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The University of Southern Mississippi

ROADBLOCKS TO INTEGRATING TECHNOLOGY INTO CLASSROOM INSTRUCTION

By

Courteney Lester Knight

A Dissertation
Submitted to the Graduate School
Of The University of Southern Mississippi
In Partial Fulfillment of the Requirements
For the Degree of Doctor of Philosophy

May 2012

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ABSTRACT

ROADBLOCKS TO INTEGRATING TECHNOLOGY

INTO CLASSROOM INSTRUCTION

by Courteney Lester Knight

May 2012

Although research has concluded that technology can enhance the teaching and learning processes, teachers have not yet fully adopted technology to support their teaching methodologies. In the last decade or so, as the accessible gap narrowed, the focus switched to other factors. This study attempts to answer the question: Why teachers do not fully integrate technology into their classroom instruction?

Recently a preponderance of the literature on technology integration has inquired into teachers' knowledge of technology, the role of the administrator, the curriculum and teachers' perception of the benefits of technology in instruction. The problem was to determine the relationship between these constructs and teachers' use of technology in their classroom instruction.

A survey, using a five-point Likert Scale was developed to collect data from 105 teachers from three small schools located in Philadelphia, Pennsylvania. A Pearson Product-Moment Correlations was used to analyze the data to find answers to seven research questions and four hypotheses.

The results of the analysis showed that the most significant relationship existed between teachers' knowledge of technology and teachers' use of technology in their classroom instruction. However, the most thought provoking question emanating from this research centers on the effect of teachers' perception of the benefits of technology on

teachers' use of technology in their classroom instruction. Therefore, no research on technology integration is complete unless teachers' perception about technology is considered. Thus, one of the recommendations for further study is research on whether teachers' perception of technology increases or diminishes with teachers' knowledge of technology

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CHAPTER I

INTRODUCTION

Without doubt, integrating technology into classroom instruction requires the merger of tradition and innovation. However, this requirement is often mired in an entangled malaise of difficulties that impede, curtail, or hamper the transition from good to better. Among these many impediments to the success of this model are instructional leadership, teacher preparedness, teacher attitude, and the curriculum which today incorporates the pervasive education philosophy much dictated by the emphasis placed on standardized tests. Notwithstanding these key factors, one must be reminded that these in turn are influenced by other intangibles that preclude the effective integration of technology into classroom instruction. Yet, without the harmonious interrelationship of all these factors, the efficiency, effectiveness, and relevancy with which technology is implemented into classroom instruction can be severely compromised.

There is considerable controversy about, if not ignorance of, the ways in which to use technology to maximize its value as an instructional tool. Wildstrom (2002) attributed this to the fact that teachers are reluctant users of technology, because it is not part of their culture. Baytak and Akbiyik (2010) agreed that replacing traditional teaching methods with new teaching methods is inevitable, but submitted that how to integrate technology into lessons to improve learning is still a vital question among researchers and educators. In addition, many school districts boast of having technology without actually giving thought to what the technology is used for, how it is used, or if it is used at all. In fact, Prensky (2007) decried that if teachers do not focus on teaching their students the important lessons necessary for the future like the quality, meaning, value and relevance

of technology, schools will have very little chance of being relevant. However, if instructional technology is allowed to dominate technology use rather than to facilitate it, the success of schools will be more distant. Indeed, many schools purchase technology without considering if those responsible for integrating technology into the curriculum have the training, inclination, or expertise to fulfill that mission. Pedersen and Marek (2007) concluded that the perception exists that teachers need to integrate technology; however, those responsible must make sure that teachers are engaged in a process of understanding the ways in which technology enhance teacher's practice and the method by which they must match the technology and practice to specific purposes and learning outcomes.

If the ultimate goal of improving instruction is to advance student achievement, then using scientifically based time tested means to improve instruction will have a positive effect. However, according to So and Kim (2009) an "explanation for the lack of technology integration is related to technological pedagogical content knowledge. Teachers may have difficulty understanding the complex relationships between technology pedagogy and content, because these are often taught in isolation in most teacher education programs" (p. 102).

This brave new world of technology may seem exciting and promising to many who pursue innovation in education. Picciano (2002) advised that the primary question to be considered should concern the extent to which technology is desirable in the school. He further acknowledged that enthusiasm about technology is desirable and even beneficial, but he warned that too much enthusiasm can be disruptive and could result in more harm than good, because technology in and of itself is limited. Notwithstanding

these limitations, when used as a tool and when placed in skillful hands, technology can open up new possibilities and enrich learning.

The conduit by which this must be accomplished is, in fact, through classroom instruction provided by the teacher. Therefore, the classroom teacher must be adequately prepared, willing, and learned in the technological skills that are necessary to accomplish this mission. The school administrator has the responsibility to ensure that these goals are realized (Afshari, Abu Bakar, Su Luan, Abu Samah & Say Fooi, 2009). This may be easier said than done, because teachers seem inherently reluctant to integrate technology into their classroom instructional practices. Much of this reluctance is due to their apprehensions, or lack of time, knowledge, access to the resources, or confidence in the ability of technology to revolutionize the educational process (Bousquet, 2009; Cuban, 2001). Ranasinghe and Leisher (2009) added, "integrating technology into the classroom begins with the teacher preparing lessons that use technology in meaningful and relevant ways, using technology to support the curriculum rather than dominate it" (p. 1958).

Too often, technology is merely tagged on to some existing teaching methodology so what we get is, "educational practice that is technologically sophisticated, but still fundamentally conventional: using PowerPoint instead of a blackboard or overhead projectors for a classroom presentation…." (Rappaport, 2003, p. 28**).** This same observation was made by Chen and Reimer (2009), who concurred that technology integration should place less emphasis on the technology itself and more emphasis on how technology can help teachers to implement ideas appropriate to different grade levels. The notion is that if technology does not enhance and advance the instructional process, then the medium is used in a manner that is not effective, efficient, or relevant.

More importantly, this demonstrates a lack of understanding of how to integrate technology into classroom instruction. Indeed, such a misconception creates an aura of misunderstanding between integrating technology to enhance student learning and demonstrating the uses of acquired computer skills. Hansen and Lovedahl (2004) confided:

> … technology teacher educators must ensure that we understand the differences between the various programs and that we build programs and build our professional activities around scholarship that allows teachers to function effectively and unambiguously in their classroom and laboratories.… Any effort to change what happens in the classroom will not be effective if it acts independently of the competence of the critical variable, the teacher. Our challenge is to figure out how best to implement and follow through on how teachers can best be prepared to teach towards technology literacy. (pp. 20-32).

Stols (2008) surmised, "the theoretical framework for the integration of instructional technology in the classroom is not well developed and more understanding is needed to understand how, when, and under which conditions technology should be used for classroom instruction" (p. 35).

The problem surrounding technology as an instructional tool is not the technology itself, but the integration of this ever evolving medium into an established fixture called curriculum. Even more important is that the medium by which this must be accomplished is the human being who must accept changes in instructional behaviors, practices, and beliefs. Therefore, this may require radical attitudinal changes by teachers and the adjustment to, and adoption of, a new instructional culture. Holland (2000) believed that

principals who know technology and possess an understanding of the pedagogy to bring innovation to the classroom could inspire these changes in teachers. The same view is espoused by Christie (2000) who asserted that lasting change in a school was most likely to occur when a complacent staff becomes inspired by a leader or new pedagogy. Royer (2002) furthered this conclusion by insisting that teachers were more likely to change and use computer technology if they were involved in discovering and testing how technology could improve student achievement. Sharp (1998) emphasized that the role of the administrator is so integral to the successful integration of technology into the curriculum that regardless of teacher knowledge of the benefits of such, or willingness to implement technology into classroom instruction, not much will be accomplished without the intervention of the administrator. Yet, Styron and Styron (2011) pointed out that too often administrators provided teachers with the technology hardware and software, but stop short of providing the other conditions necessary for connecting technology with improved student achievement.

Knezek and Christensen (2002) regarded that the integration of technology into schools today required systemic change, and this culture of change must be modeled by those who are in the leadership position, because they are the ones who dictate policies, set goals for teachers and students, control the budgets for professional development, and determine how much to spend on technology. Waight and Abd-El-Khalic (2007) extended this notion by acknowledging that the task of meaningful technology integration into instruction in the absence of intervention and support is a daunting task because the teacher must know how to structure lessons in order to tap into and to capitalize on the varied potentials of technology. However, the administrator in order to model this school

culture must be proficient in the application of technology, but equal in importance, must be credible. For example, Egol (1999**)** affirmed that the administrator of today requires the ability to lead others and to stand for important ideas and values, because the pace with which technology changes does not allow the administrator to know enough and fast enough to prescribe work through a dummying down and control process. Nevertheless, Webb (2011) assured that administrators who provide teachers with basic resources like mentoring and time to integrate the technology are most likely to promote higher levels of technology integration in the classrooms on their campuses. Although one may agree with this statement in general, one might want to add that these values and ideas should be consistent with the goals and aspirations of the specific school district and an educational philosophy consistent with the demands and requirements of a modern education. As Lacina et al. (2010) explained, "It is essential for teachers to move beyond the rote drill and practice internet activities to using technology to encourage high level thinking and learning" (p. 163).

Fullan (1994) advocated that educators must see themselves and be seen as experts in the dynamics of change, but McLester (2004) cautioned that with the changing dynamics of technology, leaders must have "big picture awareness" (p. 4). Consequently, the leader's vision of technology and how it can best help to maximize teacher instructional effectiveness in the classroom must be realistic and knowledge based.

Statement of the Problem

Despite the proliferation of technology in the classroom, teachers still do not regularly integrate technology into their teaching methodology. Many teachers know how to use various computer programs and actually use many of them in the classroom; but

they use them in ways that do not advance their teaching methodology or improve student learning, because their methods of utilizing technology are not effective, efficient, or relevant. Many believe that the problem lies not merely in the teacher, but also in the administrative leadership and the design of the curriculum. Holland (2000) lamented, that although our kids are tech savvy and our teachers are getting trained, our school leaders are being left behind. McLester (2004**)** supported this view with his observation that the higher up the leadership food chain we advance in education, the lesser the technology skills become. Nevertheless, Kuzu (2007) recognized that school administrators need others to share some of the responsibilities for integrating technology because of the additional responsibilities that administrators must execute in their daily routines.

Lei (2009) observed that the current generation of pre-service teachers has grown up in the technological era and have been using more technology for their learning as students than the previous generation, but they have not been exposed to different ideas of teaching with technology due to the slow adoption of technology in the classrooms in the last two decades. Abu Bakar (2007) attributed much of the problem to the design of the curriculum, but Sharp (1998) placed responsibility on the school's leadership by pointing out that regardless of the degree of dedication and conviction that teachers have about the benefits of technology in the classroom, they will not be able to accomplish much, if they do not have the support from their principals, curriculum directors, and superintendents. Furthermore, adding to the dilemma is the un-preparedness of the faculty of teacher training institutions to prepare teachers to integrate technology into their classroom instruction. In fact, many of the teacher training faculty have not spent much time in a K-12 classroom for several years, but are faced with the task of teaching

pre-service teachers the rudiments of incorporating technology into their classroom practices (Stetson & Bagwell, 1999).

More perplexing is the notion of how technology integration is defined. Davis, Hartshorne, and Ring (2010) concluded that teachers' definition of technology integration varied over a wide spectrum from the use of new technologies to methods of using new technologies to enhance student learning. These researchers believed that a broad definition of technology integration provides more autonomous choice among technology integration which allows for matching the integration to the users' level of comfort and expertise. Okojie, Olinzock, and Okojie-Boulder (2006) agreed that technology integration should be described broadly because it is complex and is made up of a process of interconnected activities.

This paper seeks to investigate whether:

- There is a correlation between teachers' reluctance to integrate technology into their classroom instruction and the teachers' knowledge of technology.
- There is a relationship between teachers' use of technology in their classroom instruction and their perception of the benefits of using technology in instruction
- Administrative leadership in technology contributes to the current state of technology integration into classroom instruction.
- Curriculum, including required teaching methodologies, affects teachers' inclinations to infuse technology into their classroom instruction.

Delimitations

This study focuses on teachers at three small schools in Philadelphia, and thus should not be construed as the general condition of affairs in every school in the city or the state for that matter. Given this disclaimer, fairness demands the revelation that these schools have the technology hardware and software and the high speed connections that many of the city schools lack. Furthermore, the assumption is made that the data gathered from the survey reflect the true beliefs of participants. Also, one must realize that well-established schools have well-established curricula that have proven to be effective over time, and to adjust them to meet the changing demands of technology will take time, foresight, and the will to change or to modernize their educational systems.

Moreover, the speed with which wealthy school districts can accommodate the demands of current and emerging technologies is almost incomprehensible to poor schools which, though they may have the desire, are shackled by the paucity of resources to implement or to adopt those changes. Furthermore, the focus on standards as mandated by the No Child Left Behind mandate may be inconsistent with the demands of technology infused instructional practices. Finally, this study does not pretend to be all conclusive in its attempt to decipher the core contributing factors to this dilemma. Rather, this study intends to focus attention on some of the major problems that inhibit teachers from expanding the use of technology in their classroom instruction, with the hope that educators and other decision makers including technology designers, curriculum designers, and school administrators will mediate practical solutions instead of the present practice of admitting credence to the problem with a barrage of lip service and philosophical skullduggery.

Justification

This study is undertaken, in an attempt to gain a better understanding of why teachers do not effectively integrate technology into their classroom instruction. Indeed, a large part of the literature recognizes and addresses the problem eloquently. However, because of the complexities of the contributing factors, solutions to these problems, though plausible, are not conclusive. For example, some critics advocate acquiring the technology hardware and software and training of teachers to use the technology while others opine that the reason that technology is not more widely used in classroom instruction results from a lack of administrative leadership. Others place the onus on teacher preparation programs and teachers' own perception of technology as an instructional medium. Many also place blame on the design of the curriculum. Without doubt, the real solutions lie in adjusting, repairing, or replacing current attitudes that exist within this myriad of plausible excuses. One of the goals of this study is to investigate which of these constructs independently and in combination affects teachers' usage of technology in their classroom instruction.

Furthermore, one hopes that the management of these targeted schools, as well as other schools in the country will become cognizant of the problem and provide remedy. Additionally, studies like these may create awareness in schools that prepare teachers and administrators, to examine and to adjust their teacher preparation programs to meet the needs of a contemporary technological society. In addition, teachers may also take note, that they, themselves, must take the initiative to make paradigm shifts to take advantage of best practices in their profession. They must take responsibility for their own professional development in the same way they demand that their students take

responsibility for their own learning. Furthermore, this study will support the existing literature that deals with this growing phenomenon that teachers do not integrate technology effectively into their classroom instruction.

Hypotheses

1. There is a positive correlation between teachers' knowledge of technology and the teachers' use of technology in classroom instruction.
2. Administrator mentoring of technology increases teachers' use of technology in classroom instruction.
3. Curriculum design affects teachers' use of technology in their classroom instruction.
4. Teachers' use of technology in their classroom instruction is unaffected by teachers' perception of the benefits of technology in classroom instruction.

Research Questions

1. Is there a correlation between teachers' reluctance to integrate technology into their classroom instruction and the teachers' knowledge of technology?
2. Is there a relationship between teachers' use of technology in their classroom instruction and their perception of the benefits of using technology in instruction?
3. Does administrative leadership in technology contributes to the current state of technology integration into classroom instruction?
4. Does curriculum, including required teaching methodologies, affect teachers' inclinations to infuse technology into their classroom instruction?

5. Do curricula designs impede teachers' use of technology in their classroom instruction?
6. Does teacher perception of technology as an instructional tool influence their use of technology in classroom instruction?
7. Does teacher knowledge of technology increase the use of technology in classroom instruction?

CHAPTER II

REVIEW OF THE LITERATURE

According to Afshari et al. (2009), "Technology involves the generation of knowledge and processes to develop systems that solve problems and extend human capabilities," (p.77). These researchers echo the sentiments of many research conclusions over the past decade that although technology is an effective means of widening educational opportunities, most teachers neither use technology as an instructional delivery system nor integrate technology into their curriculum. Nevertheless, in any discussion of the impediments to technology integration, one cannot exclude availability of, and access to the medium itself. However, because these problems are so obvious, this study does not discuss them in any detail. One may not find the notion implausible to conceive as moot that teachers do not integrate technology into their classroom instruction, if in fact technology is not available. On the other hand, if the technology is available, but not accessible to the teachers, then obviously, the teachers cannot be blamed for not using technology in their classroom instruction. Thus, the former is a kin to the latter: availability without access is, indeed, like a marriage between a fish and a bird – where will they live? Without diminishing the importance of having access to and the knowledge of technology, one can agree that technology integration is complex. Bude (2009) reminded that having advanced facilities and stand-alone technology training does not guarantee that teachers can effectively integrate technology into classroom teaching.

