gets built in as an integral part of the system or disappears by way of a decision to discontinue (p. 48).

Fullan (1991) believes implementation of educational change involves a change in practice. The change can occur at many levels, the teacher, the school, or the school district. He quotes throughout his book that "change is a process, not an event." Change

in not a single entity, it is multidimensional. The three components at stake in implementing any new program or policy are: (1) the possible use of new or revised materials, (2) the possible use of new teaching approaches and (3) the possible alteration of beliefs. Fullan believes all three aspects of change are necessary because together they represent the means of achieving a particular educational goal. All of these components involve the teacher (p. 91). The problem areas noted in the review of the literature align with the three phases of Fullan's theory.

The theory presented aligns with the literature, but what do the individuals implementing program change state? To cover all aspects of successful implementation of an ILS, a study needs to be conducted on what teachers' believe about the implementation of the ILS in their school.



## CHAPTER THREE

### METHOD OF STUDY

The method of study and the process used to select subjects and obtain data for this study are detailed in this chapter. Also included in this chapter are the pertinent demographics of the educators represented in this study.

#### Research Approval

Federal regulations and Oklahoma State University require an approval of all research studies that involve human subjects. The Oklahoma State University Research Services and the Institutional Review Board use this review to protect the rights of the individuals involved in the research. In compliance with this policy, this research project was approved and assigned the following number: ED 96-036. The last page of the document denotes this form.

#### Introduction

This study seeks to understand teachers' beliefs on successful implementation of technology in an integrated learning system. The results of these beliefs will be compared to prove Fullan's theory on educational change. An explanatory case study of a variety of teachers is an appropriate method to collect this data. The causal questions of how and why of an explanatory study lets one look at what teachers' believe in this area.

It was once believed that case studies were appropriate for the exploratory phase of an investigation. Surveys and histories were appropriate for the descriptive phase. Experiments were the only way of doing an explanatory or causal inquiry. This view has changed since the development of causal questions has become a serious concern of historians. One of the finest case studies ever done was by Graham Allison (1971), "Essence of Decision: Explaining the Cuban Missile Crises. Allison used three theories to explain one incident and suggest this explanation was applicable to other situations (Yin, 1994, p. 3).

Case studies are used in education to explain "how" and "why." Explanatory case studies have been conducted on decisions about programs, about the implementation process, and about organizational change (Yin, 1994, p. 22). Since these deal with education and ask "how" and "why," the case study is an appropriate way to question teachers' beliefs on the implementation process.

### Introduction to Methodology

Explanatory case studies using an interview and an audio tape recorder provided an excellent way to gain a thorough understanding of teachers' beliefs of technology in an integrated learning system. Using Fullan's (1991) theory to link the interviews will provide insight into future studies on improving implementation.

This study utilized Yin's (1994) method of case study and interview and Fullan's (1991) theory on educational change. Yin stated the focused-recorded interview with open-ended questions allows the investigator to provide a more accurate rendition than

any other interview method (p. 85). The respondents were given letters instead of names to protect their privacy. Because of this protection the respondents were more willing to speak in an open manner.

Yin (1994) identifies five components for the case study process. They are (1) the study's questions, (2) its propositions, (3) its unit(s) of analysis, (4) the logic linking the data to the proposition and (5) the criteria for interpreting the findings (p. 20).

The study's questions are written as protocol questions. The case study protocol is the main research instrument for the interview. The questions are focused yet open-ended. Using the focused interview lets the respondent be interviewed for an hour or less. Using open-ended questions allows the interview to assume a conversational manner yet follow a certain set of questions derived from the case study protocol (Yin, 1994, p. 63).

Besides providing research on the subject, the literature review in Chapter Two was helpful in generating ideas for questions for the interview and providing probes of inquiry for the interviewer to listen for during the interview process. The literature was also helpful in categorizing the data into meaningful information. The case study protocol questions were developed after the review of the literature. The case study questions should consist of relevant biographical questions that build trust between the interviewer and the respondent. The questions also allow the researcher to gain information used to compile biographical pictures of the educators being interviewed. The second part of the interview is the open-ended questions that are used to inquire what teachers' believe about the implementation process of technology in their school. The questions are the most important steps taken in a research study because they tell about the study. The questions keep the investigator focused during the data collection phase. The open-ended

questions allow the interviewees to expand on specific questions. The case study questions must be asked in a non-directive and unbiased manner. The interviewer should constantly be aware of facial expressions and body language so as not to agree or disagree with the respondent that would result in biased data.

The propositions of the study are the questions being asked. The proposition directs attention to something that should be examined within the scope of the study. If the investigator is forced to state the proposition then the study is given direction. Without the proposition an investigator might be tempted to wander in another direction. The proposition represents a vast narrowing of the relevant data. The more a study contains specific propositions, the more it will stay within the feasible limits. The proposition of this study is: teachers' beliefs of successful implementation of technology in an integrated learning system as an alternative teaching method.

The unit of analysis defines the case. The case may be an individual or include several individuals making it a multiple-case study. Yin (1994) quotes "Case studies have been done about decisions, about programs, about the implementation process and about organizational change" (p. 22). The definition of the unit of analysis is related to the way the initial research questions have been defined. In this case the unit of analysis is the teachers or principals interviewed.

### Research Process Used in the Study

The first step in the study was to submit a proposal to the dissertation committee and the Oklahoma State University Institutional Review Board. This proposal consisted

of three main sections: introduction, review of the literature, and methodology. A list of references used for the review of the literature, the questionnaire, and consent form were also submitted for approval.

After the dissertation committee and the Institutional Review Board approved the project, subjects for the study were selected. Each subject was contacted by the researcher to select the interview time and place. Only one of the subjects declined to be interviewed or participate in the study.

At each interview session, the respondent was given the consent form, Appendix C. The researcher explained the form and asked the respondent to read and sign it if they agreed. A copy of the signed document was left with each respondent.

With the permission of each respondent, all interviews were conducted using an audio tape recorder. After the interviews were completed, they were transcribed from audio tape to computer by the researcher. The tapes were transcribed verbatim, then the researcher checked the transcript with the audio tape to ensure the transcript was completely accurate. After the audio tapes were transcribed, the tapes and data were given to the head of the dissertation committee in order to provide a chain of evidence. After the review of the audio tapes by the head of the committee, the tapes were destroyed as required by Oklahoma State University Institutional Review Board.

The researcher went through a process of breaking down the data in various categories according to the questions that were asked in the interview. The data were organized according to the answers given for each question during the interview. The questions were written from the review of the literature. The data from the literature revealed three areas of concern on implementing new programs. The first area of concern

was the preplanning stage in which teachers were not included in the process to create a "buy in" effect. The second problem was the training stage that showed teachers were not being trained in a developmental process or appropriately trained to implement the program. The last problem area showed insufficient follow-up training for teachers after they achieve a certain level of proficiency. The questions for the protocol were posed to find what teachers believe about the implementation of technology in their school. The data were broken down into these three categories. The data were then generalized to Fullan's (1991) theory on educational change. The review of the literature revealed three areas of concern that aligned with Fullan's theory on educational change. The data were then organized and put in written form using quotes from the subjects in the presentation of data. During the analytic process, missing information was noted. A telephone contact was made to obtain data on another question. These data were added to the transcript. The data were then analyzed by using the analytic generalization of pattern-matching logic.

Multiple-case studies use the method of analytic generalization. This method takes a previously developed theory as a template with which to compare the results of the case study. If two or more cases are shown to support the same theory, theoretical replication may be claimed and the theory has been validated as predicted (Yin, 1994, p. 31). There are several techniques used in analytic generalization. They are pattern-matching, explanation-building, time-series analysis and program logic models. This study will use pattern-matching as the mode of analysis.

To provide for quality to the research, the researcher will use certain tests to check for validity. According to Yin (1994) the values offered by doing these tests include trustworthiness, credibility, confirmability and data dependability.

The researcher will use pattern-matching logic. Yin (1994) states that such a logic compares an empirically based pattern with a predicted one. If the patterns coincide, the results can help a case study strengthen its internal validity. The researcher will use a case study protocol that list the questions on the interview to be asked to check for reliability. The researcher used multiple sources of evidence and established a chain of evidence by recording the interviews and delivering the tapes to the dissertation committee to check for construct validity. Replication logic was used by developing a theory and generalizing more than one case to the theory to check for external validity (p. 33).

### The Researcher

Since this is an explanatory case study, it is necessary to establish the background and reveal the bias of the researcher. The reader will then understand the researcher's view on teacher involvement in the implementation process of programs over a period of years.