This study does not pretend to mitigate the importance of these two factors among the myriad of entangled reasons for the less than effective, efficient, and relevant extent of technology integration into classroom instruction. Instead, this study postulates

situations where these factors are not problematic to the process. In addition, one must be reminded that there is a host of reasons that preclude, hinder, or diminish the use of technology in the classroom. This study endeavors to investigate whether or not curriculum design, administrator leadership, teacher knowledge of technology, and teacher perception of technology contribute to the dilemma of usage, or lack thereof in classroom instructional practices.

Curriculum

Without doubt, curriculum prescribes the framework for classroom instruction methodology; hence, in the dynamics of technology integration, curriculum design can be of paramount importance. Popham and Baker (1970) describe curriculum as the planned learning outcomes for which a school is responsible, or the desired consequences of instruction. This implies that the design of the curriculum determines the goals, and hence, the pathways toward achieving those goals. If the pathways to those goals are the types of instructional methodologies, then reason demands that in order to accommodate technology, tremendous adjustments and amendments must be made in curricula that are designed for traditional teaching methodologies. So and Kim (2009) advised that those who participate in the curriculum design process need to rethink about the complex interplay of pedagogy and content, as well as the affordances of technology to achieve their design goals. On the other hand, any new curricula designs must have technology seamlessly interwoven through them. In fact, many of the contemporary curricula are very fragmented and this, coupled with the demands and pressure of time allotments have made intellectual inquiry so specialized, that by the seventh grade (in some cases the fourth grade) most curricula are departmentalized and burdened with information to be

memorized. Thus, during a typical school day, students may be instructed by many different teachers, each charged with teaching a different curriculum. This practice endures students to perceive knowledge as unconnected strands of unrelated information. On the other hand, teachers assume that students will eventually make the transfer and connection after a sufficient base of knowledge is attained (Brooks & Brooks, 1993). Popham and Baker (1970) elaborated:

> The use of certain principles underlying a discipline helps the student collate and generalize the ideas in a single discipline. This is a much more efficient process than learning a vast number of interesting but discrete bits of information and dabs of principles without a strong delineated structure in which to place them. The hope that the student will somehow arrive at these ideas himself is overly optimistic, slightly sadistic, and generally inefficient. (p. 56)

However, with the advent of The No Child Left Behind law demanding teacher accountability and standards, curriculum designers find themselves dutifully focused on developing curricula that emphasize student attainment of basic skills. Teachers, on the other hand, are held responsible for teaching these basic skills to ensure student proficiency or at best mastery of these basic skills. While this in itself does not prevent teachers from using technology in their classroom instruction, this requirement does not encourage or enhance the practice because there are not too many innovative ways to conduct drill and practice. Actually, there are many different types of computer software designed for just this purpose, but one may question whether or not the goal of education in this technological society is to prepare students for recall and memorization or to become higher level thinkers who can make informed decisions. If the curriculum is

designed for rote memorization then it limits teacher initiative to utilize the versatility of technology in their classroom instruction, lest they be accused of revolting against the mission and educational philosophy of their school. Philosophically, if the curriculum is designed for didactic instruction methodologies and this is the prevailing educational philosophy of the school district, one can assume that the dominant instructional culture of the school will not be one that promotes integrating technology into classroom instruction.

Indeed, the very structure of schools with their emphasis on lockstep grading systems, regular class schedules, standardized grading, and emphasis on skill testing at regular periods create conditions that prohibit or retard implementation of the most promising innovations. Even in cases where these innovations are possible, sustaining them becomes a most difficult task. Therefore, if schools are to accept the challenges of the new information based society, then the structure of schools must be adjusted or completely changed to accommodate the technologies that will develop students as problem solvers, thinkers, and creators (Hopper & Hendricks, 2008; Lacina et al., 2010; Schlechty, 1990).

Nevertheless, educators today depend on a single outmoded means to assess student learning and to evaluate the effectiveness of their educational programs: the multiple choice standardized test**.** Daviss and Wilson (2001) concluded:

> It's a seductive tool – inexpensive for educators to administer and easy for regulators, funding agencies, and the public to use as a measure of educators' relative competence and students' year-by- year performances….Ironically, as standardized test have become more pervasive, they've become far less

> meaningful. In the evolving process oriented classroom, standardized exams are about as useful as Smith's old spirit level: they measure the kinds of knowledge that are becoming steadily less relevant to our new definition of education. The most widely used standardized tests continue to measure fact retention and the isolated performance of rote skills….As a result, the test that educators rely on to measure the effectiveness and efficiency of teaching and learning can't provide the very information they must have in order to make real improvements. (pp. 139-140)

Curriculum designers have to examine the pedagogical models used in the contemporary classrooms to determine if they are meeting the needs of today's students. Not only must they make this determination, but they must be decisive in making the adjustments if deemed necessary. In making these adjustments, curriculum planners must evaluate the role technology can play in facilitating this transformation. However, this does not mean that technology must become the driving force for education, because if technology is allowed to be the engine, this may breed a brand new set of problems. Practically, one should not foolishly assume that purchasing and utilizing a set of technology equipment will materialize into a good educational system that meets the needs of today's educational challenges. Furthermore, much of the available multimedia products consist of nothing more than a set of glorified page-turners which seem to perceive the mind as an empty vessel waiting to be filled. Instead of presenting students with words and numbers, pictures and sound are added. This does not enhance the viability of the curriculum as a conduit for promoting innovation or advancing student higher level thinking skills. Indeed, the value of technology is greatest when the student

is empowered to take a more proactive role in the acquisition of information. Regardless, technology provides opportunities for students to do the bulk of the work (Prensky, 2007; Thornburg, 1994).

But, though the introduction of technology into mainstream education has been widely expected to penetrate and to transform teaching and learning across the curriculum, the research literature offers little support that this has materialized. Perhaps, one might have been too simplistic or unrealistic to expect technology to revolutionize teaching and learning or for teachers to make fundamental changes to their lesson plans and pedagogy. One possible reason for this is that the classroom teachers historically have had little leeway in influencing the design of the curriculum, the type of technologies within their schools, or for defining the role of technology within subject curricula. These imposed policy decisions and mechanical change models often appear unresponsive to teachers' perspective and their workplace constraints (Burns, 2010; Hennessy, Ruthven, & Brindley, 2005). If teachers do not participate in curricula decisions, they do not feel ownership of the curriculum. This lack of ownership makes teachers feel detached and imposed upon. They must teach a curriculum in which they had no input and in a manner for which they may not be prepared or with which they may disagree. Smith (n.d.) opined, "If we truly want to integrate technology into the curriculum, we will have to stop thinking about technology training and how it can be used in the classroom – and start thinking about curriculum training that incorporates technology" (para. 9).

The traditional curriculum is not designed to advance critical thinking skills and information processing skills that are required of today's students. In fact, these skills are

poorly taught in the traditional curriculum. The reasons are simple though noteworthy: much of the focus of the curriculum is on students attaining basic skills. Thus, end-of-chapter tests and exercises are mostly used exclusively to provide consolidation of the chapter content. In the few cases when students are asked to synthesize the content of the chapter, the purpose, as well as the emphasis is on distinguishing between the main ideas and subordinate points imbedded in the content. Therefore, the focus is usually on information content rather than on information processing and critical thinking.

End-of-chapter exercises do not *teach* these skills but expect them. In reality, end-of-chapter tests relate more to rote memory and recall not to extension of ideas, or the use of prior experience to make comparisons or inferences. Thus, no real innovation in teacher instructional methodology is needed to satisfy a curriculum that emphasizes drill and practice. However, the integration of technology into such curricula demands redesigning or adjusting the curricula (Groff & Mouza, 2007).

Without doubt, to design or to redesign a curriculum that attends to, and to require that these skill be taught, is at best a monumental time consuming task. This requires restructuring courses, curricula, and schools to include the way instruction is delivered and the methods of delivery. For example, the single-textbook, exclusively content-centered approach must be changed, because students cannot work on unstructured problems without being exposed to, and guided through, multiple sources of information. This does not suggest the complete elimination of the textbook from among the classroom instructional materials or to replace the textbook with a variety of information from diverse sources. Instead, the suggestion is to lead students carefully under controlled conditions into diverse information sources, skillfully sequencing instances of

unstructured problems to maximize their versatility and to provide careful instructional feedback on the degree of student mastery of content, information processing, and critical thinking skills being taught and tested. Presently, students work and study in closely structured, closed information environments within their courses and then are suddenly asked to function in open-ended information environments when they are asked to write term papers and reports, or to conduct research without ever having being introduced or acclimated to these environments

The various sources of information from which students learn course content, information processing, and critical thinking skills should reflect the diverse real world information forms and methods of access that will be beneficial to the student beyond the classroom and after school. In other words, electronic information technology should be an integral part of the curriculum. Thus, both the curricula and instructional materials must be thoroughly redesigned to teach these skills. But, this will not be enough if the course content itself is not restructured to enable the cross fertilization of ideas among the various content disciplines, so that students can develop and practice these skills. Furthermore, the curriculum must be structured in such a way that maximizes the instructional efficiency of the basic content of the subjects so that there is additional time to teach the other necessary skills (Chen & Reimer, 2009; Siegel, 1995; So & Kim, 2009).

In a study (in partnership with the University of Cambridge and a number of local British secondary schools) conducted between 2000-2003 to investigate the willingness of teachers to embrace new approaches to subject teaching and learning, the perceived constraints upon the process of integrating technology into the various curricula, and their

reservations about this, the researchers concluded that despite the widespread commitment by teachers to integrate technology into their subject disciplines, this was clearly accompanied by a feeling of externally imposed pressure. This pressure related to the requirement within the English National Curriculum to use technology within subject teaching, and the imposition of a series of technology initiative to bolster this issue. These policies with which the teachers had no input gave the teachers a feeling of implied helplessness, eroded autonomy, and disempowerment.

A notable factor affecting integration was perceived conflict whether to use technology in order to facilitate subject learning, whether the emphasis should be on demonstrating ways in which it could be used, or whether to teach technical skills. Teachers in all subjects were concerned with identifying the best situations in which to use technology or demonstrating to students how to use technology to solve their problems. In fact, many of the teachers believed they had to include technology in schemes of work, regardless of whether it was particularly useful for that aspect of the curriculum or that its use was contrived. Others wanted to use technology as the servant of the curriculum rather than the other way round.

These types of problems occur when teachers are forced to integrate technology into curricula that are not designed to accommodate the complexities of a modern, ever evolving medium like technology. However, if educators are really committed to integrating technology into the curriculum, they will essentially partner with educators from the various content disciplines, including technology, to devise the most efficient and beneficial methods to employ technology in instructional practices (Bousquet, 2009; Gilberti, 1999; Hennessey et al., 2005).

Meanwhile, Mao (2011), as well as Himes, Pugach, and Staples (2005**)** recognize that the question of curriculum alignment to implement technology is crucial, but its adoption in the instructional process depends on the degree of importance that administrators and teachers attach to technology, as well as their affirmation and commitment to use it in their classroom instruction. As a matter of fact, they argue that the initial discussion of technology integration must be a discussion of curriculum, rather than an acquisition of technology hardware or software. They deemed the practice of acquiring technology without first defining how the technology meets and interfaces with curricula and curricula goals, as almost senseless. This commitment to curricular is one of the most critical scaffolds for integrating technology into the instructional practices of the classroom.

Notwithstanding this axiom, traditional curriculum planners and many of the curricula used in schools are not flexible enough to allow teachers to make use of teachable moments. These are the opportunities to elaborate upon, or to clarify further the meaning of content at those unpredictable times when there is interaction between teacher and student. Moreover, curricula are so streamlined and rigid that teachers are not afforded the time to plan and to make the best use of technology in their classroom instruction. If any significant progress or change is to be made to this present situation, and to encourage technology integration into classroom instruction, educational researchers and curriculum developers must begin to give serious consideration to the input of teachers (Gorder, 2008; Wang & Reeves, 2003). Indeed, in the late 1990s, Egol (1999) recognized that in order to integrate technology successfully into the curriculum it would be necessary to:

> … totally redesign our institutions of learning for the Information Age. Simply correcting deficiencies of the current system won't do. We would be left with a perfect system for the Industrial Age, the wrong system. There is nothing so senseless as doing the wrong thing more efficiently. We need fundamental change for the new era, not mere improvement…our reactive methods of thinking and our mechanistic way of working and organizing ourselves are no longer sufficient….The brains at the top of the hierarchical organizations can't know enough fast enough, to prescribe work through a dumbingdown and control process. (p. 487)

Consistent with this philosophy, Abu-Bakar (2007) and Reeve (2002), implying that the curriculum is often one of the main impediments to technology integration, suggested that curriculum directors must identify the goals for student learning. Also, they must define and stipulate what content standards should be addressed in each discipline and what the important learning outcomes should be. Moreover, as a prelude to outlining what each standard a course should address, curriculum developers should sequence concepts relative to importance for student learning. In other words, essential knowledge and skills and enduring concepts students are required to retain from the course should be unmistakably defined. If this is accomplished, much of the time teachers spend teaching unessential material embedded in the curriculum, could be spent on the planning needed to incorporate the technologies into their classroom instruction. However, in many instances more emphasis is placed on mastering the technology rather than determining which instructional methods are best suited to the instructional process. Thus, the new technology is viewed as a component of instruction instead of a means to

facilitate the teaching and learning processes (Hopper & Hendricks, 2008; Thach, 1995). If the curriculum is designed to accommodate the versatility of technology, many of these problems will be avoided. To expect teachers to integrate technology into their classroom instruction using a curriculum that is rigid and unappealing to innovation is, but a tall expectation that is doomed to failure at the onset. Chen and Reimer (2009) concur: "the assertion that high-stakes tests profoundly affect teachers' instruction and, in particular, teachers' technology integration" (p. 239) gave credence to the belief that today's so-called standards-based curriculum may be a design that impedes technology integration.

Consequently, one of the goals of this study is to clarify the role curriculum plays in the general dynamics of technology integration into classroom instruction. If indeed curriculum plays a significant role in the level of technology integration into classroom instruction, then curriculum designers, as well as technology designers may find reason to rethink and to reshape their positions, in order that the one accommodates the other. Also, such finding may encourage curriculum designers to critique their pedagogical ideologies to determine if they meet the standards of this contemporary technological environment.

Administrative Leadership

If the initial discussion of technology integration must begin with the curriculum, then any discussion of technology integration into the classroom instructional practices must begin with the administrator. As an instructional leader, the administrator sets the tone for what goes on in the school. Thus, the administrator must take the initiative to understand how technology can improve instructional practices. However, knowing about technology is not enough; administrators must devise strategies for helping teachers to implement technology in their classroom instruction. Furthermore, they must use their

team-building and monitoring skills to create a support system that is beneficial to the entire school community. Administrators also must understand the most effective means of integrating technology into classroom instruction and must have reasonable expectations of the outcomes that emanate from this integration. In summary, the administrator must have a realistic vision of what technology can add to the teaching and learning processes (Schmeltzer, 2001) and should communicate this importance clearly, so that teachers are motivated to participate in the endeavor (Todorova & Osburg, 2010). Osika, Johnson, and Buteau (2009), concluded from their research on online instruction that faculty could be enticed to use technology through pressure from peers, administration, and students, as well as offers of monetary rewards. Styron, Wang, and Styron (2009) voiced, "Without an incentive to support the growth of technology within the classroom and distance education development, administrators will find it difficult to grow and/or expand current distance education offerings" (p. 94). This vision is tantamount given the fact that technology in itself is ever changing and changing rapidly. Additionally, the role of the principal in facilitating change in education is critical considering that information and communication technologies are being integrated into the classroom as learning tools, and more so, because teachers are asked, if not forced, to change their traditional teaching methodologies to accommodate these media. Principals who proactively meet these challenges are more likely to succeed in this challenge. By taking this type of approach to the innovations afforded by technology, these principals are likely to foster an environment in which teachers, as well as students, perceive benefit and meaning from technology integration into classroom instruction (Schiller, 2003); or

as connected to the belief of Corn et al. (2010), that consistent supportive distributive leadership promotes adoption and buy-in from teachers and students.

Research has concluded that principals need training comparable to that of teachers if they are to facilitate implementation of an innovation. Principals, as instructional leaders, are expected to ensure that the necessary preparation and intervention are provided to teachers. In effect, principals require training that prepares them for their tasks as implementation leaders, though this training is also relevant to their specific needs. Just as teachers' commitment is essential to the success of an innovation, the principal's commitment is also essential, because principals are the culture builders for their schools. As principals become more adept at guiding technology integration, more efficient, effective, and relevant technology use should become prevalent, if not the norm in schools. Additionally, the principals' increased knowledge of the benefits and uses of technology should lead to more support of teachers' attempts to infuse technology into their classroom instruction. Meanwhile, principals' improved technology skills should lead to increased use of technology tools, thereby producing principals who are models of technology use and principals who can build a culture of technology usage throughout their schools (Dawson & Rakes, 2003). Wang (2009) added, "Technology supports the learning process so that the cognitive, social, and teaching presences can be established and maintained" (p. 23). Sahin (2010) added that effective technology integration is achieved when the use of technology is routine and transparent and when technology supports curricular goals.

The responsibility is great, therefore, upon those who are entrusted with the tasks to support teachers. They must provide teachers with the wherewithal to develop the new

skills, to examine the implications of the new technology, and to keep abreast of new developments (Gorder, 2008; Moore, 1986). Moreover, principals must give teachers permission to take risks using technology regardless of the extent of the teachers' knowledge of the medium and must be cognizant that knowing technology is different from teaching with technology (Mao, 2011). Regardless, much of the emphasis, or what little of this is present, is focused on the student. As technology becomes more of an integral part of education more attention is given to the extent to which teachers use technology in their classroom instruction and how well students learn the technology itself, but scant regard is given to the administrator's knowledge of technology (Starr, 2009). However, Christie (2000) and Webb (2011) affirmed that compelling and enduring change is most likely to emerge in a school when a complacent staff becomes inspired by a leader or new pedagogy. In the same way that teachers become models for their students, administrators must become models for their teachers.

Webb (2011) concluded that the role of administrators in technology integration can be the deciding factor in the extent to which teachers integrate technology into their instruction. Years earlier, emanating from the various research conclusions that administrators must demonstrate a commitment to technology use if they expect teachers to become active users of technology in their classroom instruction, McLester (2004) observed:

> Today's leaders must possess more practical skills than before.… In such times of rapid technological evolution and global, economic, and political uncertainty big picture awareness is key to a vision that charts the right course into the future. An awareness of the present digital divide remains a major issue,

> for instance. An arguable 98% of schools may be hooked up to the Net, but what is the quality of student and educator experience on line? Are teachers receiving the sustained high-level training they need to be 'highly qualified' in these technology driven times? (pp. 4-6)

Holland (2000), added that a principal must create a technology plan that supports the instructional goals and plans of the school, because advancement of student learning through technology does not come through chance, but by design and practice**.** Anderson and Dexter (2000) and Kara-Soteriou (2009) emphasized that administrative leadership and decision–making have a great impact on the outcomes or success of technology programs, so in order for technology to become an integral part of the school's culture, administrators must be involved in technology. Consequently, administrative leadership in technology must be given serious consideration. Notwithstanding, that technology integration throughout a school system is, in itself, significant systemic reform, professional development and collaborative efforts are necessary to support and to encourage teachers to use technology and to use technology appropriately (Foughty & Keller, 2011).

Involvement in technology means more than just knowing how to operate the technology equipment. Administrators must have at least a basic knowledge of technology if they are to maintain autonomous, competitive, and current in their profession. Indeed, administrators must develop technology literacy which is more than knowing how to turn on the computer, and to use it for word processing or for sending E-mail (Lao, 2000). Research shows that there is a material difference between principals receiving basic technology tools and application training and those receiving training that

focus primarily on integrating technology into the curriculum. Clearly, findings indicate that training which teaches the principal the methods and procedures required for integrating technology into the curriculum is more advantageous to the principal's job as a technology leader than training that concentrates only on teaching her or him how to use basic technology tools.

Of course, one must realize that if principals are to model the use of technology for their staffs, they should learn to operate the associated hardware and software. However, their training should involve more than learning the use of technology, because their primary goal should be to guide their teachers as they employ technology in the teaching and learning process (Beglau, 2011; Christie, 2000; Dawson & Rakes, 2003). Afshari, Abu Bakar, Su Luan, Abu Samah and Say Fooi (2008) echoed the sentiment that a great body of research on effective schools concluded that technology leadership will occur if the principal as instructional leader becomes proficient in the use of technology and then provide technology leadership for administrative, instructional and learning functions. These researchers advised that administrators should never stop learning and improving their skills, but should remain current with research and best practice so they could inspire others and create shared vision. Such administrators keep their schools focused on education, set constructive tones, hold high expectations for their staffs and students, and endeavor to ensure common curricula. In other words, administrative leadership must extend beyond the principal's office to monitor and to guide the activities of the classroom.

Consistent with this theme, Begalou (2011), Schmeltzer (2001), and Landry (2002) agreed that in order to be effective technology leaders, school administrators must

have a fundamental, practical knowledge of how technology can improve instructional practices. This knowledge must include not only basic computer competencies, but also an understanding of the unique qualities of particular types of technologies that would lend themselves to the various aspects of the teaching and learning processes. However, this is not enough; they must develop strategies to help teachers to use technology in their classroom instruction. Styron and Styron (2011) complained, "All too often administrators provide technological resources to teachers, such as hardware and software, but stop short of attaining the other conditions necessary for connecting technology with improved student achievement" (p. 8). Furthermore, administrators must have team building skills, and more importantly, mentoring skills to create an environment of ongoing and sustainable support for the entire educational community as users embrace the new technologies. Davis et al. (2010) and Sharp (1998) reiterated that regardless of teacher knowledge or perception of the benefits of technology in classroom instruction, not much will be accomplished unless teachers are encouraged and supported by their administrators. However, Kuzu (2007) lamented that most administrators are novice technology users whose technology competence and experience are insufficient for them to be technology leaders.

Without doubt, very few school-based technology programs can succeed absent of the support, guidance, and encouragement from school administrators. In fact, recognition of this conclusion solidifies the premise that one of the most important indicators to tying technology–skill instruction to the curriculum, especially at the elementary through high school levels, is the administrator's level of understanding of technology standards. Actually, the notion that administrators lacking in the scope of

what they should know regarding technology use can successfully guide teachers in the nuances of integrating technology into their classroom instruction is inconceivable to entertain. Indeed, without informed leadership, many technology initiatives will be fragmented and lacking in cohesiveness and authentic application. For one thing, an administrator who lacks this type of understanding will find it very difficult, if not improbable, to tie technology–skill instruction to the curriculum. This disadvantageous position precludes the administrator from analyzing, evaluating, and synthesizing, the various situations and applying alternatives that complement the bigger picture of the school's culture and philosophy of learning (Groff & Mouza, 2007; Starr, 2003).

Experts agree that the success or failure of technology integration into the curriculum, and thus into classroom instruction, could be directly linked to the behaviors and ideologies of the instructional leader. Therefore, if the administrator does not develop a shared vision of technology integration with the teachers and students, any efforts for successful infusion of technology in the classroom and throughout the school will meet with opposition, or at best with ambivalence or indifference. For example, Foughty and Keller (2011) observed, that many mathematics teachers may be uncomfortable with the use of technology and tensions have risen between administrators and teachers in which the teachers felt forced to use a tool with which they were uncomfortable. However, administrators who promote technology as a tool for collaboration and stimulation for authentic learning experiences can motivate teachers to use technology in ways that could advance student learning. Undoubtedly, this effort requires bold leadership that values teacher input, demonstrates a determined and unambiguous effort to shed old behaviors and to adopt innovative ideas, and possesses visionary ideas of how technology can be

utilized to improve the teaching and learning processes. Moreover, such leadership must possess the savvy to design and to implement the relevant professional development programs to provide teachers with the necessary technology preparation to execute their tasks (Afshari et al., 2009; Hughes & Zachariah, 2001).

Another important reason that administrators must become tech savvy is that the information age is changing the way business is done, and this change is occurring rapidly. Like most other organizations, many of the problems schools face today can be traced back to the leadership, or the lack thereof. If schools are charged with the responsibility of preparing students to become productive citizens who can make informed decisions in a technological society, then the school leadership has to manage this responsibility. A great part of this responsibility involves providing teachers with the tools to become proficient in their application of technology in classroom instruction. But, very few schools are learning organizations. In actuality, most schools still operate as hierarchical entities in which there is little desire to involve teachers in decision-making. This type of organizational behavior prevails despite a preponderance of research which concludes that change is most likely to occur, and more easily sustained when all stakeholders are included. In other words, leaders in education must be willing to adopt a more goal oriented, team inspired orientation, if they expect teachers to adopt the new or modified values, meanings, and benefits of the ways children learn in a technological environment (Hughes & Zachariah, 2001; Senge, 1990; Todorova & Osburg, 2010).

As an extension to the idea of including teachers in the decision making process of technology integration, Mills (2005) identified:

> Another critical component for technology leadership involves what skills to look for in your staff. While knowledge of and comfort with technology is a must, technology leaders are increasingly being asked to provide more than technical expertise in our school systems. At or near the top of the list must be effective interpersonal skills. While control and ownership of technology decisions are vital, listening and communicating with staff and students can make the difference in a district's success with technology. (para. 10-11)

The ability to communicate is of paramount importance to administrator especially when a change in the manner of doing business is necessary. Requiring teachers to change their traditional ways of delivering instruction is difficult for the teacher, but more so for the administrator, because as the instructional leader, the administrator must model the change. The task is, however, less surmountable for the administrator who possesses effective interpersonal skills and can create an aura of credibility among the members of the staff.

Cavanaugh (2001) explained:

> When we talk about technology in schools, we are talking about powerful new tools for learning, and in many cases about changing the way teaching and learning happen.… Integration of technology begins with the recognition that at school, everyone's job is to learn! All staff must embrace change and see themselves as learners and models of learning. Next, understand that technology integration is as much about change as it is about technology, and know the importance of change. Some of the benefits for the school and the community of technology integration are a stronger professional bond among teachers, who are

> less isolated when they use communication technology such as email.…
>
> Technology leaders should avoid vision- killers such as reliance on tradition.…
>
> School technology leaders model ideals of lifelong learning. (para. 7-10)

An effective technology leader can model technology use by sending messages to teachers via e-mail rather than through traditional paper format. This is part of creating a culture of technology usage in the school. The role of the administrator in technology integration is pivotal. In this role the administrator is like an expedition guide who has the responsibility to organize, to facilitate, to deploy, and to rescue (Leng, 2006; Wenzel, 1998). Administrators may also be in the best position to influence teacher's perception of technology and to provide the support to help teachers to overcome a natural resistance resulting from technophobia. Styron and Styron (2011) concurred that school administrators as technology leaders, must not be consumed with the management of technology at the expense of working through teachers' fears and emotions. Teachers' fear of using technology will eventually dissipate as the administrator entices and encourages them to use technology and assists them in demystifying the world of technology. Naturally, building principals who are acclimated to technology are in the best position to serve their teaching staff and to help them to make the transition to innovation less uncomfortable.

Perhaps, the best way administrators can help their teachers to become tech savvy and comfortable using technology in their classroom instruction is to provide them with lots and lots of training. But more importantly, teachers must be provided with the right type of training– training that is applicable to their needs and relevant to the academic goals for student achievement as dictated by the curriculum. Responding to the

technology needs of teachers involves providing education in application use, as well as building a background in educational technology theory, use, and issues that will empower them to use technology in their classroom instruction and educational practices. In other words, professional development in technology should provide teachers with opportunities to explore, to use, to master, and to apply technology to the educational process. This includes integrating technology across the curriculum and exploring new technologies in order to master their application to professional and personal development (King, 1999; Starr, 2003; Webb, 2011).

Too often administrators build a field of dreams in their belief that, if the school acquired technology equipment, teachers would be inclined to use the technology. They invest heavily in equipment procurement leaving very little budgeted funds for teacher training, thus the equipment is left unused for the most part. Therefore, administrators must become cognizant of the fact that, because teachers are on the frontline of classroom instruction, investing in state-of-the-art teachers should take precedence over investing in state-of-the-art equipment. As a result, administrators who fail to provide adequate support structures for their teachers are preparing teachers to resist technology integration into their classroom instruction. Therefore, administrators must provide professional development and collaboration in order to support and to encourage teachers to integrate technology into their instruction (Foughty & Keller, 2011). To expect teachers to change their instructional practices voluntarily is merely wishful thinking. In the absence of compelling reasons and adequate training and guidance, teachers are unlikely to pursue this course of action. Technology education programs cannot be implemented just by installing technology equipment or creating a technology lab. The greater investment

must be directed to professional development for the real agents of change, the teachers; investing in equipment alone is wasteful (Hobbs, 2001). Smith (n.d.) interjected:

> Here is a slogan worth repeating - You can spend all the money you want on hardware, software, and infrastructure, but unless you train teachers to integrate technology into the curriculum – which is not the same thing as training teachers to use computers – you've wasted every dime you've spent. (para. 1)

Actually, Sahin (2010) suggested that educators must shift their focus from just providing more technology to investing in faculty. Meanwhile, Bude (2009) reiterated that having the best equipment and teacher training does not guarantee that teachers will effectively integrate technology into their classroom instruction.

The real aim of integrating technology into classroom instruction is for the express purpose of advancing student achievement by means of instruction that is more relevant and effective. Administrators who promote technology as a tool for collaboration and stimulation for authentic learning experiences can enhance teacher instructional proficiency and further student achievement. Enabling teacher-leadership is also a way in which administrators can make technology integration a reality in the classroom and the school. This type of collaboration and team building extends the traditional sense of responsibility and decision- making to individuals who may never become administrators. Furthermore, this gives teachers ownership of the problems and solutions to those problems. Administrators, who utilize the expertise of teachers effectively, send a message of recognition and confidence in the abilities of teachers. This in itself can make technology integration into classroom instruction a less tedious task (Hughes & Zachariah, 2001). Moreover, administrators must provide their teachers with professional

development on technology integration that focus on strategies that enable teachers to teach differently and support inquiry and collaboration (Mazzella, 2010).

Bray (1999) emphasized that the goal of professional development is to assist both the over zealous and the most resistant teachers to use technology as a dynamic part of the curriculum. Failure to consider the needs of teachers will incur resentment and negative attitudes. So, in order to encourage teachers to take responsibility for integrating technology into the teaching and learning processes, administrators need to become their champions by offering all the support they can including on and off site learning opportunities, required resources, and plenty of time for planning and collaboration. Probably, the following eight-step guide outlined by Bray can form the basis of an action plan for administrators who truly support technology diffusion throughout the school:

1. Create a team
2. Set your goals and vision
3. Design an action plan
4. Design and support individual learning plans (ILPs)
5. Identify and Evaluate your needs
6. Define where you are now
7. Develop a list of learning opportunities
8. Address the effectiveness of your action plan.

Obviously, the role of the administrator in technology integration is critical to its successful diffusion throughout the school. Seeking answers to four strategic questions concerning technology integration will set the administrator on the road to successful technology integration throughout the teaching and learning processes:

1. What is technology integration and what it isn't?
2. Where does technology integration happen?
3. What are the barriers to technology integration?
4. What are the stages of technology integration?

Creating a common vision of what technology integration means and where it happens, begins the journey toward the integration path. Equally important are recognizing the barriers that will surface along the way, making plans to address the changes that will take place. Classrooms where students are fully engaged in meaningful learning using a variety of instructional technologies to meet their goals are electrifying. However, technology integration is a growth process that takes time. Making educators aware of answers to these questions could be a crucial step toward using computers effectively in education (Dias, 1999).

The school administrator is the instructional leader of the school. In this position, the administrator must take the leadership role in creating a culture of technology throughout the school. In reality, the administrator must model technology by using technology, teaching teachers how to use technology in their classroom instructions, and encouraging and supporting the use of technology in classroom instruction. This study hypothesizes that there is a positive relationship between administrator mentoring of technology and teachers' use of technology in their classroom instruction.

Teacher Perception

Integrating technology into classroom instruction does, indeed, require bold visionary leadership. Consequently, regardless of the presence of this type of leadership, the extent and effectiveness with which technology is integrated into classroom

instruction depends to a great extent on the classroom teacher. The challenge for today's educators is not programming the computer or learning some difficult operational commands but in using computers and other technologies in ways that can advance student learning. Teachers are saddled with the responsibility to integrate technology in ways that ensure that their students succeed in learning communications, and the life skills, in addition to becoming technology literate. As a matter of fact, the technology standards developed by the International Society for Technology in Education (ISTE) for teachers and students indicate that more emphasis should be placed on infusing technology into the curriculum in ways that that create meaningful learning experiences and increase technology literacy, rather than merely using the technologies (Dias & Atkinson, 2001; Guernsey, 2000; Hopper & Hendricks, 2008).