My public school teaching experience has been in kindergarten through the eighth grade. I taught kindergarten for three years for one half day and eighth grade social studies the other. When I started teaching in 1971, kindergarten had just been made mandatory by the state. I was in charge of developing the kindergarten program for the first school in which I taught. I changed schools the next year and was in charge of

developing the kindergarten program at that school. I taught third grade for five years. During these five years the accountability program was implemented. Teachers spent many hours writing their curriculum objectives to send to the state department. Teachers were going to be held accountable for what they taught. Teacher accountability instituted merit pay. Numerous schools attempted the merit system. This program offered teachers extra money if their students did well on the achievement test.

Modern math was also introduced during the 1970's. This revolutionary math supposedly taught students a new way to think, making math easier. From my experience the better students had no problem learning the new math but the slower students could not comprehend it. Numerous state mandates have been attempted, not all of which were successful.

From 1980 to 1994, I taught fourth grade math and science. During these years I saw many programs implemented by the state and the school administration. I learned something from every program implemented. House Bill 1017 brought Outcomes Based Education. Criterion Referenced Testing (CRT) and the Priority Academic Student Skills (PASS) are now in the forefront of educational programs. Besides the state and administrative mandates there are federal mandates for regular and special needs students. Inclusion appears to be in the near future. This states that children will not be singled out to go to special classes. Students must stay with their own age group to receive instruction. These are only a few of the problems in teaching. The teacher must do everything in her/his power to teach the child. A teacher must be very knowledgeable in the areas he/she is assigned to teach. They must also understand different methodologies, and recognize children's learning styles. Besides other activities the regular classroom



teacher seems to be the one who is responsible for the implementation of state and federal mandates. Teachers feel that they are never given enough time to absorb the new material before they are expected to integrate it effectively into their curriculum.

Many programs have been implemented in the past twenty years. I have always been one to accept each new program positively and try to implement it with the thought in mind that it is to help improve my teaching as well as my students ability to learn. I have always taught with an open mind. Sometimes, others may know a better way of doing things.

My current pedagogy includes cooperative learning, research, peer tutoring, plays, Lego logo building kits, and experiments involving local television weather stations. The technological environments used to enhance these projects were the database, graphics, word processor, and programming. I believe the teaching profession mandates the teaching of good citizenship, honesty, and integrity. The profession also mandates teaching students to understand other cultures and deal with moral issues of society. My approach to teaching has always been one of "explore knowledge and conquer it."

During my pursuit of a doctorate of education I have also worked full time and raised a family. I have maintained membership in professional organizations and developed my teaching skills to incorporate my knowledge of the learning curve to date. I have seen many new programs implemented in the past few years. I have listened to fellow teachers comment in frustration regarding the demand placed on their performance and time. Teachers tend to refuse implementation of new programs relative to the allotted time. Before a teacher can master the concepts of a new program and integrate it, more programs are waiting to be implemented and integrated into the daily curriculum. My high

regard for fellow teachers, interest in the integrated learning system, and observing the way technology is being used, led me to this project.

### Demographics of Teachers Used in the Study

Five educators were chosen for this project, four women and one man. All are veteran teachers with six to nineteen years of teaching experience. All educators teach in average size schools for this area, which would be from six hundred (600) students to fifteen hundred (1500) students in kindergarten through twelfth grade. The schools are located in small rural towns. One educator is also an assistant principal. All respondents were white. All respondents have a bachelor's and a master's degree in a wide range of educational fields.

### Selection of Subjects

The teachers chosen for this study were recommended by their principals. The schools were chosen because of similar size and demographics. They all use similar integrated learning systems. The principals were contacted and ask for their permission to conduct a case study, to recommend a teacher for the project and why they were recommended. The teacher was then contacted for permission to include them in the project. A second contact was made with the teacher to set up a time and place for the interview. A brief biographical sketch with relevant information of each teacher is presented. The names were changed to letters to protect the subjects.

## Presentation of the Subjects

Teacher A teaches fifth and sixth grade reading. She has taught in her present position for three years. She has a total of nine years teaching. She started teaching at the age of twenty-one and she is now forty-five years old. Her bachelor's degree is in Spanish and her master's degree is in educational technology.

Teacher A has owned a computer for ten years. She rates herself as an advanced computer user. She learned to use computers by taking classes at a university and workshops at school. She was recommended by her principal because she is the type of professional person who stays current on new ideas in education.

Teacher B teaches first grade and is also an assistant principal. She has been at the present position for eight years and has been the assistant principal for two years. She has a total of ten years teaching experience and started at the age of twenty-four. Her bachelor's degree is in elementary education. She will complete a master's degree in administration in the spring of 1996.

Teacher B has owned a computer for five years. She learned to use a computer on her own. She rated herself as a beginner on the computer. She was recommended by the principal because she is currently in graduate school and is a professional teacher.

Teacher C teaches eighth grade science which includes earth and physical science. He has been at the present position for sixteen years. He has also coached baseball and taught health education. He has a total of nineteen years teaching experience starting at the age of twenty-three. His bachelor's degree is in health and physical educational. His master's degree is in biology.

Teacher C has owned a computer for eight years and rated himself as an intermediate user. He learned how to use the computer on his own. He was recommended for this study because of his background in computers.

Teacher D is a fourth, fifth and sixth grade special education teacher. She serves her students in reading. She has been teaching for six years, starting at age thirty-one. Her bachelor's degree is in learning disabilities and her master's degree is in mentally handicapped.

Teacher D has owned a computer for ten years. She learned to use a computer on her own and rated herself as a beginner. She was recommended for this project because she has shown more interest in the computer laboratory than the other teachers at her school.

Teacher E is a fourth grade teacher. She teaches in a self-contained room. She has been teaching for eighteen years and started at the age of thirty-four. Her bachelor's and master's degrees are in elementary education.

Teacher E does not own a computer but has taken computer classes and workshops offered by the school and at the vocational school. She rated herself as an intermediate user. She was recommended for this project because she has a self-contained room and takes students to the computer laboratory.

In summary, the teachers interviewed had a combined total of sixty-two years of teaching experience in the classroom. All the teachers have advanced degrees in a wide range of educational fields. Two of the teachers are currently enrolled in graduate classes. Four of the educators own computers. Five educators have acquired some computer knowledge on their own and attended classes on their own time to learn. All the teachers

are active in and out of the classroom with school workshops, meetings and professional organizations.

## CHAPTER FOUR

### PRESENTATION OF THE DATA

This chapter presents the data obtained during the focused interviews. The data are presented in three sections: phase I, the preplanning stage, phase II, the developmental training stage and phase III, the follow-up support stage. The definitions of each stage were derived from the review of the literature and also fit Fullan's (1991) theory of the three phases of the implementation process in his theory of educational change. The stages are used to organize and analyze the data.

#### Phase I

The definition of the preplanning stage comes from the review of the literature and Fullan's (1991) book on educational change. This stage is the initial or adoption stage that consists of the process that leads up to and includes a decision to adopt or proceed with a change. According to the literature and Fullan's (1991) theory this is when teachers should be included in the process to create a "buy in" effect. Three questions were asked of the respondents about their implementation process and how they use the integrated learning system. The questions were: (1) How do you use the integrated learning system with your curriculum? (2) How would you describe the implementation process of the integrated learning system in your school? and (3) How were you included in the initial stage of the implementation process? Each question was broken down on the case study protocol into simpler questions to give meaning and clarification.

### Question One

The first question on the interview asked teachers how they use the integrated learning system with their curriculum. The more direct questions under question number one were: (1) What subjects do you integrate with the integrated learning system? and (2) How do you integrate the ILS with your class work?

### Responses to Question One

Teacher A said her school uses the reading and math programs on the integrated learning system. The computer lab is a separate class for the students. The regular classroom teachers do not take students to the lab. Prior to receiving the lab, the school purchased some hardware and software. There was a disagreement among the teachers regarding who was going to get the hardware and software. After things settled down they found that no one knew how to use the new computer equipment except one or two people. The next year a full computer lab was installed and they purchased Josten's Integrated Learning System. A certified teacher was placed over the lab. She was chosen because she had taken the initiative the year before to organize the software programs by grade level, subject and a brief summary of the program for all the teachers to use. The principal chose her to be the computer teacher when they acquired Josten's ILS. Although Teacher A has a technology education degree, she is teaching fifth and sixth grade reading. Her beliefs are that the lab could be better utilized if the schedule was altered. When the students go to the lab the computer teacher has them work on math or reading. The teachers do not work with the computer teacher on integrating classroom lessons into

the student's computer lessons. Teacher A stated that if a regular classroom teacher wanted students to work on a specific thing in the computer lab this would probably be allowed. Since the computer teacher knew the programs better than anyone and knew what information was available, the other teachers let her handle the lab the way she chose. Teacher A also stated that the computer teacher pretested the students. The computer then placed the students on a level and allowed them to work individually. The students go to the lab two times a week for forty-five minutes.