However, much of this success, or lack thereof, depends on the teacher's perception of the benefits of technology to the advancement of the teaching and learning processes. Stols (2008) emphasized that unless a teacher views technology use as an integral part of the learning process technology will remain a peripheral ancillary to his or her classroom instruction**.** Rappaport (2003) explained that though the goal of technology integration is to improve student learning, the reason that merely introducing technology into schools will have minor effect on education is that technology is not inherently an agent of change. Yet, Mao (2011) insisted, "The introduction of technology produces fear…. With technology comes change … change can be difficult" (p. 72). Indeed, technology is a destabilizing agent, because it does in fact change the manner in which things are accomplished; however, one must be cognizant that education like all other long established institutions is also resistant to change.

As a destabilizing agent, technology integration into classroom instruction means that teachers must change their long standing medium of instruction and make adjustments to their instructional methodologies to accommodate this agent. However, this is much easier said than done, because the psychological mental models they have of the teaching and learning processes have been developed over long periods of times and have been consistently reinforced by the existing infrastructure. Waight and Abd-El-Khalick (2007) agreed that teachers' beliefs are integral to their planning and instructional practices and these beliefs translate into their values and ideas of what is important and how it should be conveyed to their students**.** Actually, many teachers are reluctant to use technology in their classroom instruction simply because they have legitimate questions and doubts about the effectiveness of technology to improve the teaching and learning processes (Wang & Reeves, 2003). Meanwhile, Bousquet (2009) reminded that the benefits of technology are significant; but, the downfalls are not insignificant!

Furthermore, teachers may view technology as irrelevant to their lessons or incapable of advancing understanding of the concept they are teaching. This makes integrating technology a very difficult strategy for many teachers who have been teaching for years, have a tried-and-true curriculum, and therefore, do not perceive the significance or benefits of technology. Added to their dilemma is the pace with which technology changes --- new technologies continue to be demonstrated before teachers have tried or gotten accustomed to the former ones. Teachers have not jumped on the bandwagon, because they fear falling off (Bray, 1999; Prensky, 2007). Some teachers argue that if they are going to be forced to give up their traditional teaching

methodologies and adopt technology, they at least want to see proof that their efforts are worth the results (So & Kim, 2009). Others maintain that technology can be used as a springboard for learning math, science, literature, and history. They want students to use software to reinforce the lessons that were taught by their teachers (Chen & Reimer, 2009; Guernsey, 2000). Meanwhile, other teachers resist technology integration, because they perceive the negative effect on the culture of their school in that it curtails face to face communications among teachers and between student and teacher (McNierney**,** 2004).

Teachers should perceive technology as a powerful new tool for learning and for changing the way in which teaching and learning occur. This work of change is easier for those who understand and believe in the change. The first step in the integration of technology into education is the recognition that schools are designed for the purpose of learning. Everyone in the school must embrace change and think of himself or herself as a learner and model of learning. By doing this, technology integration will be seen as a medium of change as well as part of the change (Cavanaugh, 2001). Yet, Hartzell (2003) and Lacina et al. (2010) are conscious of the fact that people are creatures of habit so once teachers grow accustomed to a particular teaching methodology or a particular way of relating to their students and colleagues, one can reasonably understand why they are expected to be resistant to alternatives to the norm. Change forces us to step away from familiar work worlds into ones that are less predictable. Teachers who do not believe in the hype of technology are unwilling to make the change or reluctant to even try. Stols (2008) emphasized that if teachers do not perceive the use of technology as beneficial enough to make the effort of using it worthwhile, they will not use technology. People

create their own universes and adamantly defend them. Our present perception of schools and educators developed a long time ago when we ourselves were but mere school children. Thus, one can understand why teachers may view introducing new ways to perceive things or better ways to do what they have always done makes them uncomfortable. Teachers, like other people have a difficult time adjusting to, or adopting practices with which they are unfamiliar and a more difficult time accepting and doings things in which they lack confidence. Webb (2011) concluded that teachers' willingness to integrate technology into the curriculum is affected by their own attitudes towards technology; the more positive their attitude the more prone they are to integrate technology.

No new genius is needed to conclude that teachers like to exude a high degree of confidence in front of their students. They like to be seen as confident disseminators of the content they impart to their students and possessing of control of how this content is commuted and accepted by their students. Given the increasing pressure for teachers to integrate technology into their classroom instruction, Lam (2000) conducted a study to attempt to understand if teachers' indifference actually resulted from fear. The study concluded that fear of technology was but a very minor deterrent to teachers' use of technology in instruction. In fact, results of the study indicated that the practice of labeling teachers *technophobic* is unfair, because teachers' decisions to integrate technology into their classroom instruction are based not on fear but on personal convictions. The teachers who did not use computers in their classroom practices did not cite fear as a controlling factor for not using them. Some teachers did indicate their lack of confidence in their computer skills, but not of complete reluctance to use them.

Indeed, some teachers seemed to prefer their traditional methods of teaching, others thought that the technologies were too stupid and too mechanical, while others admitted that they did not possess the confidence that technology could provide the ascribed benefits, although they believed that technology could in some ways benefit their students by giving them access to other students or practicing writing skills. Conversely, the teachers who used technology in their classroom instruction perceived that technology was beneficial to the teaching and learning processes, but did not speak of adopting all things technological. In fact, a study conducted by Baytak and Akbiyik (2010) concluded that although teachers perceived that technology could benefit student learning, they could not articulate how this could be achieved.

Again this shows that the availability of, and access to, computers and other technologies and even knowledge of technology is no guarantee that teachers would be inclined to use technology in their classroom instruction. Moreover, even though teachers believe that technology may lead to improvements in teaching and learning, they may choose not to use technology if they do not have the confidence to use it. Certainly, given the availability of technology and attainment of the skills and knowledge to use technology, little or no integration will occur without positive attitudes and a lessening of anxiety towards technology (Rovai & Childress, 2003). Consequently, one reason for the lag in technology integration is that teachers are not yet convinced that computer technology can significantly enhance learning (Royer, 2002). Pedersen and Marek (2007) supported this view that knowledge of and comfort with technology do not assure usage of technology. This same attitude is extended by Niederhauser and Perkmen (2008) who added that intrapersonal factors like self-efficacy, outcome expectations, and interest play

a central role in whether teachers choose to integrate technology into their instructional practices.

Regarding teachers' reluctance to use hand held technologies, Purcell (2005) warned:

> Left unchecked, teachers' reasonable hesitation about computers and other devices can become deeply embedded sources of resistance to technology use and integration. These same hesitations become increasingly difficult to overcome given insufficient professional development opportunities to overcome teachers' lack of skill and the lack of sustained curriculum development support for effective and efficient technology use being afforded teachers today. When held up for closer examination, though, teachers' perceived obstacles to using hand held technologies do not always match the realities they encounter in the classrooms.…New technologies that complement and nurture active learning, collaborative problem solving, and knowledge construction are not being embraced by teachers in lieu of more traditional, didactic instructional approaches to learning and teaching. If teachers remain unwilling to change their approach to instruction to reflect the promise and potential alluded by handheld technologies, then there may be little hope for the success of these devices regardless of how much or how little software is available. (pp. 79–93)

Without doubt, the introduction of technology into schools was heralded to revolutionize education in various ways. Unfortunately, this expectation did not materialize. Much to their chagrin, the blame for the failure was placed squarely on the shoulders of the classroom teachers, notwithstanding the fact that many innovations into

education have previously failed for reasons other than teachers' doings. Many believed that once the technology was introduced into the schools, teachers were free to use whatever was appropriate, but they refused to do so, because of self-interest, fear, or other personal and self-serving reasons. Yet, there were some who perceived that teachers needed time to accept the new technologies and to change their beliefs, which could be accomplished through the proper type of support. Then, if no change took place, one could conclude that something were indeed wrong with the teachers, students, or anyone except the researchers and the pundits who failed to realize that they never give credence to teachers' perceptions about technology use in the classroom (Wang & Reeves, 2003).

This propensity to blame teachers for the slow pace with which technology is integrated into the classroom instruction may or may not be groundless**,** but not unexpected. Indeed, teachers are the ones who are in direct contact with the students delivering instruction on a daily basis. Clearly, to attribute the inability or the resistance of teachers to integrate technology into their classroom instruction to their fear of technology is arguable. Lamson and Barnett (1994), and Okojie et al. (2006) stipulated that there should be a unifying vision that the teacher is the primary vehicle for instruction and is, therefore, the key to implementing changes in the classroom. Teachers' resistance to technology integration can be overcome by providing them with the access, training, and support they need to make technology an effective tool for teaching and learning. One must be sensitive to the fact that at the inception, teachers are being asked to use a tool which they do not understand.

In addition**,** Hansen and Lovedahl (2004) advised that one must also become cognizant of the notion that technology is not a one-shot cure-all, so teachers will have

difficulty to let go instantly of the past and to pursue a new beginning. Also, one has to recognize that many innovations just do not work well, ideas may appear ambiguous, and some will be necessary to redefine the program. Given these issues, there is little difficulty in understanding why teachers will be apprehensive to embrace the wholesale use of technology. However, there are those critics who still maintain that teachers' fear of technology abounds in many schools. They ignore the fact that teachers most likely teach the way they themselves were taught. For example, a study conducted by Thomas, Larson, Clift, and Levin (1996) concluded that elementary student teachers whose supporting teachers used the classroom computer strictly to prepare parent newsletters, lesson planning, assessment, and grade recording were less inclined to use the computer as a resource for curriculum planning or to explore other software for classroom use. These differing uses of technology may suggest that teachers need to understand how to use technology as a tool as well as how to use technology as a teaching or resource tool. They must perceive technology as versatile and beneficial to the teaching and learning processes. If they view technology as a disrupting force, they will most likely avoid or at least minimize its use. Baytak and Akbiyik (2010) concluded that one must accept that integrating technology is still new and time is needed to change the culture of teaching that teacher candidates may have experienced from their school year teachers.

Norton, McRobbie, and Cooper (2000) illustrated this complex attitude in the findings of a study conducted to determine why teachers of mathematics were reluctant to integrate technology into their classroom instruction. They determined that although the targeted school was considered technology-rich, the teachers of mathematics rarely used technology in their classroom instruction. Individual teachers' resistance was related to

their beliefs about mathematics teaching and their existing pedagogues. These pedagogues included their perceptions about examinations, concerns about time constraints and preferences for different texts resources. Furthermore, the research concluded that teachers' perceptions were also influenced by their preference for certain teaching methodologies. For example, teachers who were partial to the traditional direct instruction methods perceived teaching with technology as restrictive and lessened teacher control of the teaching and learning processes. On the other hand, teachers who espoused the constructivist philosophy of these processes were more apt to integrate technology into their math lessons, because they perceived technology as having tremendous impact on student learning. Likewise, Sun and Liu (2009) supported this idea that the adoption of constructivist theory can help teachers to integrate technology into their instruction.

Interestingly enough, although the mathematics teachers who used the learner-centered or constructivist approach to mathematics instruction realized the potential of technology integration in their discipline and used technology more frequently, they expressed concerns. While these teachers recognized that the technology like calculators, for example, took the tedium out of large computations, they worried that this would deprive students of the opportunity to practice basic skills and procedures that they believed were the main ingredients of secondary school mathematics. Many teachers also believed that their instructional practices were more effective and efficient in meeting their educational goals of covering the syllabus and helping students to pass examinations. This, they believed was more important than having students use computers. Yet, other teachers believed that they could use technology as a tool for

students to construct mathematical meaning and to explore the fallible nature of mathematics. These findings demonstrate that the critical beliefs or perceptions of teachers about technology use are reminders that high technology should not be seen as the panacea for the failings of modern education. Nor, contrary to the prevailing beliefs of many researchers, high technology should not be the cause for discarding so-called traditional forms and content of learning (Kleine, Trawick-Smith, & Swaminathan, 2003). Ranasinghe and Leisher (2009) advised, "Technology can never replace the human mind, but it can help expand it. Thus teachers have a critical role – teaching students how to use technology as a tool to help, rather than hinder, their learning" (p. 1957).

Applying this trend of thought to higher education, Zywno (2002) chided teachers for their failure to change their instructional practices to keep in step with the existing and emerging technologies. Although teachers are viewed as unresponsive to change, one might think that research conclusions which project that teaching with technology can enhance student learning would be enough to increase the level of teacher enthusiasm to make the necessary adjustments and to integrate technology into their classroom instruction. Unfortunately, this has not materialized. Thus, the author concluded that the dismal user rate of technology enhanced instruction is a direct result of the prevalent instructor-centered education paradigm, and the low knowledge of educational theories and instructional design principles. Therefore, So and Kim (2009) advised that teacher education should provide teachers opportunities for deep understanding regarding pedagogically sound technology integration through teacher programs that are holistically

designed to allow students to understand the complex interrelationship among content, pedagogy and technology.

Thus, understanding the role of technology in the classroom requires comprehending how to use technology to maximize student learning, a fundamental understanding of pedagogue, and the skill to interface the two to enhance the teaching and learning processes. Teachers' perception of learning is fundamental. Instructional methodological practices identify two primary approaches to learning- *didactic* and *constructivist.* The didactic approach is teacher centered and more in line with drill and practice or basic skills attainment.

On the other hand, the constructivist approach to learning is student centered and concentrates on student development of higher level thinking skills. The effectiveness of educational technology is enmeshed in the kind of pedagogy employed. Constructivist uses of technology help students to learn better than they would otherwise, whereas didactic uses of technology make technology useless or even damaging. Credence to this conclusion is supported by the findings that in spite of tremendous outlays for technology and the availability of newer and better technologies, students in technology-rich classrooms of the late 1990s learned little more than their counterparts did in the late 1980s. Increased access to technology cannot enhance performance without an effective teaching force and high standards. This effective teaching force that is necessary for effective integration of technology in classroom instructional practice is lacking in this country. In actuality, the U.S. teaching force is primarily a didactic one, whereas that of one of the highest performing countries, Japan, is oriented towards constructivist ideals (Wenglinsky, 2005).

Whether a teacher favors a didactic or a constructivist approach to learning is based on the teacher's perception of how children learn. However, one must consider that teachers have certain curricular goals to meet. Added to this is the school's philosophy of education over which the teacher may have very little control. For example, Prosser and Trigwell (1999) deduced that teachers conceptualize and approach teaching in a discrete number of ways which are qualitatively different, yet related. If these approaches to learning are related then, one might assume that the incidence of technology use in a constructivist classroom should vary little from that in a didactic classroom. However, research findings demonstrate that there is a greater disparity in the effectiveness and regularity of technology use among teachers with a constructivist view of teaching and learning compared to those teachers who uphold the traditional or didactic perception of the teaching and learning processes (Himes et al., 2005; Stols & Kriek, 2011; Wenglinsky, 2005; Zywno, 2002). This difference might be accounted for by the curricula goals, which are an antecedent of the school's philosophy of education. If the school's philosophy of education is focused on the student's basic skills preparation, most likely, technology will be centered on software that provides drill and practice and direct instruction will be the dominant instructional methodology. The qualitative difference is that the constructivist perception of learning encourages teachers to experiment more with technology, because it is more student-centered, less teacher controlling, and motivates students to seek meaning in learning through higher level thinking. Therefore, if teachers perceive that the constructivist methodology is more advantageous to their students' achievement then by design they will be more inclined to use technology in their classroom instruction. While the tradition approach to instruction

does not preclude the use of technology in classroom, research shows that this method does not augment the use of technology, and when the medium is used, the constructivist methodology is still more effective. Stols and Kriek (2011) extended the idea that "a relationship exists between pedagogical beliefs and technological use" (p. 148).

Woodbridge (2004) claimed that technology integration means perceiving technology as an instructional tool for delivering subject matter from an established curriculum. He insisted that educators must understand technology integration more completely. He elaborated:

> True technology integration is rare. It involves students constructing their own learning while using both hardware and software tools and allows for student-centered approaches for both teacher and student.… Teachers are practical and often autonomous individuals. They may not mind learning new skills, such as computers, but they desire flexibility and control in implementing those skills….Technology integration is a complex phenomenon that involves understanding teachers' motivations, perceptions, and beliefs about learning technology. There appeared to be a strong relationship among participants in this study between integrating technology in the classroom and having a philosophy that leaned towards using constructivists teaching strategies. (para. 7, 11)

The real intent of integrating technology into classroom instruction is predicated on the hope that students will learn how to accomplish more and meaningful tasks. However, one of the forgotten considerations is what teachers perceive that technology will do for them as teachers. In a study conducted by Sugar, Crawley, and Fine (2004), the research concluded that that technology integration was a personal decision for

teachers. This decision seemed to be uninfluenced by other people, resources, or impediments by the local school district. Technology adoption by teachers resulted solely form teachers' conscious reasoning about the personal consequences for using technology. Thus, although teachers cared about their student's success, they often questioned how technology would advance their careers as teachers. The fact remains that teachers are bombarded by the *technology is good* message, but do not perceive how technology will affect their roles as teachers, or how to integrate technology effectively into their classroom practices. For example, results from this same study indicated that many of the more experienced teachers thought that their students became too dependent on the technology and that technology seemed to be more entertaining than instructive.

This type of perception about technology is responsible for teachers' resistance or refusal to integrate technology into their classroom instructional practices. Moreover, good teachers usually use the methodologies and materials that are most advantageous to their students' learning outcomes. Glasset and Schrum (2009) suggested that "We need more research that will provide a greater understanding of how and why teachers' pedagogical beliefs are formed and sustained as well as how their beliefs about pedagogy relate to their belief about technology" (p. 48). Given this posture, this study will investigate the degree to which teachers' perception of the benefits of technology in instruction influences their use of technology in their classroom instruction.

Teacher Preparedness

In order for teachers to teach, they must have something to teach and, more importantly, they must have some depth of knowledge of the content they impart to their students. Many believe that teaching no longer centers around the transfer of knowledge

from teacher to student, but learning comes from student inquiry, critical thinking, and problem solving based on information derived from many sources. Mazzella (2010) believed that in order for teachers to integrate technology seamlessly they must have access to various types of technologies, as well as ongoing professional development that can facilitate change in teachers' knowledge beliefs and preconceptions. Such will allow teachers to develop the competencies to help students to develop the aforementioned skills. Thus, the most important competency for teachers appears to be knowledge– not merely content, but a firm understanding of how to use this knowledge to benefit their students. Bingimlas (2009) believed that lack of competence is one of the most important obstacles to teachers' use of technology in education.

Teachers should be more concerned with using technology as a tool that is integrated effortlessly into classroom instruction rather than teaching about technology itself. This shows the importance of focusing teacher professional development on competencies essential for designing, delivering, managing, and evaluating instruction. Therefore, teacher technology training, as well as frequent research and review of pertinent competencies must be ongoing processes (Scheffler & Logan, 1999). After all, "technology integration is not about the availability of technology, but more about the teacher's effective use of technology that makes a difference in reforming the classroom" (Gorder, 2008, p. 65).

On the other hand, Landry (2002) and Wright and Wilson (2005) maintained that teacher knowledge should include not only basic technology competencies, but also an understanding of the unique characteristics of the various types of technologies. Mohamed and Bakar (2008) charged that "to be able to function in a technology savvy

environment, teachers should be well trained to make use of the required technologies" (p. 62). The combination of technological, content, and pedagogical knowledge defines effective technology integration into classroom instruction. Schwartz, Peterson, and Henricks (2000) insisted that offering to teachers, technology workshops focused on the mechanics of hardware and software or placing technology in the classroom does not lead to technology integration. Teachers must play a leadership role in using the technologies in their classroom instruction. Therefore, teachers must practice using these technologies at home and at school to develop confidence with, and ownership of them.

However, if teachers must play this leadership role, the imperative demands that they must not only perceive technology as beneficial to their students' learning, but they must have the knowledge of how to integrate technology into their instruction, so that their students could derive from these benefits. Scheffler & Logan (1999) surmised:

> The most important competences for teachers appear to be knowledge and skills to make computers a seamless part of the school's curriculum. Teachers, in general have less need to teach about computers and a greater need to use technology as a learning tool that is integrated routinely into classroom instruction.…{There is} a growing need for teachers to learn more about how to use and manage this resource to enhance instruction. This change can only come about with teacher confidence and teacher competence in the use of computer technology....Teacher preparation and professional development for computer technology should be based on competencies essential for designing, delivering, managing, and evaluating instruction.…Rapid advancement in hardware and software make specification of these competencies a moving target: therefore,

> both teacher technology training and frequent research and review of pertinent competencies must be ongoing processes. (pp. 306-07)

This constant change in technology creates difficulty for teachers to gather the confidence and knowledge they need to integrate technology effectively into their classroom instruction. Teachers, then, must continuously evaluate their pedagogical principles. They must know whether or not what they are doing is beneficial to their students learning. Furthermore, given the dynamic nature of technology development, and the constantly changing landscape of educational practice, teachers must constantly improve just to keep in cadence with the changes and more so to make their instructional practices viable and relevant (Towndrow, 2005).

In reality, this complex maze of what is and what is not effective technology integration causes doubt and concerns among many teachers. Undoubtedly, commonsense dictates that teachers must be trained to use the technology if they are to integrate this medium into their instructional practices with any degree of completeness and effectiveness. However, there seems to be a disconnect between the teacher and the technology experts who focus more on what the technology can do for learning rather than how teachers can use technology to help children to learn. Many teachers believe that they lack knowledge about technology and do not know how to integrate technology into their instruction. Moreover, they lamented that most of the professional development workshops they attended were one shot deals with no follow up. Even more defeating was the fact that most of these workshops focused on the technical aspects of the technology rather than the pedagogical aspects (Lam, 2000).

In their research on teacher technology use, Fordham and Vannatta (2004) concluded:

> Higher levels of classroom technology use were best predicted not only by the amount of technology training a teacher received, but by the amount of time a teacher spends outside of class preparing for instruction and by a teacher's openness to change regardless of teaching philosophy or beliefs about one's teaching ability. Although research has shown that a constructivist teacher is more apt to utilize technology in the classroom, typically a constructivist teacher uses technology as a tool to advance constructive learning. (p. 261)

Certainly, if the goal of technology integration into classroom instruction is to promote student learning, the type of learning that promotes higher level thinking, then one may agree that this approach to teaching is effective. After all, research also shows that teachers who use the constructivist methodology have the higher levels of technology use in the classroom. This means that teachers who use the traditional or didactic teaching methodology are out of step with effective instructional practices, and hence, are not using technology to derive the greatest benefit from their instruction– enhanced student learning outcomes.

Kember and Murphy (1995) elucidated:

> Higher order thinking skills demand a different kind of learning and, thus, a different approach to teaching…. One learns to think skillfully by solving real problems that become more complex as one's thinking and imaginative skills grow. We develop strength and agility not by reading the sports page but through exercise. A new kind of learning also demands a different type of teaching….In

> education's traditional paradigm, teachers teach by lecturing; a student is expected to learn by listening to the teacher and then completing a set of exercises– often rote drills– about the information communicated.… Many teachers, especially those teaching the elementary grades, don't know their subjects well enough to coach them as skills.… Few teachers have been shown that effective teaching is itself a higher order skill. Most have never seen it practiced as such, and virtually none have been taught to coach students towards mastery instead of to teach by information transfer. Intentionally or not, the U.S. system of schooling has decided that teacher education is something that takes place in college and then is largely over. (pp. 99-104)

While using a computer as a teaching aid places new demands on teachers, in the larger context, a computer provides serious implications for classroom instructional practices. Contrary to the misguided beliefs of many, one of these implications is not the replacement of the teacher. Obviously, the computer, or technology for that matter, does not replace the teacher, because only the teacher's presence and skill can possibly channel the computer's flexibility and power into the creation of exciting learning experiences. While the computer and computer technology can reduce the role of the classroom teacher, there is no doubt that the burden of transforming classroom instruction falls upon the already hard-pressed classroom teacher. Indeed, the teacher will have to develop the new skills to use these technologies to advance student learning (Bitter & Pierson, 2002). Consistent with this view, Foughty and Keller (2011), opined that opportunities for teachers to understand how the technology can be used effectively and what the impact on student learning can be, is vital to them using the technology well.

These new skills may demand a change in instructional practices. Indeed, research consistently demonstrates that technology integration reflects the philosophy of instructional paradigms. This evolution requires a shift in perception about student learning and knowledge in general (Franz, 2000). Teachers' knowledge of how to integrate technology into meaningful classroom activities that are aligned to the curriculum standards is of extreme importance, for as Lei (2009) warned, "being able to use technology does not mean being able to use technology critically, wisely, or meaningfully" (p. 88). However, knowledge of how to create these activities that challenge students to employ higher level thinking is the key to assuring that the teachers' classroom instructional practices are achieving their goal of advancing student learning (Holland, 2000).

This idea may seem distant to some, but with the advent of the No Child Left Behind mandate, teachers are increasingly held responsible for students' success on state examinations. While some may argue that this does not impede or curtail the use of technology in the classroom, it may be disingenuous to say that this mandate promotes technology usage. Teachers may have the knowledge and the will to use technology in their instruction, but may be restrained by curricular and administrative demands. Sugar et al. (2004) intimated that although they may seem unrelated, both standardized testing and heterogeneous grouping of students may limit teachers' use of technology in their classroom instruction. The primary reason is that many schools structure their curricula according to the requirements of the state's standardized assessments. Unfortunately, many of these tests focus on multiple choice questions. This type of structure and the heterogeneous grouping of students limit the types of technologies that can be used in the

classroom. Therefore, teachers' knowledge of technology integration does not guarantee that technology will be used effectively in their classroom instruction. More likely than not, such curricula will concentrate more on basic skills acquisition which limits the type of innovation that technology brings to the instructional process.

Another important concept that teachers must know is that technology is multifaceted. Despite the broader viewpoint from the literature that instructional technology encompasses the teaching and learning processes, many including teachers, still use this term to mean computer technology. This myopic understanding is responsible for much of the problems related to integration particularly the focus on the access to hardware and software at the expense of pedagogy, as if to say that this medium is the panacea for the challenges facing education (Earle, 2002).

Regardless of the narrowness of a teacher's definition of technology, there still remains the importance that the teacher knows how to use the tool effectively enough to advance the teaching and learning processes. This is even more important, because the content of technology education is driven by the need to keep pace with technology and its application to classroom practices. Therefore, educational institutions must respond to the technology needs of teachers by providing them with training in application use, theory, and other training that would empower them to use technology in their educational practices. In this way, teachers will know how to integrate technology into their classroom instruction (King, 1999). Ertmer and Ottenbreit-Leftwich (2010) reemphasized:

> Teacher beliefs have been shown to be heavily influenced by the subject and school culture in which they participate … unfortunately, most of the culture to

> which they must conform has not adopted a definition of effective teaching that includes the notion of technology as an important tool for facilitating student learning. (p. 264)

Many people assume, understandably so, but nevertheless mistakenly, that this lack of knowledge about technology integration is mostly confined to older teachers. However**,** Bradley and Russell (1996) pointed out:

> When student teachers complete a course of teacher education, it is reasonable for schools to expect that graduates will have the knowledge and confidence to use computer technology effectively in the classroom. Increasingly, in primary and secondary schools, teachers are expected to know not only how to use computers, but how to use them effectively with students. However, in many educational systems throughout the world, there are concerns with teachers' use of computers.…it will be easy to assume that feelings of anxiety are held only by older teachers, and that the problem will eventually be solved demographically, as new generation of computer literate teachers replace the old….{however,} evidence suggests that a number of the newer generation of teachers still hold reservation about their ability to use computers in school. (p. 245)

Fourteen years after this observation, Goral (2000**)** quoted a 1999 NCES survey which reported that only 10% of teachers felt that they were competent enough to use technology effectively in their classroom instruction. One year later, 23% of teachers thought that they had the knowledge to integrate technology into their instruction, while 53% felt somewhat prepared to do so. Goral partially attributes this slow pace in technology integration to the sheer speed with which the technologies change. He

acknowledged that this coupled with the numerous demands on teachers curtails the amount of time teachers have to acquaint themselves with the new technologies and severely limit their ability to use them in their instruction. Teachers then must find time to keep pace with the changing technologies. However, Bhattacharyya and Bhattacharyya (2009) observed:

> Because there is an urgent need to improve teachers' skill in using technology in their classrooms care must be taken to ensure that the use of technology is pedagogically grounded in authentic experiences in which learners engage meaningfully with the subject of study instead of being mired in the details of technology…. Such technology infused learning environments would offer in-service teachers multiple possibilities for grounding instruction pedagogically instead of simply adding new technology to the classroom without any connection to the learning theories resulting in isolated and possibly ineffective efforts to incorporate technological literacy into teaching practices. (p. 21)

A basic knowledge of technology is not sufficient to provide teachers with the knowledge and confidence to integrate technology into their instructional practices. Indeed, it will be ignoring educational prudence to assume that teachers improperly trained in traditional teaching methodologies can deliver instruction effectively. If one can accept this premise, then one can easily conclude that it is irresponsible, if not naïve, to expect teachers who are not trained to teach with technology to integrate technology into their instructional practices. Bhattacharyya and Bhattacharyya (2009) argued that with the current workloads of teachers, it is not possible for them to reinvent their teaching unless they are provided with exemplars and the necessary resources. Therefore,

the authors advised that before teachers are asked to adopt a new pedagogy and reinvent their instructional strategies a team approach must be firmly in place to support this venture. Kumar and Kumar (2003) supported the research findings that teachers who underwent a single computer course might be able to teach students basic computer applications, but this would not be sufficient to prepare teachers to integrate technology into their instruction. This is the very reason that many teachers lack the experience to apply technology in classroom settings. Of course, the research shows that a single computer course can change teachers' attitude towards technology and can even improve their skills; but it is not enough to change teachers' attitude and equip them with skills that are necessary to get them to integrate technology effectively into their instructional practices. Therefore, teachers need to learn about the various technologies, as well as how to use them effectively in the classroom.

Moreover, teachers must realize that their perceptions of, approaches to, and the learning context they promote, affect the way students perceive technology. Unless teachers understand and use technology as an integral part of student centered learning approach, technology integration is not likely. In effect, only when students accept technology as part of a learning context that encourages some independence in learning– meaningful learning, will student achievement improve (Cope & Ward, 2002). On the other hand, with regards to the teacher Beglau (2011), emphasized that "selecting and integrating technologies requires knowing what is likely to result in student learning not how just to use the technologies" (p. 64).

Summary

The review of literature suggests that there is no easy answer to the problem of technology integration. While the literature offers examples of successful integration, much is fraught with suggested solutions, mostly unproven, postured by technology experts. For example, the general consensus that students' attitudes become more positive when they use technology has been proven argumentative. Some studies have concluded that when technology is used and expectations are imposed on students, learning increases, because of the added instructional support. Certainly, research also shows that new technologies can help teachers to enhance their pedagogical practice, as well as assist students in their learning (Bingimlas, 2009). However, technology when not properly implemented can cause student attitude to fall because of the added pressure placed on students to perform with tools that are unfamiliar and have not been mastered (Farnsworth, Shaha, Bahr, Lewis, & Benson, 2002). Nevertheless, this study will investigate whether technology integration is affected by, among many other equations, curriculum design, administrative leadership, teacher perceptions about technology and teacher knowledge of technology.

CHAPTER III

METHODS

This chapter outlines the researcher's process of data gathering and analyses to determine if, indeed, teachers' integration of technology into their classroom practices is influenced by: the design of the institution's curriculum; administrative leadership; teacher's perception or attitude towards technology; and teacher's preparedness and knowledge of technology. Further information is provided on the instrument used to gather the data, participants, role of the researcher, data gathering or data generation techniques, data analysis, and the rationale for the methodology.

Participants

Data were collected from 105 teachers from three public schools in Philadelphia, Pennsylvania serving students in Kindergarten through eighth grade and one private school (Kindergarten through twelfth grade school for children with learning differences) in an adjacent county. These schools are all under the administration of the same administrative team and are good samples, because the mission signature of the first three schools is technology. In fact, all students in these schools begin using technology from kindergarten. Technology is scheduled as a regular subject on a daily basis. Although the schools can be considered technology rich and teachers are encouraged to use technology in their classroom instructions, many teachers, for whatever reasons use technology reluctantly or fail to use technology effectively in their classroom instruction.

About 95% of the teachers are Caucasian, but about 95% of the student body is of African American or Latino descent. In addition, less than 30% of the teachers have more than five years of teaching experience and male teachers comprise less than 10% of the

instructional staff. Furthermore, the mean age of the participating group is approximately 25 years and the range is 38 years.

This group of participants was selected for the study because of the ease of gathering the data (the researcher's relationship with the schools) and the anticipation that participation would have been close to or equal to 100%, given the culture of the schools' environment. Moreover, the researcher is familiar with the administration, teachers, curricula, and educational philosophies of the targeted schools. This makes for ease of access to collect the data. Participation in the study was strictly voluntary and confidential, in that names were not allowed or required. Most likely the responses were candid, because of the lack of perceived threats or anticipated retaliation from the schools' management and because of their confidence in the credibility of the researcher. The candor and honesty yielded a positive effect on the reliability of the data and the research. This scenario did not become a serious limitation.