Teacher B, who teaches first grade and is an assistant principal, said their lab is programmed to work with the school curriculum. It is aligned with the Iowa Test of Basic Skills (ITBS) and the Priority Academic Student Skills (PASS). The computer lab is supervised by a teaching assistant. The lab has been in operation for five years. The lab is used as an extra class. The students alternate the class once a week with physical education, art, music, and health. Teacher B said it was used as a time filler. The students take a placement test and the computer places them on a level and they progress to the next concept. She said she does not know what the teaching assistant has students doing since the system has been upgraded.

Teacher C says his students go to the lab for science. The teacher takes the students to the lab and assigns what they will study. He states that he matches the lessons with his earth and life science. If the class is studying volcanoes in the textbook, that is what the students will use on the Josten's ILS. The students go to the lab for forty-five minutes every other week.

Teacher D teaches special education reading for grades four, five and six. The school has inclusion so she serves her students in reading only. The computer lab is



managed by a teaching assistant who has been trained to run Josten's ILS. The students take the placement test and the computer places the student at a working level. The schedule, made by the aide, is left blank for the teachers to choose a time they want to go to the computer lab. The students go to the lab for forty minutes two times a week.

Teacher D said, with the help of the teaching assistant, she has learned to find the lessons that match specific skills for her reading students. She has the teaching assistant place the students in this lesson until they have mastered the concept. She uses the lab to reinforce what she teaches.

Teacher E has a self-contained fourth grade class. She takes her students to the lab two times a week for forty-five minutes each session. The schedule is assigned by the lab attendant. The lab attendant has bachelor and master degrees in electronics and was hired by the Title VII (federal grant program) program to maintain the elementary and middle school computer labs. The classroom teacher is responsible for what the students do in the lab. Each teacher received training to find lessons and place the students in these lessons. The teacher may also leave a note for the lab attendant to put the lessons in for him/her. After the students take a placement test and the computer places them at a starting point, the students work on math one day and reading the next day. The teacher does not integrate the computer lessons with her curriculum because she does not have time and does not remember how to do it.

Three of the teachers interviewed go into the lab with their students and have control of the students' learning. Two of the teachers integrate the Josten's lessons with their curriculum. Two of the teachers do not go to the computer lab therefore they do not integrate their lessons. The labs are used for reading and math at lower levels and includes

science at the middle school level. When the lessons are integrated the teacher must look through manuals to find lessons and align them to their curriculum.

### Question Two

The second question of the interview asked the teachers to describe the implementation process of the integrated learning system at their school. The more direct questions under this one were: (1) Who got the process started? (2) Who was involved in the process?

### Responses to Question Two

Teacher A said the high school principal started the process at their school. They had some computers at the intermediate level. They purchased more computers and the Josten's Integrated Learning System five years ago with the textbook money instead of buying books. They purchased the reading and math program from Josten's Learning Corporation. Teacher A believes the school personnel involved in the implementation process were the superintendent, principal, counselor, the teacher selected to be the computer teacher and a few classroom teachers. When asked if all the teachers had input in the decision she replied that only the computer teacher would use the lab so there was no need to include all the teachers. Administration decided to purchase a network lab so teachers did not need to be consulted. The year before the teachers disagreed about the hardware and software the school had purchased.

Teacher B said their computer lab began with a grant to up-date technology. The Federal Programs Director wrote the grant for Chapter One and received money for the labs. She believes the people involved in the implementation process were teachers, parents, business personnel and administration. Two or three teachers were asked to serve on committees because they had not served on a committee for some time.

Teacher C believes the middle school principal initiated the implementation process at his school. He says the principal was interested in acquiring computers in all classrooms. He did not know who was involved in the process besides the principal but possibly the reading teacher and the superintendent.

Teacher D says the Chapter One teacher launched the computer implementation process at their school. She said, "We first got computers through the chapter program then some of the equipment was bought through the gifted program. The chapter teacher ran the lab for the first two years. Now it is run by a teacher's helper." The principal and the counselor were involved in the process. The teachers were involved by being asked to visit other schools to view the Josten's ILS program. Teacher D thinks the program will be successfully implemented if the teachers use it appropriately. She believes the chapter teacher is responsible for the success of the program.

Teacher E says the chapter teacher initiated the implementation process at their school. The chapter teacher heard about the Josten's program and its' success at a chapter meeting. She encouraged the Federal Programs Director to write a grant for the school. The grant was funded for the project. The superintendent and the principals were also involved in the process.

### Question Three

The third question under the preplanning stage asked the teachers how they were included in the initial stage of the implementation of the integrated learning system. The more direct questions that were listed on the protocol were: (1) Do you feel you were included in the process? (2) Do you feel you should have been included? and (3) Do you think being included in the process gives the teacher a desire to use the computers more than if they had not been included in the process?

### Responses to Question Three

Teacher A was not at the present school when the computers were installed. She still felt she was a part of the process because she was allowed to view software. She quoted, "This school already had their lab set up. But every time they got ready to buy new software, the administration would send a team of teachers to look at software being shown. The new software was then placed in the lab for a few days for review. The administration was good about letting us order software through the library." She said that although she was not at this school to be included in the process, she thought being included in the process would give the teacher more of a desire to use computers than if they had not been included in the process.

Teacher B said she was not included in the process and felt that all teachers should have been. She was asked how she and others felt about not being included in the initial stage of implementation.

Speaking for myself, I felt left out. I felt like they were trying to shove something on me after everything was in place. I didn't have anything to do with the selection of it, and it's a lot easier to make people feel a part of things if their a part of the entire process. So, when it came time for us to go to the workshops to learn how to use the lab, I was a very rebellious person. I'm just that kind of person (Teacher B, p. 6).

Teacher B indicated that she was thrilled when she heard the school was purchasing computers. She thought she would get a computer in her room. When the computers were placed in the lab and none of the teachers were allowed to use them Teacher B said her attitude was very rebellious.

Teacher C stated he was not included in the process of purchasing computers but he was consulted later. The principal asked him to view the Josten's ILS program. He thinks he should have been included in the process. He believes he was asked to view the program because he teaches all middle school science and the school was purchasing the Josten's science program. He was already involved with computers. He thinks if teachers feel they are a part of the initial process it would not be as difficult to encourage them to use the computer appropriately and attend training workshops.

Teacher D believes she was included in the initial process because she taught in the lower level and she felt the school wanted to be sure to start with a bottom-up approach. She said that being included in the process gave her more reason to use the computer lab with her students.

Teacher E does not feel she was included in the initial process. She stated she thought all teachers should be included in the initial process. Teachers would have a

better understanding of the Josten's ILS program and would feel more comfortable working with it. She agrees that if she had been included in the process it would have given her more of a reason to use the computer lab.

## Phase II

From the review of the literature, the definition of phase II, the developmental training stage, is the time during which teachers rationalize inner conflicts as they attempt to use technology in education. They have to change their methods of teaching, beliefs and materials. A teacher must go through a developmental training stage to learn technology before using it as a teaching tool in the classroom. According to Fullan's (1991) theory on educational change, phase II is the implementation stage (usually the first two or three years) and involves the first experiences of attempting to put an idea or reform into practice. Fullan (1991) cites Schoon (1971) as stating that all real change involves passing through the zones of uncertainty . . . the situation of being at sea, of being lost, of confronting more information than you can handle. He states that the three components at stake in implementing any new program are: (1) the possible use of new or revised materials, (2) the possible use of new teaching approaches and (3) the possible alteration of beliefs (p. 31). Three questions were asked on the case study protocol under this stage of the implementation process. They were: (1) How would you describe the type and amount of training you had to implement the ILS with your curriculum? (2) Did you use new materials, new teaching methods and alter your beliefs when you started using the ILS program? and (3) Describe how you felt about these changes?

#### Question Four

The fourth question asked teachers to describe the type and amount of training they had to implement the ILS with their curriculum. The more direct questions under this question on the protocol were: (1) What type and amount of training did you have at the beginning of the implementation? (2) What type and amount of training did you have after you felt confident with what you had learned? and (3) Did the training teach you to integrate the ILS with your curriculum?

#### Responses to Question Four

Teacher A stated her school has not provided any computer training in the three years she has taught in this position. Her computer training was on her own time and in college but not on an ILS. She has a degree in educational technology. She took computer training because it was what she chose. She also stated that additional training was necessary to stay current in her field. Teacher A reported that she was not present in the training stage. Since the computer teacher would be the only one in the lab, she received the training. She noted the training enabled her to integrate the ILS with the curriculum.

Teacher B seemed upset about the training provided by her school. She stated the following words.

We've had no training. We went in for a workshop and I caught the tail end of one workshop or the beginning of another because I was on duty. The trainer said, 'OK turn on your computer and this is what the children will be

doing.' I felt like I was being made fun of when Josten's went through the programs (Teacher B, p. 8).