Research Design

This study utilized a Pearson's Moment Correlations to address the hypotheses primarily because the goal was to determine relationships between the independent and dependent variables:

1. There is a positive correlation between teachers' knowledge of technology and teachers' use of technology in classroom instruction.
2. Administrator mentoring of technology increases teachers' use of technology in classroom instruction.
3. Curriculum design affects teachers' use of technology in their classroom instruction.

4. Teachers use of technology in their classroom instruction is unaffected by teachers' perception of the benefits of technology in classroom instruction

and to use the analysis of data to answer the research questions:

1. Is there a correlation between teachers' reluctance to integrate technology into their classroom instruction and the teachers' knowledge of technology?
2. Is there a relationship between teachers' use of technology in their classroom instruction and their perception of the benefits of using technology in instruction?
3. Does Administrative leadership in technology contributes to the current state of technology integration into classroom instruction?
4. Does curriculum, including required teaching methodologies, affect teachers' inclinations to infuse technology into their classroom instruction?
5. Do curricula designs impede teachers' use of technology in their classroom instruction?
6. Does teacher perception of technology as an instructional tool influence their use of technology in classroom instruction?
7. Does teacher knowledge of technology increase the use of technology in classroom instruction?

The study is designed to determine the significance of four independent variables: curriculum, administrative mentoring, teacher perception of technology, and teacher knowledge of technology, singularly and combined on the dependent variable-technology usage in classroom instruction.

Procedure

In spite of the familiarity with the participants, the researcher made every effort to maintain confidentiality of the individual participant, as well as their responses. The data were gathered over a two day period. The researcher explained to the participants the survey instrument, the purpose of the data gathering, how the data would be used and the disposition of the paper surveys after the extraction of the data.

The researcher executed the instructions on completing the survey, distributed the survey instrument, and collected and procured all surveys. This policy was implemented because the researcher believed that this was an effective means of maintaining uniformity of the process, maintaining a high degree of ethics, and precluding the appearance of influencing the responses. The researcher also intended to mitigate or to dispel any semblance of impropriety.

All teachers were allowed sufficient time to complete the surveys but were instructed to avoid collaboration during the process. This was an attempt to maintain confidentiality and to avoid tainting the reliability of the data. The average time for completion of the survey was about 12 minutes.

Despite all of these precautions to maintain reliability of the data collected, one may assume that the researcher's knowledge of the participants could have been a negative as well as a positive. For example, participants might have answered some of the questions favorably even though the situation might have been contrary. They might have believed that the information would be shared with the school's administration which could cause conflict between administrators and teachers. On the other hand, some teachers might have intended to use the opportunity as a means of exaggerating the

present state of technology use in the school, in the hope that the school's administration will not pressure them to increase technology use in their instruction, while others might have exaggerated the situation for other ulterior motives. These are all possibilities, but there was no reliable method to extract truth of occurrence because the survey was anonymous. Therefore, in the absence of proof of any of these negatives, the researcher believes that the data gathered were indeed valid.

Furthermore, the possibility existed that other teachers might have believed that the researcher expected them to respond favorable or negatively to some specific questions and thus did not express their true sentiments. Realistically, there is always a risk, remote as it may seem that the school's administrators may react in some unfavorable ways towards their teachers depending on the results of a research using data collected from their institutions. Participants may entertain these thoughts themselves, whether or not this may be the case and this too, can have a negative impact on the validity of the data. Again, in the absence of proof positive of these assumptions, the researcher believes that the data gathered were valid.

Role of the Researcher

The researcher maintained independence in the data gathering and analysis phases of the study, as well as throughout all other phases of the research. In fact, the researcher discussed the purpose of the data gathering with all participants, but did not discuss the data gathered with any participant or the schools' administration before the entire study was completed. Furthermore, the actual instrument used to collect the data was unknown to all except, of course, the researcher himself, until the survey process.

This role is consistent with the type of research questions, and the theoretical framework of the instrument design. Given the situation that the researcher is closely familiar with the existing conditions at the school regarding the administration, the teachers, the educational philosophy, the curriculum and the general dynamics of the entire school districts, a posture of independence was necessary, if not critical. The combination of an assumed lack of researcher independence and the design of the measuring instrument like a Likert Scale had the potential to elicit data that might not reveal the true opinions of the participants in a survey. Such will contaminate the validity and impair the reliability of the research. In this type of environment, participant's confidence in the researcher is vital to the purity of the data that are collected from the surveys. Consequently, the researcher remained a non-factor as far as influencing the opinions of the teachers.

Instrument

The data were collected by means of a survey that contained 26 Likert Scale type questions. The instrument was designed by the researcher specifically because of its suitability as a tool for measuring attitudes and opinions, ease of completion, short period of time to complete, the probability of high participation and return, standardized questions and manageable sample size. The indicators were patterned after many found in the literature. However, the researcher was well aware that the type of instrument design might be susceptible to superficial responses, information that described rather than explained and unbalanced sampling even if it were distributed randomly. Moreover, the type of survey questions cannot be considered intrusive or incriminating, simply because they asked the participants merely to express an opinion without really giving any

substantive support for their opinions. In addition, the design of the instrument afforded the participant the opportunity to straddle the fence if he or she so chose, by selecting the position of neutrality whenever it was desirable. Although the researcher preferred that the participants give more definitive answers, the survey did afford the option of neutrality, so that the participant was not forced to give a directional response, if he or she did not know how to answer the question or preferred to give a safe response.

The instrument was pilot tested with a group of 12 teachers, but data gathered from this pilot test were not used in the analysis of data for this study. The average time of completion was ten minutes with a standard deviation of less than three minutes. Some teachers suggested disseminating the indicators of the categories rather than grouping them. Others suggested making some of the indicators more definitive. The survey was amended to accommodate these concerns.

Cronbach's alphas were used to test the internal consistency of the twenty-six (26) items that make up the five constructs listed in Table 1. All of the constructs contain five items except for the construct, Administrative Mentoring of Technology which is comprised of six items.

Table 1

Data Items Distribution

Constructs	Related Data Items				
Teachers' Use of Technology	1	10	14	18	21
Teachers' Knowledge of Technology	2	8	15	16	22

Table 1 (continued).

Administrators' Mentoring of Technology	4	6	11	19	25	26
Curriculum Design	5	7	12	17	24	
Teachers' Perception of Technology	3	9	13	20	23	

Table 2 shows the Cronbach's alpha computed for each construct. According to computed alphas, the items that make up the construct *Administrators' Mentoring of Technology*, (alpha = .88) had the highest internal reliability while those that comprise the construct, *Curriculum Design*, (alpha = .60) had the lowest internal reliability. Considering a test of internal consistency of a construct using Cronbach's alpha targets a measurement of .70 or greater, four of the five constructs met or closely approximated this threshold, while the other, *Curriculum Design* missed the threshold by about 10%.

Table 2

Reliability Statistics

Constructs	Cronbach's Alpha	Number of Items
Teachers' Use of Technology	.690	5
Teachers' Knowledge of Technology	.762	5
Administrators' Mentoring of Technology	.875	6
Curriculum Design	.550	5
Teachers' Perception of Technology	.687	5

Data Collection Procedure

Data were collected over a two-day period in January 2012 after approval was received from the researcher's dissertation committee and the IRB. Most of the surveys were completed on day one; however, a second day was required to accommodate teachers who were absent the first day of school.

The researcher distributed the surveys and monitored the process for specific irregularities regarding adherence to the instructions pertaining to participation and non-collaboration. In the absence of significant violations, or any other irregularities that might have compromised the validity of the data, the researcher considered the data ready for analysis.

A primary coding scheme was part of the inherent design of the measurement instrument. All data were codified into five broad categories ranging from strongly agree (5) to strongly disagree (1). Additionally, the 26 questions were placed into four categories, each containing five or six questions before analysis. Each category of questions was associated with one of the four hypotheses. The results of the data analysis are presented in the next chapter.

Undoubtedly, the data collection and analysis procedures were conducted in a most efficient manner to maintain the anonymity of the participants, as well as the integrity of the data. All necessary permissions were secured before the collection and analysis of the data. Furthermore, the researcher maintained independence in the data gathering and fostered due diligence in the preparation and analysis of the data. Thus, the entire process concerning the instrument, data gathering, participants, researcher, data analysis and results there from can be considered authentic.

CHAPTER IV

RESULTS

The primary purpose of this study was to determine the impact of four independent variables: *teachers' knowledge of technology; teachers' perception of technology; administrators' mentoring of technology; and curriculum design*, on the dependent variable, *teachers' use of technology* and to answer the research questions. Pearson Correlation Analysis was used to explain the research questions. The results of the analyses of the data continue below.

Means and standard deviations for the individual items that make up the constructs and each construct as a whole are presented in Table 3.

Table 3

Descriptive Statistics

Construct/Question	Min.	Max.	M	SD
Teachers' Use of Technology	**1.25**	**5.00**	**3.63**	**.79**
Q1: I use some form of technology instruction	1	5	3.80	1.19
Q10: I use learning activities that require technology	1	5	2.90	1.16
Q14: Tech. is used for instructional preparation	1	5	4.14	.84
Q18: I assign homework that required tech. use	1	5	2.86	1.20
Q21: I use computer assisted instruction in my class	1	5	3.68	.98
Teachers' Knowledge of Technology	**1.40**	**5.00**	**3.94**	**.71**
Q2: I don't know how to use technology	1	5	4.35	.90

Table 3 (continued).

Q8: Locating comp. generated presentation material	1	5	4.08	.88
Q15: I can evaluate technology based materials	1	5	3.37	1.04
Q16: I'm not competent in the use of tech. materials	1	5	3.84	1.10
Q22: I don't understand technology integration	1	5	4.06	1.05
Administrators' Mentoring of Technology	**1.00**	**5.00**	**2.79**	**.97**
Q4: My principal assists me with integrating tech.	1	5	2.97	1.40
Q6: Admin. Provides teacher with tech. training	1	5	2.47	1.19
Q11: Admin. uses tech. when conducting Prof. Dev.	1	5	3.40	1.15
Q19: Administrator's model of tech. use helps me	1	5	2.50	1.23
Q25: I don't get admin. feedback and support in tech.	1	5	2.99	1.29
Q26: I am rewarded by my admin. for using tech.	1	5	2.39	1.18
Curriculum Design	**2.00**	**4.80**	**3.66**	**.61**
Q5: A constructivist focused curriculum	1	5	4.04	.85
Q7: Tech. integrated curr. promotes better instruct.	1	5	4.34	.84
Q12: Curriculum makes implementing tech. hard	1	5	3.43	.98
Q17: Curr. design makes implementing tech. difficult	1	5	3.23	1.28
Q24: Traditional curricula do not limit the use of tech.	1	5	3.25	1.11
Teachers' Perception of Technology	**1.75**	**5.00**	**4.45**	**.59**
Q3: Technology empowers teachers and students	1	5	4.62	.78
Q9: Technology increases classroom interaction	1	5	4.38	.81
Q13: Tech. helps students with diverse learning styles	1	5	4.41	.77

Table 3 (continued).

Q20: Tech. inst. does not enrich students' knowledge 1	5	4.31	.09
Q23: Tech. helps to provide instruction in diff. modes1	5	4.41	.82

Note: Strongly Agree =5; Agree =4; Not Sure = 3; Disagree = 2; Strongly Disagree = 1

The numbers represent responses from a five point Likert scale ranging from one (strongly disagree) to five (strongly agree). Participants in the survey indicated that they were most confident in their responses to questions that make up the construct, Teachers' Perception of Technology (*M* = 4.45, *SD* = .590*)* in general, and specifically to Questions 3– Technology empowers teachers and students (*M* = 4.62*, SD* = .780) and 13- Technology in instruction helps teachers to reach students with diverse learning styles (*M* = 4.41, *SD* = .770). Conversely, the survey participants were least confident in their responses to questions that comprise the construct, Administrators' Mentoring of Technology (*M* = 2.79*, SD* = .970) in general, and specifically to Questions 6- My administrator provides teachers with training in technology and follow up support with integrating technology into classroom instruction (*M* = 2.47, *SD* = 1.19) and question 26– My administrator rewards me for using technology in my classroom instruction (*M* = 2.39, *SD* = 1.18). Participants also demonstrated strong confidence in their responses to the constructs, Teaches' Knowledge of Technology (*M* = 3.94, *SD* = .980), Curriculum Design (*M* = 3.66, *SD* = .610), and Teachers' Use of Technology (*M* = 3.63, *SD* = .790).

Correlation coefficients were computed primarily to determine the relationship of the four independent variables-Teacher Knowledge of Technology, Administrator Mentoring of Technology, Curriculum Design, and Teacher Perception of Technology

with the dependent variable-Teacher Use of Technology in Instruction. The results of the correlation analyses presented in Table 4 show that all correlations between the independent variables and the dependent variable were statistically significant at the .01 level except the construct, Administrator Mentoring of Technology, and that all were greater than or approximate .30 except the construct, Administrators' Mentoring of Technology.

Table 4

Pearson Correlations (N = 105)

		Teachers' Knowledge of Technology	Administrator's Mentoring of Technology	Curriculum Design	Teacher's Perception of Technology
Teachers' Use of Technology	Pearson Correlation	.365(**)	.224(*)	.352(**)	.252(**)

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

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

Teacher Knowledge of Technology and Curriculum Design show the most signification correlation with the dependent variable, Teacher Use of Technology, r (103) = .36, $p \leq .01$ and r (103) = .35, $p \leq .01$ respectively. In general, the results suggest that the four independent variables are reasonable predictors of teachers' use of technology in their classroom instruction, though among these variables, Teachers' Knowledge of Technology may be the best predictor of this phenomenon.

Table 5

Hypotheses

1. There is a positive relationship between teachers' knowledge of technology and teachers' use of technology in classroom instruction.
2. Administrative mentoring of technology increases teachers' use of technology in classroom instruction
3. Curriculum design affects teachers' use of technology in classroom instruction
4. Teachers' use of technology in classroom instruction is unaffected by teachers' perception of the benefits of technology in classroom instruction.

Hypothesis one assumed the existence of a positive relationship between teachers' knowledge and teachers' use of technology in classroom instruction. The results of the correlation analysis in Table 4 show a positive relationship $r\ (103) = .36, p \leq .01$ between teachers' knowledge of technology and teachers' use of technology in classroom instruction.

Hypothesis two claims that teachers' use of technology in classroom instruction increases in environments where administrators mentor technology. As shown in Table 4 Pearson's Correlation statistics reveals that the relationship between these two constructs is positive: $r\ (103) = .22, p \leq .05$.

The results of the analysis of data using Pearson's Product Moment Correlation show a positive relationship, $r\ (103) = .35, p \leq .01$. This is consistent with the suggestion made in hypothesis three that teachers' use of technology is affected by the design of the curriculum.

The results of the analysis of data shown in Table 4 show a positive relationship between teachers' use of technology in classroom instruction and what teachers perceive about the benefits of technology, $r\,(103) = .25, p \leq .01$. This is contrary to the assumption made in hypothesis four that teachers' use of technology in classroom instruction is unaffected by teachers' perception of the benefits of technology in classroom instruction.

Table 6

Research Questions

Number	Research Question
1	Is there a correlation between teachers' reluctance to integrate technology into their classroom instruction and the teachers' knowledge of technology?
2	Is there a relationship between teachers' use of technology in their classroom instruction and their perception of the benefits of using technology in instruction?
3	Does Administrative leadership in technology contributes to the current state of technology integration into classroom instruction?
4	Does curriculum, including required teaching methodologies, affect teachers' inclinations to infuse technology into their classroom instruction?
5	Do curricula designs impede teachers' use of technology in their classroom instruction?
6	Does teacher perception of technology as an instructional tool influence their use of technology in classroom instruction?
7	Does teacher knowledge of technology increase the use of technology in classroom instruction?