Teacher B stated that the amount of training she received was minimal. She said she attended a workshop for three hours one day after school. When the lab was up-graded she attended another two hour session. She said it just seemed like a different approach to enter the ILS system. The program did not allow students to advance until they met mastery level skills. She reported that the lab attendant did not offer training, but did monitor the system. If the lab attendant was absent for some reason, the lab was left locked until she returned. No one was allowed in the lab without the attendant.

Teacher B was asked if the training was enough to make her feel confident to integrate it with her curriculum. She stated the following words.

I have begged to go in and spend time on the computers, even for my own personal benefit, so I could learn more to do with them (computers) so I could use them with my classroom. I have what is called the top section of first grade this year. I am dealing with children that are very intelligent and they get bored very easily. They need this technology, and they need to be able to have this hands on experience. Not only that, I have some children who are very tactile learners and visual learners and they are going to need this as well. I have been begging for a computer in my classroom. Just give me one old one but I can't seem to get them to do that either. As far as being able to go in and use the lab, I've had no time (Teacher B, p. 8).

Teacher B says the training did not teach her to integrate the ILS with the curriculum. She stated that materials are available for help with integration.



There are books in the lab that are at our disposal that tell every portion of the program that Josten's Integrated Learning System will run. If we decide that we want to pick out a section for a particular student by digging through all this material and run a comparison with our curriculum, we can leave a note for the lab attendant and she will plug the student into a certain lesson. With the responsibilities of being assistant principal and a first grade teacher, I have not had time to do that. I feel like it is cheating my students, but I just don't have time (Teacher B, p. 9).

Teacher C said his school provided a four hour session on the weekend for two or three weeks. He said he felt confident as far as knowing what the program offered and how to integrate it with his curriculum. He did not feel confident about knowing how to change the lessons, but he would like to learn. He stated that the training did not teach him to integrate the ILS with his curriculum, but he knows how to find the topic he is covering in the Josten's manuals and write down the lesson numbers so the lab attendant can plug in the lessons he wants.

Teacher D reported that most of the training for their teachers came from the Chapter One teacher and her assistant. She said, "They have always been in there to show me how to pick out the programs I need and show me what to do. We did have an inservice when we first got the computers. It was an introductory thing for two or three hours" (Teacher D, p. 8). She stated that she was not provided more training but the lab attendant received further training. Teacher D noted that she used the lab more than other teachers. She reported that scheduling was a problem. The lab attendant left the schedule blank and the teachers could sign for a time to go to the lab. Attendance was voluntary.

She felt that most of the teachers visited the lab at least once a week. She was the only teacher visiting six times a week because of her class levels. During introductory training the Josten's trainer suggested integrating the computer lessons with curriculum. She felt she had received enough training as long as the lab attendant was able to provide assistance.

Teacher E stated, "We had a two hour session at the beginning and then we were expected to go in on our own time to practice and there was never enough time to become familiar enough to use the program." (Teacher E, p. 9). She indicated not enough training was provided to achieve program competency.

When Teacher E was asked if the training was enough to make her feel confident to integrate it with her curriculum, she replied, "No, there was not enough repetition or work on the computer. Not being familiar with a computer to begin with and having to learn the computer as well as a teaching program was just too much. There was not enough time to absorb all of that and learn how to integrate it also" (Teacher E, p. 9).

Teacher E stated, "Josten's came back two or three times a year during the planning period. They made a stab at teaching teachers to integrate the ILS with the curriculum. That's one of the things that really held me back. There was just never enough time and not enough practice to use the program" (Teacher E, p. 9).

#### Question Five

The fifth question asked teachers to describe the personal changes they made during the implementation of the ILS with their curriculum. The more direct questions on

the protocol asked: (1) Did you have to change your teaching materials, if so, what new materials did you use and how did you feel about it? (2) Did you have to use new teaching methods, if so, what new methods did you use and how did you feel about it? and (3) Did you have to alter your beliefs, if so, what beliefs were altered and how did you feel about it?

### Responses to Question Five

Teacher A reported she did not use new material because she was not taking students to the lab. Having a technology education degree trained her to use the computer as a teaching tool. She said if she did take students to the lab she would be required to use new material because new methods bring new materials. She stated that it would not bother her to use the new material because that was part of teaching and staying current with new methods. At the school she taught in before this assignment, the new material included computers, manuals for the new programs, and new programs.

Teacher A stated that using new teaching methods would also be required because teaching with technology required using different teaching strategies other than the traditional teaching methods. She believes the teacher becomes a collaborator when teaching with computers. The teacher relinquishes some of the control over the students in order for them to learn on their own. She used groups and peer tutoring with projects. She felt good about using new teaching methods because she was getting to use what she had learned.

She stated that teachers would also need time to adjust their beliefs about how students learn. She said she had to change her beliefs about whole group instruction for every subject and individual work. She did not use the ILS at the other school. She feels she went through the anxiety stage as she was working on her technology education degree.

Teacher B noted the times she attempted to use the lab to integrate. She had to use the material provided by Jostens. She did not like looking through the books trying to find the concept that aligned with what she was teaching because it took too long. She felt the Josten's manuals were not written to be user friendly. She had a computer at home and was already comfortable with the idea of having computers in the classroom. After using a computer at home she realized the it could be used as a teaching tool. She said she felt computers would benefit students if they were used to their potential. For computers to be used to their potential, teachers have to change their teaching methods. When she found out her school was purchasing computers she was thrilled. She thought she would have a computer in her room. She was informed that the computers were for a lab and the teachers would not be taking their students to the lab. A lab attendant would take care of the computer lab. She felt disappointed the computers would not be used the way she thought. She felt she had already changed her beliefs to include computers in her curriculum and knew how she would use them. She believed the extra work with new materials and methods would benefit the students.

Teacher C reported that he used new teaching material in a different format. The computer material was not aligned with the books but it was still the same material as his science books. He felt that additional material in a different format was a minor change.

He felt that he had changed his teaching methods because he was using an alternative way of presenting the lesson. He was very adapted to the computer and welcomed the change. He felt he did not alter his beliefs because he thinks teachers should always look for new ways to present material to their students to keep them motivated. He was very excited when his school received computers because it would add a new dimension to the students learning.

Teacher D stated that she had to use new teaching material, including computers and program manuals, but it did not bother her. Being a special education teacher to her meant being able to adapt to change. She said there are many new rules and regulations every year required by the government concerning special students. She thought teachers would have to use new teaching methods, but she had to use so many different methods with her students another change was not frightening. She had to relinquish part of her control over the students to the computer. She said she had to alter her beliefs because she was afraid of computers in the beginning. She knew the change would benefit her students so she managed to change and felt she had benefited as well as her students.

Teacher E stated she had to use new materials to use the computers. She thought it took too long to find the lessons in the Josten's manuals to use with her concepts. The computer manuals were not available when she needed them so she would have to wait and found this very irritating. She said that she would have to change her teaching methods and her beliefs about the way students learned if she used computers the way they were supposed to be used. She does not use them and she does not like going to the lab because it takes time away from her teaching. She felt that her students would learn

more from her teaching in the classroom than in the lab having fun and wasting time. She does not like to change and does not want to learn how to use computers.

### Phase III

Phase III, the follow-up support stage is the time after the program has been implemented and everyone is integrating it with the curriculum. The literature notes that after a teacher is trained and working successfully that follow-up support needs to be available for new hardware, software and training for new teachers. According to Fullan's (1991) theory on educational change the third phase is called continuation and refers to whether the change gets built in as an ongoing part of the system or disappears by way of a decision to discard.

### Question Six

The sixth question on the interview was: How do you feel about the follow-up support your school has provided since you have had the ILS? The more direct questions listed on the protocol were: (1) After you learned a certain amount on the computer, did your school provide more training? (2) When did the training take place? and (3) Were you provided class time to go to workshops?

### Responses to Question Six

Teacher A stated that since their teachers do not use the computers follow-up training was unnecessary. The computer teacher has received additional training.

Teacher B reported initial training had to be on planning or break time. Class time was not provided for any training. The school attempted to set it up on planning periods by grade level when the Josten's lady came for training. The system had been upgraded and a Josten's trainer had returned for a short workshop during their planning time.

Teacher C claimed the ILS had been upgraded but no more training was offered to him. His initial training was after school and on weekends.

Teacher D stated that no more training was provided but teachers had the opportunity to visit another school that used the Josten's ILS. This was considered a part of their staff development plan. She says the teachers will do the same thing again next year.

Teacher E noted the Josten's trainer returned during one or two planning periods to teach them how to integrate the ILS with their class work.

### Question Seven

The final question was asked to ascertain what teachers considered to be a successfully implemented ILS program. The first part of the question asked if they thought the ILS was successful or not at their school and who they felt was responsible? The last part of the question was: pretend the ILS is successfully implemented into your school, how would you describe a scenario in the classroom or lab? The more direct questions on the protocol were: (1) How would you have the class set up? (2) How would you manage discipline? and (3) What would the students be doing?