Table 6 above shows the research questions. Research question one sought to determine if there is a correlation between teachers' knowledge of technology and teachers' *reluctance* to use technology in their classroom instruction. Pearson's Product Moment correlations revealed a positive correlation between the independent variable, Teachers Knowledge of Technology and the dependent variable, Teachers' Use of Technology. Although no specific test for *reluctance* was performed, construct questions 2- *I don't know how to use technology* (M = 4.35, SD = .90) and 22- *I don't understand technology integration*, (M = 4.06, SD = 1.05) seem to indicate that teachers will not use technology if they do not know technology or if they do not understand how to use it in their instruction

The second research question inquired whether teachers' perception of the *benefits* of technology in instruction determined their use of technology in their classroom instruction. Results of the correlation analysis show that there is a positive relationship between teachers' perception of technology and teachers' use of technology in classroom instruction. A benefits test for technology use was not performed, however, construct questions 9- *Technology increases classroom interaction* (M = 4.38, SD = .810) and 23- *Technology helps to provide instruction in different modes* (M = 4.41, SD = .820) assume that the extent to which teachers use technology in their classroom instruction may relate to the proportionality of the added benefit they believe technology can contribute to the effectiveness of their instruction.

The third research question inquired whether administrative leadership in technology contributes to the level of technology integration in instruction. Construct questions 19 - *Administrator's model of technology use helps me* (M = 2.50, SD = 1.23)

and 4- *My principal assists me with technology integration* (*M* =2.97, *SD* = 1.40) seems to indicate that administrative leadership does contribute to the current state of technology integration into classroom instruction. For example, if administrators emphasize its importance and encourage teachers to use technology in their classroom instruction, teachers are more likely to do so; if administrators fail to demonstrate its utility, teachers may be less likely to integrate technology into their classroom instruction.

The fourth research question referred to whether the curriculum, including required teaching methodologies, affects teachers' inclination to infuse technology into their classroom instruction. Considering that implicit in curriculum are teaching methodologies, teachers' inclination to infuse technology into their classroom instruction may depend on the adaptability of the curriculum to technology use. This can be inferred from the participant responses to construct questions 5- *A constructivist focused curriculum enhances instruction with technology* (*M* = 4.04, *SD* = .850) and 7- *Technology integrated curriculum promotes better instruction* (*M* = 4.34, *SD* = .840).

Consistent with this thought, research question five sought to establish if curricula designs impede teachers' use of technology in their classroom instruction. Correlation statistics determined that there is a positive relationship between the design of a curriculum and teachers' use of technology in their classroom instruction; therefore, curricula design may impede teachers' integration of technology into their classroom instruction. This can be interpreted from the participant responses to construct questions 17- *Curriculum design makes implementing technology difficult* (*M* = 3.23, *SD* = 1.28) and 12- *Curriculum makes implementing technology hard* (*M* = 3.43, *SD* = .980). Thus,

the less technologically adaptable the curricula, the more difficulty teachers may have integrating technology unto their classroom instruction.

Research question six sought a determination as to whether teachers' perception of technology as an instructional tool influences their use of technology in their classroom instruction. Responses to all questions that comprise the perception construct, for example, questions 20- *Technology in instruction does not enrich students' knowledge* ($M = 4.37$, $SD = 1.09$) all show that the extent to which teachers use technology in their classroom instruction may vary with their conviction of the utility of technology as an instruction tool or how much added benefit technology can contribute to the effectiveness of their instruction.

Finally, research question seven sought an answer to whether teachers' knowledge of technology increases teachers' use of technology in their classroom instruction. Correlation statistics reveal a positive relationship between teachers' knowledge of technology and teachers' use of technology. Although causality cannot be presumed, responses to construct questions 15- *I can evaluate technology based materials* ($M = 3.37$, $SD = 1.04$) and 16- *I am not competent in the use of technology materials* ($M = 3.84$, $SD = 1.10$) do indicate that teachers' knowledge of technology may dictate the extent to which they may use technology in their classroom instruction.

Results of the analysis of data are consistent with the literature. Teachers' integration of technology into their classroom instruction is a function of teachers' knowledge of technology, administrator mentoring of technology, teacher's perception of the benefits of technology in their classroom instruction, and the design of the curriculum. Though these results do not presume causation, these results indicate that

these constructs are important in any discussion of technology integration in classroom instruction. Moreover, these results agree with the literature that technology integration is a complex issue.

CHAPTER V

DISCUSSION

Technology is not the panacea for ineffective instruction. However, the results of many studies have indicated that integrating technology into classroom instruction can make instruction more effective, efficient, and relevant. Yet, in spite of these findings, many teachers have not adopted the practice. Although there is a very obvious, if not sublime answer to one part of the equation, the answer or answers to the other part of the equation are more complex.

The most obvious answer to the inquiry concerning the reason that teachers do not integrate technology into their classroom instruction is that the medium is neither sufficiently available nor accessible to teachers. As incredible as this condition may seem, such is the state of affairs in many poor inner city schools throughout the nation. In some cases, the schools are connected to the Internet, but the classrooms do not share access. In others, the prevailing condition may be a lack of resources to procure adequate hardware and software, while other schools may have all of the above, but no one to maintain the system or to demonstrate how to use the software. Notwithstanding these prevailing conditions, there are many more concrete reasons that more teachers are not fully integrating technology into their classroom instruction, even though technology is available and accessible to them in the schools in which they are employed.

As a consequence of the numerous conclusions elicited from research on this phenomenon and from my own observations regarding teachers' classroom behavior relevant to integrating technology, I felt obliged to inquire further. Apart from the issues pertaining to availability and access, much of the serious literature related to research on

the reasons that teachers do not fully integrate technology into their classroom instructions centers mainly on:

1. Teachers' knowledge of technology
2. Administrators mentoring of technology
3. The design of the curriculum
4. Teachers' perception of the benefits of technology in instruction.

Thus, the purpose of this study was to investigate the relationship between each of these individual factors and teachers' use of technology in their classroom instruction. Consistent with this was to determine which of these factors had the strongest relationship with teachers' use of technology in their classroom instruction. A further purpose was to determine if conclusions drawn from this study added anything to the existing body of literature pertinent to this subject.

To gather data for the study, a five-point Likert Scale questionnaire containing twenty-six questions was pre-tested among approximately twenty teachers from three small K- 8 (Kindergarten to eighth grade) schools in Philadelphia, Pennsylvania. The schools were chosen because they were equipped with reasonable amounts of technology including hardware, software, at least one technology lab in each school, and Internet accessible classrooms throughout. In addition, the researcher was familiar with the administration and staff of each school. This allowed for greater access and co-operation among all participants.

The data from the pre-test were a source of useful information for making the adjustments to the measurement instrument to improve its relevance to the constructs to be measured. This information was also used to make the surveys more user-friendly and

less time consuming for the participants. Furthermore, the preliminary findings indicated that the instrument seem to measure the intended constructs and the conclusions drawn seemed to support the literature relative to teachers' willingness to integrate technology into their classroom instruction. After adjusting the measurement instrument, the survey was administered to one hundred five (105) teachers and five (5) members of the administrative staff. The surveys given to the administrative staff were not included in the data analyzed for the study, but just a decoy to attach some level of importance and inclusiveness to the endeavor. In effect, the data from the surveys completed by the administrative staff were exempted from analysis. Data were extracted from the surveys completed by the teachers and were analyzed (Pearson Product-Moment Correlation) using SPSS.

Review and Discussion of the Main Conclusions of the Study

Four hypotheses were developed for this study. An analysis and commentary on each follow in the proceeding descriptions.

Hypothesis 1: There is a positive correlation between teachers' knowledge of technology and teachers' use of technology in classroom instruction.

This hypothesis posits that there was a linear relationship between teachers' use of technology in their classroom instruction and teachers' knowledge of technology– that teachers' use of technology in their classroom instruction is directly related to the amount of technology they know. For example, acknowledging that there is no causal relationship, the more teachers know about technology the more they use it in their instruction and conversely, teachers who sparingly integrate technology into their

classroom instruction may be assumed to have limited knowledge of technology. The data support this hypothesis.

Discussion and Implication.

Part of the research on why teachers do not fully integrate technology into their classroom instruction (Beglau, 2011; Bingimias, 2009; Mazzella, 2010; Scheffler & Logan, 1999) focuses on the assumption, if not actually the fact, that technology integration is lagging primarily because teachers are not adequately prepared to use this fast moving medium as an instructional tool. Many conclude that older teachers are primarily lacking in technological skills, while younger teachers may have the skills, but do not use these skills in ways that improve the effectiveness of their instruction.

On the other hand, research (Holland, 2000; King, 1999; Mohamed & Bakar, 2008; Schwartz et al., 2000; Towndrow, 2005) also concludes that part of the reason that teachers do not integrate technology into their classroom instruction rests in the fact that teacher college preparation courses do not adequately prepare teachers for this practice. Thus, teachers come into the profession without the knowledge of how to integrate technology effectively into their teaching practices or the awareness of how technology can enhance their classroom instruction.

Consistent with the literature, teachers cannot be expected to integrate technology into their classroom instruction if they do not know technology or how to use technology. Furthermore despite the relationship between teachers' knowledge of technology and teachers' use of technology, there is no proof that teachers who know technology and how to use technology integrate technology into their classroom instruction to any greater or lesser extent than teachers with lesser knowledge of technology. In spite of these

considerations, however, this positive correlation between teachers' knowledge of technology and teachers' use of technology in their classroom instruction implies that teachers must become proficient in the knowledge and use of technology. Knowing technology is not sufficient; teachers must learn how to apply this knowledge in practical ways as part of their teaching methodology or to support their teaching methodologies. Another implication of this finding is that teacher preparation institutions, continuing education providers and professional development planners must provide teachers with the necessary skill sets that will help teachers to transition from traditional instructional practices to appropriate technology supported instruction. Indeed, the conclusions drawn from this hypothesis indicate that the positive relationship between teachers' knowledge of technology and teachers' use of technology in their classroom instruction indicates that teachers' knowledge of technology contributes positively to technology integration in instruction.

Hypothesis 2: Administrators mentoring of technology increases teachers' use of technology in classroom instruction.

This hypothesis is supported by the literature, as well as the analysis of data which shows that there is a positive correlation between Administrators mentoring of technology and teachers' use of technology in their classroom instruction. This correlation indicates that when administrators model technology or emphasize the importance of technology in instruction, teachers are likely to adopt the same practices. However, the correlation does not indicate that teachers do not value the importance of technology in classroom instruction in environments where administrators do not model technology.

Discussion and Implication.

In fact, some research studies (Afshari et al., 2008; Beglau, 2011; Christie, 2000; Dawson & Rakes, 2003; Kuzu, 2007; Lao, 2000; Mc Lester, 2004; Schiller, 2003) conclude that the school administrators must not only know the different technologies and how to use them, but must model using technology, if they expect their teachers to attach importance to the use of technology in their classroom instruction. Furthermore, the positive correlation between the administrators mentoring of technology and teachers' use of technology shows that administrative leadership in technology integration is important. Moreover, this correlation indicates that in environments where technology-literate administrators model using technology, teachers' integration of technology into their classroom instruction increases – administrators' mentoring of technology use has a positive effect on teachers' use of technology in their classroom instructions.

The implication of this finding is that administrators have a vital role in changing the culture of instruction in the school. Indeed, as instructional leaders, school administrators must practice what they preach. If they want teachers to understand the importance of technology integration in instruction, they, themselves must become technology literate and use technology in ways that will help teachers to attach importance to the medium as an effective teaching tool.

Moreover, administrators have to become supportive of teachers in this endeavor, (Davis et al., 2010; Mills, 2005; Styron et al., 2009; Todorova & Osburg, 2010). They must afford opportunities for teachers to acquire the knowledge and skills, procure the appropriate technologies, and provide the technological guidance to help teachers to garner the confidence they need to integrate technology effectively into their instructional

practices. Implicit in this correlation between administrators' mentoring of technology and teachers' use of technology is the notion that the extent to which technology is integrated into classroom instruction is a function of the administrators' leadership in technology.

Hypothesis 3: Curriculum design affects teachers' use of technology in classroom instruction.

This hypothesis argues that the curriculum has an effect on teachers' use of technology in their classroom instruction. Both the literature and the results of the analysis of data support this hypothesis. The positive correlation between the design of the curriculum and teachers' use of technology in their classroom instruction indicates that some curricula designs are more technology friendly than others and that some curricula designs can limit teachers' use of technology in their classroom instruction. Moreover, the correlation between these two variables presumes that the design of the curriculum may contribute to the level of technology integration into classroom instruction.

Discussion and Implication.

Contributing to the problem of technology integration into classroom instruction is the curriculum – that blueprint that guides teachers on what to teach, when to teach it and how to teach the information. When a curriculum is developed, inherent in its design is a methodology. If that methodology ignores technology or the flexibility to adapt to the continuous changes of technology, then the awkwardness of adjusting the methodology to accommodate this medium becomes a formidable task; the opportunities for teachers to

integrate technology into their classroom instruction becomes frustrating, if not discouraging, (Groff & Mouza, 2007; Hopper & Hendricks, 2008; So & Kim, 2009).

Research conclusions (Burns, 2010; Chen & Reimer, 2009; Daviss & Wilson, 2001; Hennessy et al., 2005; Himies et al., 2005; Schlechty, 1990; Smith, n.d.) determine that the design of the curriculum is of paramount importance. Thus, schools must design their curricula to adapt to the new technologies that can be used to make their students better thinkers and problem solvers. The positive relationship between the design of the curriculum and teachers' use of technology in their classroom instruction may be an indication that the design of the curriculum can be an inhibitor or an enhancement to technology integration into classroom instruction.

In effect, the correlation between curriculum design and teachers' use of technology in their classroom instruction implies that the design of the curriculum plays a serious role in technology integration. In fact, this signals to curriculum developers that they must give serious consideration to technology as part of the inherent methodology during this development. Furthermore, this merits that curriculum developers can no longer ignore the importance of including technology experts as part of their team. Certainly, this finding supports a narrowing or bridging of the gap between the curriculum department and the technology department to enhance the goal of integrating technology into instruction in the classroom. After all, as research about the cognitive and affective domains of the brain increases, many universities are merging their Education and Psychology departments to take advantage of the new information and to adjust the various views of the teaching and learning processes.

Consistent with this thinking, the correlation between curriculum design and teachers' use of technology in their classroom instruction further implies that education institutions must constantly update and upgrade their curricula, if they require teachers to integrate technology into their instruction. Therefore, the implication targets traditional inflexible curricula which can easily be considered as misfits for the flexibility of technology. Without doubt, this correlation suggests that the curriculum must be designed with technology in mind, if the goal is to infuse technology into classroom instruction.

Hypothesis 4: Teachers' use of technology in classroom instruction is unaffected by teachers' perception of the benefits of technology in classroom instruction.

This hypothesis contends that whether or not teachers' believe that technology is beneficial to their classroom instruction does not influence their use of technology in their instruction. However, neither the literature nor the conclusions from the analysis of the data support this hypothesis. On the contrary, the analysis of the data, notwithstanding the literature, determines that there is a positive correlation between teachers' perception of the benefits of technology in classroom instruction and teachers' use of technology in their classroom instruction. This correlation indicates that teachers' perception about the benefits of technology in instruction is related to the extent to which teachers will use technology in their classroom instruction. In other words, what teachers believe about the contribution of technology to the effectiveness of their instruction can be an impetus or inertia to technology integration into classroom instruction.

Discussion and Implications.

Much of the myth that teachers do not integrate technology into their classroom instruction because of technophobia has been squelched by research. As a matter of fact,

findings from a study conducted by Lam (2000) concluded that teachers' failure to integrate technology into their classroom instruction has less to do with fear and more to do with personal beliefs. This idea that technology integration was a matter of personal choice was supported by various studies (Cavanaugh, 2001; Lacina et al., 2010; Niederhauser & Perkmen, 2008; Rappaport, 2003; Sugar et al., 2004; Webb, 2011) which concluded that technology integration was a personal decision for teachers. Therefore, the correlation between teachers' perception of the benefits of technology in classroom instruction and teachers' use of technology in classroom instruction shows that the value teachers attach to the effectiveness of technology in instruction can be an important factor in teachers' integration of technology into their instruction.

Likewise, other researchers (Baytak & Akbiyik, 2010; Landry, 2002; McNierney, 2004; Prensky, 2007; Rovai & Childress, 2003; Stols, 2008; Waight & Abd-El-Khalick, 2007) found that the lag in technology integration in classroom instruction can be indicative of the reality that teachers are not yet convinced that technology can make a significant contribution to learning. The correlation between the two constructs is positive, rendering the conclusion that what teachers believe about the effectiveness or the irrelevance of technology as a support to the instructional process may be related to the enthusiasm or the reluctance with which teachers integrate technology into their classroom instruction.

Ignoring causation, the correlation between teachers' perception of the benefits of technology in classroom instruction and teachers' use of technology in their classroom instruction implies that technology integration is a mindset. It is like a psychosis with various magnitudes, each with its own undefined and complex variations. Indeed, if

technology integration depends on teachers beliefs of the contribution technology can render to the learning process, then teachers must first have some knowledge of technology before they can make informed decisions. If teachers have no knowledge of technology or are disinterested in acquiring these skills, then technology integration becomes an unattainable or at best, a hapless goal.

Another implication of this correlation is that if teachers are technology literate they are no more or less likely to integrate technology into their instruction unless they perceive technology as a medium that can add something more to the teaching and learning processes. However, the correlation implies that teachers who perceive technology to be beneficial to instruction and learning and possess the skill sets may be more likely to use technology in their classroom instruction.

Recommendations for Policy and Practice

For a long time, the responsibility for technology integration into classroom instruction has been delegated to the school administrators who in turn have reassigned the responsibility to classroom teachers. However, in this study the supporting literature and results of the analysis of data indicate that successful technology integration is based on a multiplicity of integrated factors.

For example, as the governing body, the School Board of Trustees the (Board) must establish a clearly defined vision of technology integration for its school district and disseminate this vision to the school superintendent for development and implementation. Furthermore, the Board must energize the public about the importance of this technology vision so that the public can share in the endeavor. Too often the public fails to provide the funding for such undertakings either because of lack information or connection to the

vision. Most importantly, School Boards must provide the necessary monetary and logistical support for the implementation and continuance of technology integration, as well as continuous oversight and evaluation of the state of technology integration throughout the school district.

Next, the school Superintendent must take ownership of the responsibility and challenges for the implementation of the vision of technology integration. First, the Superintendent should gather a team of technology experts, curriculum developers, administrators, teachers, and other tech savvy stakeholders to design a sustainable technology plan for the process of technology integration. This plan should represent a road map for the long term proliferation of technology throughout the school district and may involve curriculum adjustment or curriculum redesign, training for administrators and teachers, technology research to acquire the best and the most current technology hardware and software that meet the requirements of the school district's education plans. Moreover, this plan must include provisions for continuous update and maintenance of the entire system including the safeguarding and protection of hardware and software assets and guidelines for use of technology software regarding copyright infringement and user protection.

Finally, the acquisition of technology hardware and software must be a well-thought out team decision. However, at no time should the school district make these purchases unless the users are provided with the training to use the equipment and materials and the added benefit from such use can be clearly articulated. This is very important because both the literature and results of the analysis of data from this study

show that teachers' perception of the benefits of technology may have a profound effect on their willingness to integrate technology into their classroom instruction.

Nevertheless, the building principal plays a key role in executing the School District's technology plan. As the instructional leader, the principal must set the culture of technology integration throughout the school; therefore, the principal must lead by example. In other words, the principal must become technology savvy and must model, promote and encourage technology use throughout the school. For example, the principal should take every opportunity to communicate with teachers electronically via E-mail rather than paper; use technology when conducting professional development workshops; provide professional development opportunities for teachers and other staff in the use of technology; make technology integration a part of teachers' evaluation and reward teachers who integrate technology into their classroom instruction.

Creating a technology rich environment also involves establishing a technology services department within the school building. This department will have the responsibility for purchasing technology hardware and software, providing technical services like trouble shooting and servicing technology equipment, as well as advising and training users of technology hardware and software. Moreover, the principal must remain a consistent and believable player in technology integration so that all stakeholders may perceive its importance.

The role of the teacher in technology integration is unquestionable, the most important, because the teacher is on the frontline of the instructional process. Both the supporting literature and results of the analysis of data for this study indicate that teachers' knowledge of technology and teachers' perception of the benefits of technology

are important factors in teachers' willingness to integrate technology into their classroom instruction. Thus, teachers cannot reasonably integrate technology into their instruction if they do not know technology or how to integrate technology into their instruction to make that instruction more efficient, relevant, and effective. Teachers, then, must buy into the school district's broad vision of technology and participate actively in the school's culture of technology integration. This may mean adopting a positive attitude towards the endeavor by demonstrating a willingness to try to incorporate technology into their classroom instruction, even if they have to make drastic changes in the way they normally teach. Teachers will have to reorient their traditional ways of instruction to incorporate technology, but just as important, they must do so with the mindset that technology will improve their instruction and advance student learning.

Therefore, teachers should avail themselves of all opportunities to become technology savvy. This can be accomplished through attendance at professional development workshops, continuing education classes, college courses offered by brick and mortar education facilities or online schools and participation in technology conferences. Teachers can also gain information from technology trade books and magazines, the internet and other technology savvy colleagues. Perhaps, the best means to determine the benefits of technology is to practice using technology in instruction and to analyze the data derived from student performance based on this instruction.

Limitations of the Study

Most of the data for this study was gathered from teachers in three small K-8 schools in Philadelphia, Pennsylvania. These schools are charter schools and are not representative of the area schools which are traditional public schools. Many area schools

do not have the challenging academic program, the flexibility to reinvent the curriculum nor the resources to create and to maintain technology rich learning environments. Moreover, the great majority of teachers in these schools are young females with less than ten years of teaching experience. This limitation precluded analysis to determine the effect of gender on technology integration. Another unforeseen limitation was the small disparity in age of the teachers that made it almost futile to determine the impact of teacher experience or age on technology integration. Furthermore, the small sample size (105 teachers) limited the effectiveness if not the authenticity of the study.

Yet, another limitation that was not anticipated was the design of the schools' curricula. Given the fact that these schools were comparatively new and that their curricula were designed for technology use, the data collected could not accurately reflect any teacher views on integrating technology into a traditional curriculum. Therefore, the data collected for the curriculum design construct may have been derived from teachers who may never have taught a traditional curriculum.

The data collection procedure and the design of the instrument might have offered opportunities to compromise the validity of the data. A case in point is the low Cronbach's alpha, .550 for the construct, *Curriculum Design*. This could indicate a necessity to adjust some or all of the items that make up this construct. Another concern is the researcher's familiarity with all the teachers and administrators of the school. This might have had an impact on the manner in which the surveys were completed even though they were anonymous. Teachers might have not stated their true beliefs in responding to the survey information. In addition, the survey, five point Likert Scale afforded participants to straddle the fence by answering "Not Sure" to questions instead

of being forced to give a definitive answer. If this were not an option, the responses to the survey questions might have been more accurate measures of the respondents' true feelings.

Recommendations for Future Research

The results of this study provoke the following suggestions for further research about the roadblocks to integrating technology into classroom instructions. One conclusion of this study is that both teachers' knowledge of technology and teachers' perception of the benefits of technology can affect teachers' use of technology. Therefore, further quantitative research should be conducted to determine whether teachers' knowledge of technology influences teachers' perception of the benefits of technology in instruction or vice versa. Furthermore, future research should focus on determining if the perception gap is indeed personal or if it can be bridged in environments where there is a culture of technology.

This study shows that among the four constructs, there was a closer relationship between teachers' knowledge of technology and teachers' use of technology in their classroom instruction. Further investigative research should be conducted to determine if teacher use technology in instruction because the resources are available and teachers know technology or because teachers believe that technology improves the teaching and learning processes. In addition, the study should investigate how the design of the curriculum affects teachers' attitude towards integrating technology into their classroom instruction. Another interesting study might focus on the direct observation of the teachers in these institutions using technology in their classroom instruction. Most of the data used in this study was gathered from three small selective schools in Philadelphia,

Pennsylvania. These schools are not representative of the city, so the conclusions drawn from this study, though authentic, may be difficult to replicate. Perhaps, a study using this same instrument should be conducted using data gathered from a larger, more traditional school in a large city or in the suburbs. The study should be extended to a comparative study of technology use between charter schools and suburban schools.

Summary

Teachers' use of technology in classroom instruction is undoubtedly increasing as many barriers surrounding the myths of teaching with technology are being eroded. Administrators and teachers are becoming more technology literate and more aware of the power and versatility of the various media. Furthermore, teacher preparation institutions are realizing that they have a responsibility to provide their students with the skills sets that will make them highly qualified. This study has shed some light on the complexity of technology integration. Furthermore, it supports the literature and at the same time has sought to continue the dialogue and provided some direction for research that can provide clarity and direction for educators concerned with the issue of technology integration into classroom instruction. Indeed, the findings of this study supports the literature that technology is so ubiquitous that its relevance to the teaching and learning processes simply cannot be denied.

This study also supports the conclusions of the large majority of studies that technology integration does not begin or end with the classroom teacher. Considering that the dialogue about technology integration has primarily focused on the lack of resources and expertise in this endeavor, one can understand the reasons that school administrators and teachers bear the brunt of the blame where success has not materialized- the school

administrator is the instructional leader while the classroom teacher is the medium through which instruction is delivered. Nevertheless, this research has demonstrated that technology is not a spectator sport.

In reality, administrative modeling of technology, the curriculum design, teachers' knowledge of technology, and teachers' perception of the benefits of technology in classroom instruction all play a role in technology integration. The mere idea that teachers' perception of the benefits of technology in instruction seems to be an important element in the decision process is indicative of the complexity of the phenomenon. For example, how can teachers use technology in their classroom instruction if they are not technology proficient? Then, even if administrators model technology integration or even create the culture of technology use in the classroom, there is no proof that senior teachers would be willing to change their teaching practices that have proven successful and adopt technology as part of their methodology. Moreover, if the curriculum is an impediment to technology integration, why not design curricula that motivate teachers to use technology in the delivery of the subject matter? Though the literature supports all of these issues, most studies have focused on one issue or the other as the compelling reason that teachers do not integrate technology effectively into their classroom instruction.

This study suggests that any effort to minimize the importance of any single one of these four major issues is counterproductive. As long as one agrees with the literature and the findings of this study, that teachers' perception of the benefits of technology contributes to teachers' willingness to integrate technology into their classroom instruction, the problem of integration becomes more complex. Consequently, this study adds to the literature that given the availability of adequate technology hardware and

software and the necessary delivery platforms, any study focused on teachers' use of technology into their classroom instruction must consider teachers' knowledge of technology and teachers' perception of the benefits of technology in their classroom instruction.

APPENDIX A

TEACHER SURVEY

Instructions for completing this questionnaire*: **The survey is voluntary and anonymous. Kindly circle one answer only for each question. Please do not write your name or any one's name on the survey. Any survey that bears a name will be voided.***

1. I use some form of technology in my classroom instruction each day.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agre ○ Strongly Disagree

2. I do not know how to use technology to find resources for my classroom instruction.

○ Strongly ○ Disagree ○ Not Sure ○ Agre ○ Strongly Disagree

3. Techology empowers teachers and students with a wide variety of resources for teaching and learning.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

4. My principal assists me in finding ways to integrate technology into my classroom instruction.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agre ○ Strongly Disagree

5. A constructivist focused curriculum greatly enhances instruction with technology.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

6. My administrator provides teachers with training in technology and follow up support with integrating technology into classroom instruction.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agre ○ Strongly Disagree

7. A technology integrated curriculum promotes better classroom instruction.

○ Strongly ○ Disagree ○ Not Sure ○ Agre ○ Strongly Disagree

8. I am not skilled at locating computer generated class presentation materials.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agre ○ Strongly Disagree

9. Technology as a part of the instructional methodology increases interaction in the classroom.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

10. Many of the learning activities I use in my classroom require students to use some form of technology.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

11. My administrator uses some form of technology when conducting professional development workshops or teacher evaluations.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

12. Curriculum requirements such as graduation standards make it difficult to implement new ideas like technology in classroom instruction.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

13. Technology in instruction helps teachers to reach students with diverse learning styles.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

14. I use technology to prepare my instructional materials.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

15. I know how to evaluate technology-based curricula materials.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

16. I am not competent in the use of technology hardware and software.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

17. The rigidity of the curriculum makes it difficult to implement technology into my classroom instruction.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

18. I assign my students projects and homework that require the use of a computer or other forms of technology.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

19. As a result of my administrator's demonstrations, I am better prepared to integrate technology into my classroom instruction.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

20. Technology in instruction does not enrich students' knowledge.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

21. I use computer assisted instruction in my classroom.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

22. I do not understand how to integrate technology into my classroom instruction.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

23. Technology helps teachers to provide instruction through different delivery modes.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

24. Traditional curricula do not limit the use of technology in instruction.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

25. I do not get feedback and support from my administrator when I use technology in my classroom instruction.

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

26. My administrator awards me for using technology in my classroom instruction

○ Strongly Agree ○ Disagree ○ Not Sure ○ Agree ○ Strongly Disagree

Note: This project has been reviewed by the Human Subjects Protection Review Committee which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research subject should be directed to the chair of the Institutional Review Board: The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001.

APPENDIX B

IRB HUMAN SUBJECTS REVIEW FORM

HUMAN SUBJECTS REVIEW FORM
UNIVERSITY OF SOUTHERN MISSISSIPPI
(SUBMIT THIS FORM IN DUPLICATE)

Protocol # 2903200 2
(office use only)

Name Courteney Lester Knight Phone 6105519364

E-Mail Address Courteney.knight@yahoo.com

Mailing Address 242 Hearthstone Rd King of Prussia, PA 19406
(address to receive information regarding this application)

College/Division Education and Psychology Dept Education Leadership/Resear

Department Box # 5027 Phone

Proposed Project Dates: From To
(specific month, day and year of the beginning and ending dates of full project, not just data collection)

Title Roadblocks to Integrating Technology into Classroom Instruction

Funding Agencies or Research Sponsors N/A

Grant Number (when applicable) N/A.

_____ New Project

__✓__ Dissertation or Thesis

_____ Renewal or Continuation: Protocol #

_____ Change in Previously Approved Project: Protocol #

Courteney Knight — Principal Investigator — 3/8/07 Date

Advisor — 3/19/07 Date

Department Chair — 3/19/07 Date

RECOMMENDATION OF HSPRC MEMBER

_____ Category I, Exempt under Subpart A, Section 46.101 ( ) ( ), 45CFR46.

__✓__ Category II, Expedited Review, Subpart A, Section 46.110 and Subparagraph (7).

_____ Category III, Full Committee Review.

HSPRC College/Division Member — 7/27/07 DATE

Howard A. Doolman — HSPRC Chair — 8-15-07 DATE

INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.6820 | Fax: 601.266.4377 | www.usm.edu/irb

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **R27032002**
PROJECT TITLE: **Roadblocks to Integrating Technology into Classroom Instruction**
PROJECT TYPE: **Previously Approved Project**
RESEARCHER/S: **Courteney L. Knight**
COLLEGE/DIVISION: **College of Education & Psychology**
DEPARTMENT: **Educational Leadership & Research**
FUNDING AGENCY: **N/A**
IRB COMMITTEE ACTION: **Expedited Review Approval**
PERIOD OF PROJECT APPROVAL: **12/15/2011 to 12/14/2012**

Lawrence A. Hosman, Ph.D.
Institutional Review Board Chair

1.

Institutional Review Board
University of Southern Mississippi
118 College Drive
Hattiesburg, MS. 39406
May 23, 2007

To Whom It May Concern:

Mr. Courteney L. Knight has my authorization to conduct the survey of all teachers to collect data for analysis for partial satisfaction of his dissertation. Participation in this survey is strictly voluntary and may include all teachers from Main Line Academy, The Lab School, and Ad Prima.

Thank You

The University of
Southern Mississippi

Institutional Review Board

118 College Drive #5147
Hattiesburg, MS 39406-0001
Tel: 601.266.6820
Fax: 601.266.5509
www.usm.edu/irb

TO: Courteney Knight
242 Hearthstone Road
King of Prussia PA 19406

FROM: Lawrence A. Hosman, Ph.D.
HSPRC Chair

PROTOCOL NUMBER: 27032002
PROJECT TITLE: Roadblocks to Integrating Technology into Classroom Instruction

Enclosed is The University of Southern Mississippi Human Subjects Protection Review Committee Notice of Committee Action taken on the above referenced project proposal. If I can be of further assistance, contact me at (601) 266-4279, FAX at (601) 266-4275, or you can e-mail me at Lawrence.Hosman@usm.edu. Good luck with your research.

242 Hearthstone Road
King of Prussia, PA 19406
courteneylknight@yahoo.com
Telephone 610-265-7587
June 12, 2007

To All Participants:

The attached low risk survey is solely intended to gather data for analysis for a study in - partial fulfillment of the requirements for completion of my dissertation for the Doctoral program in Education Leadership at the University of Southern Mississippi. Participation in this survey presents no known risk to you. Furthermore, your participation is wholly voluntary and confidential. You may also discontinue participation in the survey at any time during the process.

Completion of the survey will take about 15-20 minutes of your time. Please feel free to ask me any questions during or after the process. You may also contact me at the home address, E-mail address, or telephone number for any matter concerning the contents, use, or disposition of the data collected. I thank you for your participation and I appreciate your time and help.

Thank you greatly.

Courteney Knight

Courteney Knight

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