Responses to Question Seven

Teacher A considered the integrated learning system successfully implemented in some ways. She would like to see more input from the teachers on what the students study on the computer. She would like regular classroom teachers to have the availability to also use the network. She said the teachers use the Apple IIs and the Packard Bell computers in the library. She stated that the Teacher Grade Book is set up on the Apple IIs and some of the teachers use it because it is more user friendly than the Packard Bell computer. She noted that knowledge of available software was the main problem. Chapter One projected the purchase of a new Macintosh computer lab and software. Some of the teachers are considering purchasing additional Macintosh software for their classes if money is available. She stated that out of the twenty teachers in her building only five or six of them use the computers in the library. She indicated the teachers are afraid they will mess up the programs. She stated that teachers do not know how the computer works and what it can do for them and their class. She felt the principal and the computer teacher were responsible for the success of the ILS.

Teacher B does not believe the ILS program at her school is successfully implemented.

I do not feel like they [students] spend enough time in the lab. I feel like I could better use them [computers] in my room. I wish they would give me three computers and a printer in my room and let me have at it. Let me buy my own software. Let me do what I want to do with them (Teacher B, p. 4).



She was asked what she might do if she was allowed to take her students into the computer lab.

That would be great, but around here we're not treated like we have a lot of knowledge about computers. We have not even been shown how to turn them on, or how to implement the program. They treat us like we are computer illiterate. Don't touch that computer, they haven't been turned on. What do you do? You turn them on. I know how to set those things up. I have a computer at home. But, if you are not on the first initial team that Josten's came down and trained, you aren't allowed to touch the computers (Teacher B, p. 4).

Teacher B does not feel the ILS program has been successful and it is the fault of the entire school system.

We have invested that much time [five years], effort and money and it's not being utilized to its potential. It doesn't set idle, but the person who is over the lab is not a certified teacher. She is paid by Title Seven. She runs off our papers and copies in the morning and takes the classes in the afternoon. To me it is more or less a time filler, either they go to art, music, health and physical education or computers. They rotate so that's why they go one time a week. The older students [fourth and fifth grade] run through the same schedule as the first graders. The gifted and talented class do use them [computers] a little more often like one afternoon a week, but they are set up to run a totally different program (Teacher B, p. 5).

Teacher C feels the ILS program is successful but would like to have more lab time for his students. He believes the integrated learning program is successful because of the type of program it is. He believes that ninety percent of his students enjoy the lab and believes it helps raise the standardized test scores.

Teacher D thinks the program is successfully implemented if the teachers use it appropriately. She believes the chapter teacher is responsible for the success of the program.

When asked if she considered the ILS program to be successful in her school, Teacher E stated, " I can't really answer that because I don't know enough to know what is successful about it" (Teacher E, p. 5).

Teacher A described the following scenario for a successfully implemented ILS program.

In my classroom I would have at least four computers at a station. I do lots of group work. I would have a group there. I would have them working in pairs, teams, or individually, or in a group. I would use it that way so I could work with each group or individual. I would let those on level work at their own pace and keep up with them from a management standpoint, providing the software would let you. Then I would rotate the groups. I would also like one [computer] to use for word processing just by itself. I would use the ILS in reading. I would target certain skills and let them work on that. I have found in the past that the ILS is more successful than workbook pages. It is technically the same skill but there's a lot more enthusiasm for this format. They get feedback immediately and it tells

them why they got it wrong. With small groups I do not have a lot of discipline problems because I have to give them so much attention (Teacher A, p. 13).

Teacher B noted several ways her students would use the ILS if she could use it in her classroom.

If the ILS was successfully implemented, I could see my children using it in different ways. I see it as busy work right now. I would have my students writing stories on the word processor and adding pictures to their stories. They would be into technology more than what they are now. Right now they could play Nintendo and get as much out of it. I would rather it be stationed in my room so that I could use it to teach with and benefit the students. The way it is being used now does not benefit the students. We have the ability to say 'Oh yes, we have computers in our lab and we have the Josten's ILS program.' But, between you and I, it is not a successful program for the amount of money spent on it (Teacher B, p. 13).

Teacher C stated he would use the system as he is using it now. For instance, he teaches the classification system in the book. Josten's ILS has a classification system in the lab. He has the students complete the Josten's lessons before going into the classroom. The classification program gives them practice in classifying the characteristics and when we get to the text it makes it easier for the students to understand. He says that the only discipline problem he has confronted is students viewing each others screen. If this happens he may have to separate certain students. He generates reports and uses the grades as extra credit.

Teacher D says she views successful implementation of the ILS as the way she is doing it now. She divides the special class reading groups and selects lessons on their level and specific skills. The students work individually in the lab. When a student finishes one skill he moves to another. The teacher notes that students become bored when they stay in the lab for forty minutes. This year she only takes them for twenty-five minutes. She says her group is so small she does not have any problems with her fourth, fifth, or sixth graders.

Teacher E would visit the computer lab two times a week for forty to fifty minutes. She believes the students would benefit from working in small groups or pairs. She would have the students continue working on a concept they had been working on in class. She would do supplemental activities that would strengthen their knowledge. They have been studying about multiplication as a short way to add and then she would have them do the same thing on the computer to develop a stronger background in multiplication.

### Summary

The presentation of the data revealed the thoughts, feelings and beliefs of teachers on successful implementation of the ILS. The presentation of the data was divided into three major categories: the preplanning or adoption stage, implementation or developmental training stage, and continuation or follow-up support stage. The preplanning stage data was then broken down into the following sections: using the ILS with curriculum, the implementation process at each school, and if they felt they were

included in the initial stage of planning. The implementation or developmental training stage was separated into describing the type and amount of training and their feelings on: changing the materials they used, the new teaching methods and if they had to alter their belief system about teaching. The continuation or follow-up support stage asked teachers about the support their school provided in training or new equipment since the purchase of computers. The last question was asked to understand how teachers would use the ILS differently.

The various subtopics of the data would often fit into more than one category. As the interview progressed the respondents would often get on their soap box. The information was arranged by the researcher to fit the appropriate questions. Quotations were used to express strong feelings and provided insight into the respondents' feelings.

The next chapter will be an analysis of the data, comparing the responses of the teachers with the literature and Fullan's (1991) theory on educational change. The data will be presented in categories of agreement or disagreement with Fullan's (1991) theory and the literature.

The data will be analyzed in three major areas: phase I, the preplanning or adoption stage, phase II, developmental training or implementation stage, and phase III, continuation or follow-up stage. Each area is broken down into subtopics for organizational purposes.

## CHAPTER V

### ANALYSIS OF THE DATA

Chapter Five presents an analysis of the data that was presented in Chapter Four. Data analysis consists of examining, categorizing, and recombining the evidence to address the initial propositions of the study. The data will be analytically generalized to Fullan's (1991) theory on educational change. One method of analytically generalizing is theoretical propositions. The results of the study are compared to a stated theory. Pattern-matching is a mode of analysis under theoretical propositions that compares an empirically based pattern with a predicted one. If the patterns agree the internal and external validity of the study is strengthened. Using this method, the data will be broken down into areas of agreement and disagreement. There will be three major categories of discussion: phase I, the preplanning or adoption stage; phase II, the developmental training or implementation stage; and phase III, the follow-up support or continuation stage.

#### Background

The respondents were asked how they used the integrated learning system with their curriculum for background purposes. All schools have a Josten's ILS and have about the same size student body.

Teacher A teaches fifth and sixth grade reading. At her school the students go to the computer lab and the curriculum is not integrated with the computer activities. The

computer lessons are selected from the score each student achieved on the basic skill inventory test. Each student works at his/her own pace and advances according to mastery. The teachers do not go to the lab. The students visit the lab one day a week under the supervision of the computer teacher.

Teacher B teaches a self-contained first grade class and is assistant principal. At her school the computer lab has been set up to align the curriculum objectives to the ITBS and the PASS objectives. Students go to the lab one day a week under the supervision of a lab attendant. Each student works at his/her own pace and advances according to mastery of the concept.

Teacher C teaches eighth grade science. He takes his students to the computer lab and monitors what they study. They work in the lab forty-five minutes every other week. The teacher integrates the computer lessons with his curriculum.

Teacher D teaches fourth, fifth, and sixth grades special education reading. She takes her students to the computer lab two times a week and has input into what they study and aligns the lessons to the curriculum. The lab attendant has been trained to integrate the computer lessons with the curriculum. She helps the teachers align concepts and places lessons on the computer for them. Teacher D is in the lab six times a week. The students work individually.

Teacher E has a self-contained fourth grade class. She takes her students to the lab two times a week for forty-five minutes. She does not align her curriculum with the concepts the students will work on for that day. Each child works on an individualized curriculum. The placement was made by the computer after the students took a basic skills test. She says she does not have time to align the curriculum with the computer

concepts. A lab assistant is available to place lessons on the computer if the teacher leaves a list of the lessons she wants added.

From the respondents' answers to question one the following generalizations were made: two of the teachers align the ILS with their curriculum, one of the teachers does not have the time, and the other two teachers do not have the opportunity to have input into this part of their students' learning. This background will help the reader understand the analysis of different situations presented in this chapter.

## Phase I

### The Literature and Theory

Fullan's (1991) first phase is the initial or adoption phase. The literature called this phase the preplanning stage. The first phase consists of the process that leads up to and includes a decision to adopt or proceed with a change. The change can be initiated by different people for different reasons. The personnel having the most access to new programs and the most likely to initiate a program would be the administrators, consultants, and coordinators (p. 48). Robinson (1992) stated the successful adoption of any technological innovation requires the informed consent of the administration. Teachers can also initiate change. The teachers hired under federal programs attend regular meetings for improvement to meet guidelines. These teachers also have access to information that regular teachers do not. Question two refers to this part of the theory.

According to the literature and the theory, during this phase all teachers should be made to feel a part of the implementation process by being included in the decision-making



stage. If teachers feel a part of the process, the chances of successful implementation are greater. Some administrators only include a few teachers. This appears to other teachers that they are being left out (Fullan, 1991, p. 127; Murphy, 1991). For the adoption phase to be successful, teachers need to be included in the initial process. Both goals and roles need to be clearly stated and communicated by the principal. Question three is answered in this area of the theory.

### Areas of Agreement

The first part of the second question was to understand the teachers' beliefs about who started the implementation process. Two of the teachers believe the principals of their schools started the implementation process. Three of the teachers believe the Chapter One teacher initiated the process at their school. The Federal Programs Director wrote the grant and the grant was approved for the school. These responses agree with Fullan's (1991) theory that anyone can initiate change and it is usually initiated by administrators or teachers who have more access to the knowledge of new programs than regular classroom teachers.

The second part of question two was to ascertain teachers' beliefs about who was involved in the process. All the teachers agreed the personnel involved in the implementation process at their school included the administration and one or two teachers. One of the schools included a few business people and parents from the community. According to Fullan's (1991) theory this is the way the process has been done and it is one of the problems with the process.

The third question was to investigate teachers' feelings about being included in the implementation and if being included would have made the program more successful. Three of the five teachers interviewed felt they were not included in the adoption or preplanning phase. There are always different situations to be considered. Two of these four teachers felt they had been included shortly after the computers were purchased. They felt included because they were asked to view the software to be purchased. They felt they were asked to view the software because of their computer knowledge. There were other teachers in their schools who were not included in the process. Being included after the decision was made does not mean being included in the process. However, the principal made them feel more included than other teachers by asking their opinion..

Three of the respondents felt they were not included in the implementation process. All respondents felt they should have been included. All respondents felt that being included in the initial decision-making process would give a teacher more of a desire to use the ILS appropriately. This attitude agrees with Fullan's (1991) theory and the literature. Fullan (1991) states that all teachers should be included in the decision making process because this increases the chances of successful implementation (p. 127).

#### Areas of Disagreement

One of the teachers felt she was included in the adoption phase. As the interview progressed and she understood Fullan's (1991) definition of the adoption phase, she still felt she was included. She said some of the other teachers were not included. She felt she was included because the school wanted to be sure to include some of the lower grade

teachers so they would be sure to use the ILS. The principal asked her to visit another school and view their Josten's ILS. This act made her feel included. Another teacher felt included because the school allowed her to view software each year. She was not at this teaching position when the ILS was adopted. Fullan (1991) disagrees with this type of inclusion. He feels teachers should be included in the initial decision-making process to feel included.

## Phase II

### The Literature and Theory

Phase two includes the implementation phase or the developmental training stage. This phase involves the first experiences of attempting to put an idea into practice. During this phase of training the teachers rationalize inner conflicts as they attempt to use the technology. According to Fullan's (1991) theory teachers may be affected by three components during the training stage. The three components are: the possible use of new and revised teaching materials, the possible use of new teaching approaches, and the possible alteration of beliefs. The questions were formed to investigate the type and amount of training offered the teachers during the implementation process and the changes they had to make using new materials, new teaching methods and in their beliefs. The literature identifies one of the main problems during the implementation phase as--teachers not having enough training and time to go through a developmental learning process to use the ILS with their curriculum. They are not given enough time to get acquainted with

the computers, new teaching material, new teaching methods, or resolve their true feelings and beliefs about using computers (Dwyer et al., 1994; Marcinkiewicz, 1993-94).

### Areas of Agreement

The fourth question asked teachers to describe the type and amount of training they went through to prepare them to implement the ILS with their curriculum confidently and appropriately. One of the teachers had no training because the schedule did not allow her to take students to the computer lab. Another had minimal training but was not allowed to take her students to the lab. The other two teachers had introductory training but had a lab assistant available for information. Four of the teachers agreed they did not have enough beginning training on the ILS.

A subtopic asked if the training made them confident to use the computers. Four of the teachers said they did not have enough training to give them enough confidence to use the ILS program. Two of these four teachers take their students to the computer lab. One teacher has the lab assistants help in using the computer. The other teacher said she did not have enough repetition on the computer to feel confident with using the computer.

Another subtopic asked teachers if training was provided to help them integrate the computer lessons with their curriculum. Four of the teachers stated that no training was available to teach them to integrate the ILS with their curriculum. One of the teachers felt she had been introduced to integrating the ILS with her curriculum. The teacher said she still felt inadequate to integrate the ILS with her curriculum.

Fullan's (1991) theory states that real change involves loss, anxiety and struggle. He thinks teachers have to work through these problems for real change to take place. These changes involve having enough experience and training on the computer to move to the next stage of implementation. Four of the teachers agree with this theory. They felt they did not have enough training and experience on the computer to integrate the ILS with their curriculum. One teacher felt he had enough training but not with integrating the ILS.

Question five asked the teachers about using new materials, new teaching strategies, and changing their beliefs and how they felt about each new aspect. Each educator agreed that it would be necessary to use new teaching materials to adapt to the change of using computers. The new material to be used would include computers, computer programs, program manuals, and computer generated reports. Four of the teachers felt they already knew how to use the computer. One teacher is still at the beginning stage. Two of the teachers felt the change of using new material took too long to find information and they would rather not have to do it. They felt their time was wasted trying to find information because the teachers' manuals were not available when they were doing their lesson plans. One of the teachers felt the manuals were not organized to find the information easily. The other three teachers said using the new materials would not bother them. They expected to use new material if something new was introduced.

All educators agreed that new teaching approaches would have to be used in integrating computers with their curriculum. Going from the role of teacher in front of the classroom to letting a computer present the lesson is a dramatic change for a teacher.

They felt the computer took away part of their control. The ILS was in charge of what the students would learn. They were accustomed to teaching from a book and this new alternative way of teaching was totally different. Some of the new teaching methods included cooperative learning and peer tutoring. The teacher had to be a collaborator and facilitator.

Four of the teachers agreed that their beliefs had to be changed from the traditional teacher role to using the ILS with their curriculum. They felt the teacher must take on the role of collaborator. Their beliefs had to change in letting the students have more control over what they learn. The teacher had to change from whole class instruction to individualized instruction. The most important belief was that the teacher had to believe the extra work she did in preparation for her to use the ILS would enhance the students' learning.

Fullan (1991) states that teachers will be affected by the three areas discussed and that they must have time and training to work through the conflicts that arise in each area.

Four of the teachers agreed they did not have enough time and training on the ILS. Five agreed that new material would have to be used. Five agreed new teaching methods would have to be used. Four agreed new beliefs would have to be intact to use the ILS appropriately.

### Areas of Disagreement

The area of disagreement was illustrated by the teacher who received the most training. He had been using a computer in his classroom for several years. He felt the

training was enough for him. He stated that he had about ten hours of training and he felt confident about using the computers. Having used computers before made the above teacher comfortable with the aspects of the change and let him concentrate on the new program.

One teacher disagreed about altering his beliefs. He felt teachers should always look for new ways to present material to their students to keep them motivated. He was very excited when his school purchased a computer lab. The lab added a new dimension to the students' learning.

### Phase III

#### The Literature and Theory

The continuation or the follow-up phase is the time (after three or four years) after the program has been implemented and teachers are integrating the program with their curriculum. Fullan (1991) stated it is the time in which the change gets built in or is discarded (48). The literature indicates that the process comes to a standstill because the federal monies have ended and the school cannot carry the expense for continuation (Siegel, 1995). Fullan (1991) also stated that continuation depends on whether the change has generated a mass of administrators and teachers who are skilled and committed to the change. This phase also depends on establishing procedures for continuing assistance for supporting new teachers and administrators (p. 89). Teacher and administrator turnover are one of the biggest problems in the continuation phase. Money is another problem in the continuation phase (Lauro, 1995).

### Areas of Agreement

Question six asked teachers about the continuation or follow-up support for their school. The support would include additional training for teachers, new software to update the programs and eventually new hardware to replace the obsolete. Each teacher agreed that additional training was not available. One teacher stated that her school used a computer teacher to keep down the expense of training all teachers. Three agreed the update on their ILS was purchased in the original contract with the Josten's Learning Corporation. No other hardware had been purchased. Fullan (1991)) stated that a plan should be in place from the beginning for additional training and materials. The teachers' responses agree with the theory that additional training was unavailable. The school's improvement plans were written in the federal grants and those plans have been or are still in the process of being carried out but new plans need more money and most small rural school budgets have been cut due to cuts in the federal programs.

### Areas of Disagreement

The area of disagreement is that one school intends to purchase a new lab of Macintosh computers for the coming year. Their current program is five years old. This school purchased the first lab with textbook money. They plan on using Chapter One money for the new lab. They have a plan, but the money for next year has not been appropriated.



### Successful Implementation

The last question asked teachers if they thought the implementation was successful and who was responsible for the success. According to Fullan (1991) programs having the active support of the principal were the most likely to do well and those that are not supported are likely to fail. He also stated that the principal's actions toward the program determine whether the teachers take it seriously or not and whether teachers are supported psychologically and with resources (p. 76). Teachers are also responsible for the success of the program. The respondents' answers agreed with Fullan (1991). One teacher considered the ILS program successful at their school and felt this was due to the efforts of the principal and the computer teacher. Another teacher attributed the success of their program to the principal and to Josten's Learning Corporation for writing this type of program. Another attributed the success to the chapter one teacher. Another believed the program to be unsuccessful and placed the blame on the administration. The last teacher did not know if the program was successful because she felt she lacked the knowledge to answer the question.

The second part of the last question was asked to understand if teachers would use the ILS differently than the scheduled way if given the opportunity. They were asked to describe a scenario of successful implementation of the ILS with their class. According to the literature successful implementation of the ILS or technology included using it in variety of ways. The ACOT experiment began with teachers using the computers for drill and practice. The next stage brought technology integrated with traditional classroom practice. The technologies used were word processors, databases, computer assisted

instruction and graphic programs. As the teachers evolved instructionally, they observed students moving toward working collaboratively with other students on long term projects.

Teacher A disagrees with the way her school uses the ILS program. She teaches fifth and sixth grade reading and would like to take her students to the lab. The computer teacher is the only one allowed to use the lab. She stated that she would have the students work in pairs or groups. She would have a station of four computers. She would have other activities operating at other stations and would rotate the groups. She would like to have another station of four computers with printers to use for word processing. She said she would have the students use the ILS for reading skills because she had found that students enjoyed that format over workbook pages. With small groups and directed attention she would have no discipline problems.

Teacher B disagrees with the way her school has used the computers. She says she would have the computers stationed in her classroom. She would have her students using the word processor to write stories and add graphics. She stated her students would be into technology more than what they are now. She feels the students would benefit greatly from the reading and math skills the ILS presents.

Teachers C and D feel they would use the ILS system the same way they are using it now. Teacher E would use the system differently if she had the time to get enough experience on the computer to know what she was doing. She stated she would have the students working in small groups or pairs because she believes this would benefit the students. She would use the ILS as a supplementary activity to strengthen the concepts taught in class.

## CHAPTER VI

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Chapter Six will present the major points of this study, report the findings and conclusions, discuss recommendations for further study, and provide final comments.

#### Summary

This study sought to validate Fullan's (1991) theory on educational change. An explanatory case study outlined by Yin (1994) was used to compare teachers' beliefs to Fullan's (1991) theory. The literature was used to present the problems with the implementation of the ILS in some schools and successful models in other schools. A study of this kind is important, especially in the area of technology, to allow teachers to express their feelings on the subject, since they are rarely asked for their opinion. If technology is going to be successfully implemented, teachers need to be a part of the process and be given enough time and practice to absorb all the changes one must go through to reach the point of willingness to use the computers appropriately to enhance their teaching.

Chapter One presented the structure of the study. It presented: (1) an introduction, (2) the background which contains the literature that revealed the weak areas within the implementation process (3) a plan of study that revealed Fullan's theory on the three phases of implementation, (4) Yin's method of an explanatory case study, and (5) a brief introduction of each chapter of the study.

Chapter Two discussed a review of the literature related to Fullan's theory on educational change. The literature was presented in two sections: (1) the ILS: its promises and problems and (2) Fullan's (1994) theory and the literature. Fullan's theory and the literature were presented in the three phases of implementation.

Chapter Three discussed the: (1) method of study, (2) research approval, (3) introduction to methodology, (4) research process used in the study, (5) researchers biases and background, (6) demographics of subjects, (7) selection of subjects, and (8) presentation of the subjects.

Chapter Four presented the data acquired from the respondents in three sections: (1) phase one, (2) phase two, and (3) phase three. Each phase was then broken down into questions to ask teachers on the case study protocol.

Chapter Five presented a brief background and analysis of the data. The data were analyzed and compared to the chosen theory and the literature. The data analysis was broken down with areas of agreement and disagreement with the literature and the theory, using the three phases of Fullan's (1991) implementation process. The last section revealed the respondents' beliefs on how they would use the ILS if it could be used the way they wanted, compared to the successful model revealed by the literature.

## FINDINGS AND CONCLUSIONS

Although the subjects had a wide range of educational experience, their experiences with the implementation of technology revealed many areas of agreement with Fullan's (1991) theory.

Fullan's (1991) theory and the review of the literature were presented. Interview questions were prepared from both sections to cover all aspects of the subject. The subjects were asked their view on the preplanning stage, phase one, of the implementation process of the ILS at their school. The data revealed that the subjects agreed with the theory about teachers needing to be included at the beginning of the process to create a "buy in" effect. The subjects agreed with this but their school had not practiced this process during implementation. No school had included every teacher. They had done what Fullan (1991) stated was happening. The school administration would select a few teachers by different methods to be able to say they had included teachers. This practice made the other teachers at the schools feel left out.

The subjects' beliefs on program implementation revealed that a teacher who has never used a computer needed time to go through a developmental training stage. This training time allowed the teacher to work through struggles and anxieties before progressing to the next level. Once through this stage the teacher is free to work on absorbing new teaching materials and new teaching methods. Four respondents revealed that owning a computer at home helped them work through the initial fears that most people face. When faced with computers at school they were excited to have them because they knew the value of computers to education and learning. The oldest respondent interviewed did not own a computer and was still at the beginning stage of getting acquainted with a computer.

The educators agreed that new teaching materials would be used because this would be expected with new concepts. Three of the respondents said it did not bother

them to use new materials. The other two said they did not have the time to locate the material to align the concepts.

#### LIMITATIONS FOR RESEARCH, PRACTICE, AND TEACHER PREPARATION

This study reveals that more research needs to be done on the implementation process of technology in schools. In today's school there are many computers but not enough teachers who use the ILS appropriately. As students become familiar with the computer, they get bored doing lessons with the same format, just as they do with books. The ILS has the capabilities to be used as a word processor with graphics. The stories on reading can be used in science and social studies. Math can be integrated with science, reading and social studies. The ILS can be used to make learning exciting for students, but if teachers are not given time and training on the computer to work through their anxieties, and to use the computers to their potential, then learning will remain stagnate.

If the potential of technology is to be utilized appropriately, administrators must improve the implementation process and realize the value of technology in today's education and the part it plays in everyday life. Continuation with the way technology is used in some schools only serves to alienate the students and defeats the true purpose of technology. Teachers must use technology to make learning exciting for students to keep pace with the entertainment world. Administrators must view technology as a way of enriching students lives for the future by helping them view technology and learning as a way of life.

Our teacher colleges need to ensure that future teachers are well prepared to use technology as a tool to teach with, not as a drill and practice tool or an extra privilege for the advanced students. Professors in all fields of education and methodology need to teach their students to integrate technology in each area and how these areas relate to everyday life. They need to instill the value of new and different methodologies and ensure that future teachers will not stand in front of the class and tell the students to read the chapter and answer the questions. Education today needs to be exciting, fun and challenging for all students. Today's teachers need to know how to use technology to students' advantage.

#### RECOMMENDATIONS FOR FURTHER STUDY

This study was limited to small town schools and a specific subject area. The focused interview was the only research instrument and the data was collected at the time of the interview. The following are recommendations for further study:

- Study done two years later with the same teachers on the same topic.
- Study to explore administrators' views of the implementation process at their school.
- Study using a comparison of male teacher beliefs versus female teacher beliefs on implementation.
- Study using students' beliefs about how technology should be used with the curriculum.
- Study with teachers who have never used computer.
- Study on why certain teachers were included in the process and some were not.

## FINAL COMMENTS

I believe administrators owe it teachers and teachers owe it to students and their profession to find the best way to challenge students and use technology to enhance students learning.

While this study dealt with teachers' beliefs on the implementation of technology, it can also be used as a guide to inform teachers of a better way to utilize the ILS than just drill and practice for math and reading concepts (Hickey, 1993).

When I received my bachelor's degree in elementary education, I thought I had learned all I would need for my teaching career. I returned to school for a master's degree in guidance and counseling. This area of education increased my knowledge in student behavior and development. Ten years later when I started my doctorate, I learned even more about teaching, about diagnosing students' work and different ways to use technology. Some teachers never return to school, read a professional magazine, attend a workshop or learn new teaching methods.

Some teachers do not want to change to use technology but are encouraged to do so. Others would like to use the technology but are not afforded the opportunity. This study showed that teachers need to be included in the adoption phase to create a "buy in" effect. Teachers need to be given time and training to work through the anxieties of using new materials and new teaching methods. Administration needs to support the continuation process with more training and equipment for updates in technology. For the implementation process of technology to be successful, these components need to be addressed early in the adoption phase.



Finally, I think Judy Salpeter (1995), Editor-in-Chief, of Technology and Learning magazine summed up my beliefs in her passage in "Quit Blaming Teachers."

. . . my moments of frustration do make me sympathetic to those teachers--and we all know plenty of them--who fear computers. It's tempting to blame them. After all, you've gotten past your fears and discovered how technology can have a positive impact on kids. Why can't they see its value? The world seems to share this need to assign blame. We've all heard plenty of speeches and read plenty of articles berating our schools (and the teachers in them) for their failure to educate students for tomorrow. Over and over we hear that the classroom has hardly changed at all over the past century, that teachers are the only professionals who do not use technology in their daily work.

This may be true, but who's to blame? How many lawyers or business executives do you know who not only use computers but also are expected to set up and repair their own machines, and install and customize their own software? Far too often teachers are left on their own to do just that. . . .

Of course, it is unrealistic to expect this level of support in schools today, but just a little bit would help. Much lip service is paid to the importance of staff development but far too few districts have devoted the time and money to ongoing training and support. Rather than blaming reluctant educators, let's acknowledge those who, in spite of the road blocks, blaze new technology trails--often on their own time and at their

own expense. Let's hope these leaders, aided by ever-improving technology, will have the time, resources and grace to inspire their colleagues to follow (p. 6).

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## APPENDIX A

## INTERVIEW PROTOCOL

## Biographical Information

Date:

Place of interview:

Tape #

Transcribed by:

Gender: M F

Age:

Size of school district:

1. Do you own a computer? Yes \_\_\_ No \_\_\_
2. How many years have you owned a computer? \_\_\_
3. How would you rate your knowledge and use of computers:  
Beginner (0-2 yrs.) \_\_\_ Intermediate (3-5 yrs.) \_\_\_  
Advanced (5 or more yrs.) \_\_\_
4. Did you learn to use a computer on your own or did you take classes?
5. How many years of teaching experience do you have?
6. What age did you begin teaching?
7. What is your bachelor major?
8. What is your master major?
9. What is the setting of your school's computers? Classroom \_\_\_ Lab \_\_\_
10. How many computers do you have in each? Classroom \_\_\_ Lab \_\_\_
11. What type of integrated learning system do you have?
12. How long has your school had an integrated learning system?

## APPENDIX B

## CASE STUDY PROTOCOL

## Open-ended Questions

1. How do you use the integrated learning system (ILS) with your curriculum?  
Which particular subjects do you integrate?  
How do you integrate the ILS into your classwork?
2. How would you describe the implementation process of the ILS in your school?  
Who started the process?  
Who was involved in the process?
3. How were you included in the initial stage of implementation of the ILS?  
Do you feel you were included in the process?  
Do you feel you should have been included?  
Do you think being included in the process would give a teacher more of a desire to use the computers?
4. How would you describe the type and amount of training you have had to implement the ILS with your curriculum?  
What type and amount of training did you have at the beginning of the implementation process?  
What type and amount of training did you have after you felt confident with what you had learned after the first training?  
Did the training teach you to integrate the ILS with your curriculum?
5. How would you describe the personal changes you made during training?  
Did you have to use new teaching materials, if so, what new materials did you use, and how did you feel about it?  
Did you have to use new teaching methods, if so, what new methods did you use, and how did you feel about it?  
Did you change your beliefs, if so, what beliefs did you change and how did you feel about it?
6. How did you feel about the follow-up support your school has provided after you had the ILS for two or three years?  
After you learned a certain amount on the computer, did your school provide more training?  
When did your training take place?  
Were you provided class time to go to workshops?



## APPENDIX B (continued)

7. How would you describe the success of the implementation of the ILS?  
Do you think the ILS is successfully implemented at your school?  
Who do you think is responsible for the success?  
Pretend the ILS is successfully implemented into your school,  
how would you describe a scenario in the class or lab, include the physical  
arrangement, the management of the classroom and what the students  
would be doing?

## APPENDIX C

**CONSENT FORM**

(To be read by respondent and discussed with interviewer before the beginning of the interview. One copy of this form will be left with the respondent, and one copy will be signed by the respondents and kept by the interviewer. After the original tapes are transcribed, the original audio tapes will be destroyed.)

I, \_\_\_\_\_, hereby authorize Carla Bennett Wortman to perform the procedures described below.

This study is being conducted as part of an investigation entitled **TEACHERS' BELIEFS ON SUCCESSFUL IMPLEMENTATION OF TECHNOLOGY IN AN INTEGRATED LEARNING SYSTEM AS AN ALTERNATIVE TEACHING METHOD**. The purpose of this study is to understand different educators' beliefs on success implementation of technology of an integrated learning system by using the case study interview. Respondents will be asked to answer a number of questions. The interview will be taped and transcribed by the researcher.

I understand that participation is strictly voluntary, that there is no penalty for refusal to participate. This interview will be kept strictly confidential and will be available only to the researcher and members of the researcher's doctoral committee. Excerpts of this interview may be made part of the final research report, but under no circumstances will my name, school or identifying characteristics be included in this report.

I may contact Carla Bennett Wortman at (918) 773-8736. I may also contact University Research Services, Oklahoma State University at (405) 744-5700.

I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date: \_\_\_\_\_ Time \_\_\_\_\_ (a.m., / p.m.)

Signed \_\_\_\_\_  
signature of subject

I testify that I have personally explained all aspects of this form to the respondent before asking him/her to sign it.

Signed \_\_\_\_\_, Researcher

Carla Bennett Wortman

Candidate for the Degree of

Doctor of Education

Dissertation: **TEACHERS' BELIEFS ON SUCCESSFUL IMPLEMENTATION OF TECHNOLOGY IN AN INTEGRATED LEARNING SYSTEM AS AN ALTERNATIVE TEACHING METHOD**

Major Field: Curriculum and Instruction

Biographical:

Personal Data: Born in Vian, Oklahoma, on January 17, 1950, the daughter of Theodore and Noma Stites.

Education: Graduated from Sallisaw High School, Sallisaw, Oklahoma in May, 1968, received Bachelor of Science Degree in Elementary Education from Northeastern State University, Tahlequah, Oklahoma in May, 1971. Received the Master of Science Degree in Guidance and Counseling from Northeastern State University, Tahlequah, Oklahoma in May, 1978. Completed the requirements for the Doctor of Education Degree in Curriculum and Instruction at Oklahoma State University, Stillwater, Oklahoma in May, 1996.

Experience: Employed by Vian Public School as a school counselor for one year, a fourth grade math and science teacher for fourteen years, concurrent gifted and talented teacher for four years, Marble City Schools as a third grade teacher for five years, Brushy School as kindergarten/seventh and eighth grade science teacher for one year, Moffett School as a kindergarten/fifth, sixth, seventh and eighth grades science teacher for one year.

Professional Memberships: Association for Curriculum and Development, and National Education Association.

OKLAHOMA STATE UNIVERSITY  
INSTITUTIONAL REVIEW BOARD  
HUMAN SUBJECTS REVIEW

2

Date: 10-11-95

IRB#: ED-96-036

**Proposal Title:** TEACHERS' BELIEFS ON SUCCESSFUL IMPLEMENTATION OF TECHNOLOGY IN AN INTEGRATED LEARNING SYSTEM AS AN ALTERNATIVE TEACHING METHOD

**Principal Investigator(s):** Bruce Petty, Carla Wortman

**Reviewed and Processed as:** Exempt

**Approval Status Recommended by Reviewer(s):** Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING.

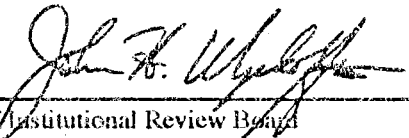
APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.

ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

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Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Signature:

  
Chair of Institutional Review Board

Date: October 23, 1995

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