# Teachers' Concerns, Attitudes, Beliefs, and Pedagogical Practices as it Relates to Technology Integration

by

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## Abstract

Education is the catalyst for preparing students to become productive members of society. Developing skills and knowledge students will need to compete globally is the charge excepted by educators at every level. The skills and knowledge needed to compete has become more interrelated with technology and its resources than ever before. In order to incorporate these changes in classroom practices the classroom teacher must make fundamental changes in the presentation of classroom instruction. These changes can only be accomplished through a process of continual professional development opportunities. This professional development must be teacher-centered focusing on their concerns, attitudes, beliefs, and pedagogical practices all while extending time for practice and reflection. The current study chose to analyze and compare teachers who work in comprehensive and magnet high schools. The data collected can be used to develop ideas for professional development opportunities for reluctant technology using teachers in order to meet the need of their students.

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Lord, I would first like to take a moment to give all praises to you. I know that this is not my miracle but your works. You have taken a young boy from south Mississippi who struggled in reading and blessed him, through many trials and tribulations, with receiving the highest honor bestowed upon an individual in education. For this I say thank you. I am truly humble and grateful. May your works through me be an inspiration for others who believe. I will continue to sing your praise as I work as a steward in your vessel.

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# CHAPTER ONE: INTRODUCTION

## Introduction

The idea of schooling is to prepare students to become productive members of society. As we prepare our students to make their marks on humanity, the question arises, "as educators are we preparing our students to compete universally?" The skills and knowledge students will need to compete globally and be successful is embodied within a world rich with technology (Marx, 2006). In many aspects students are well ahead of our efforts in the classroom. Students are using technology in their social lives in order to communicate, exchange and look up information, investigate new cultures, as well as for many other recreational activities (Becker, 1998). Many students have expressed concerns about the disconnect between after school activities, involving technology, and in school practices (Strom & Strom, 2009).

A number of K–12 in-service teachers are continuing with business as usual and teaching in the manner in which they were taught. Some teachers have moved forward with trying to integrate technology into classroom instruction while others have been reluctant to change (Brownell, 1997). One of the major contributors to this hesitance to conform is the teacher's personal pedagogical ideas. Research has suggested that in order to use utilize technology to its fullest potential one must adopt a more constructivist mind set (Cuban, Kirkpatrick, & Peck, 2001; Dunn & Rakes, 2009; Rakes, 2007; Rakes, Flowers, Casey, & Santana, 1999). These changes are not easily accepted. Time, concerns, beliefs, and attitudes are key components of change and adoption of new models (Hord & Loucks, 1980; Wetzel, 2002). The teacher is the

catalyst of change within their classroom. Given enough time, support, and proper training teachers who are reluctant to the change process have the best chances for integrating technology into their classroom operation in an authentic format that supports students learning processes.

## Conceptual Framework

The idea surrounding this study is the ultimate goal of student achievement. There are identifiers that suggest that students learn from two major sources: external influences and from classroom practices. These external influences are engulfed with technological tools which are engaging to the student learned. However, many classroom practices do not incorporate the use of these technological resources as instructional tools. As a result of the student being engaged on one end and disengaged on the other, students are becoming more disconnected with school. As an effort to reconnect students with learning and supply them with skills needed to link classroom experiences with real world application, many agencies are asking K–12 schools to incorporate more technology into instructional practices. Many have thought that making technology available to teachers would encourage them to utilize these tools in their classrooms. This was not the case; many teachers ignored these tools because they did not fit into their pedagogical views as it pertained to instruction. Ultimately, reformers began to look at teachers' pedagogy as a key contributor for getting teachers to integrate technology into their practices.

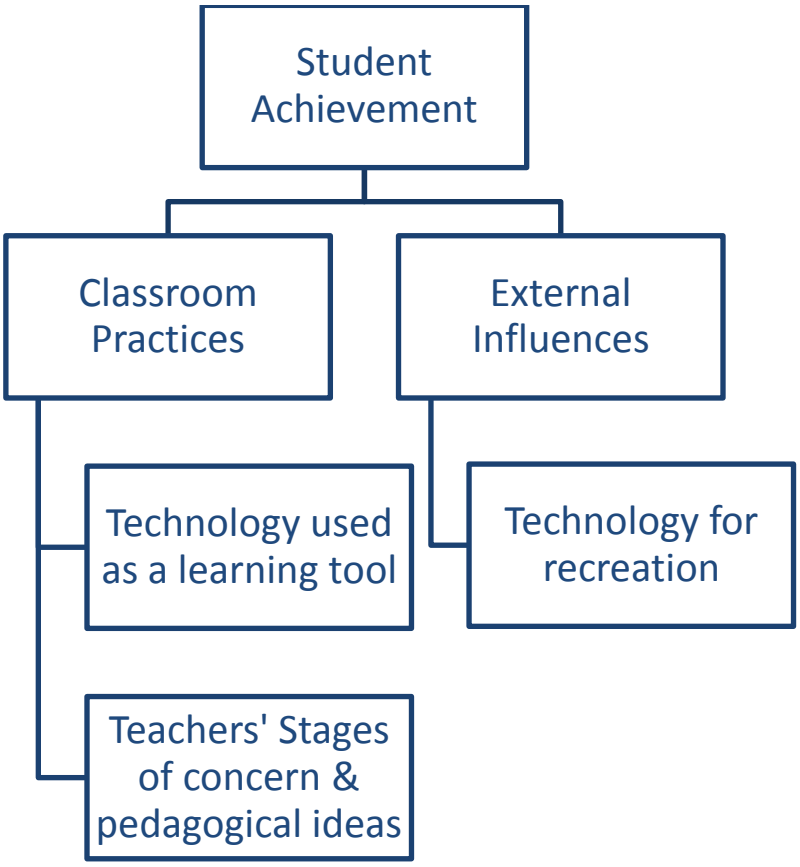


*Figure 1.* Student Achievement Tree

This study will take a bottom up approach for reaching student achievement. As described in figure 1 the ultimate goal of educators is to encourage and support student success. Students learn in two different arenas, intrinsically or inside the classroom and extrinsically outside the classroom. In many cases what students learn outside the classroom is influenced by technology at a greater rate than what is being taught inside the classroom. Because of this fact many students are becoming disconnected with what is going on inside the classroom (Strom & Strom, 2009). In order to prepare students for the global workforce and keep students engaged in the learning process teaching practices must include strategies that incorporate technological tools as well as authentic tasking opportunities (Marx, 2006). This research will deal with

teachers' attitudes, concerns, and constructivist behaviors surrounding their willingness or hesitance towards integration technology into their instructional practices. By identifying teachers at both magnet and comprehensive high schools a comparison study can be conducted to identify factors that would help support reluctant technology using teachers as they attempt to address pedagogical ideas and concerns related to technology use as an instructional tool. These ideas can be incorporated in professional development opportunities which allow teachers to learn how to better service their students and raise the academic altitude of all students.

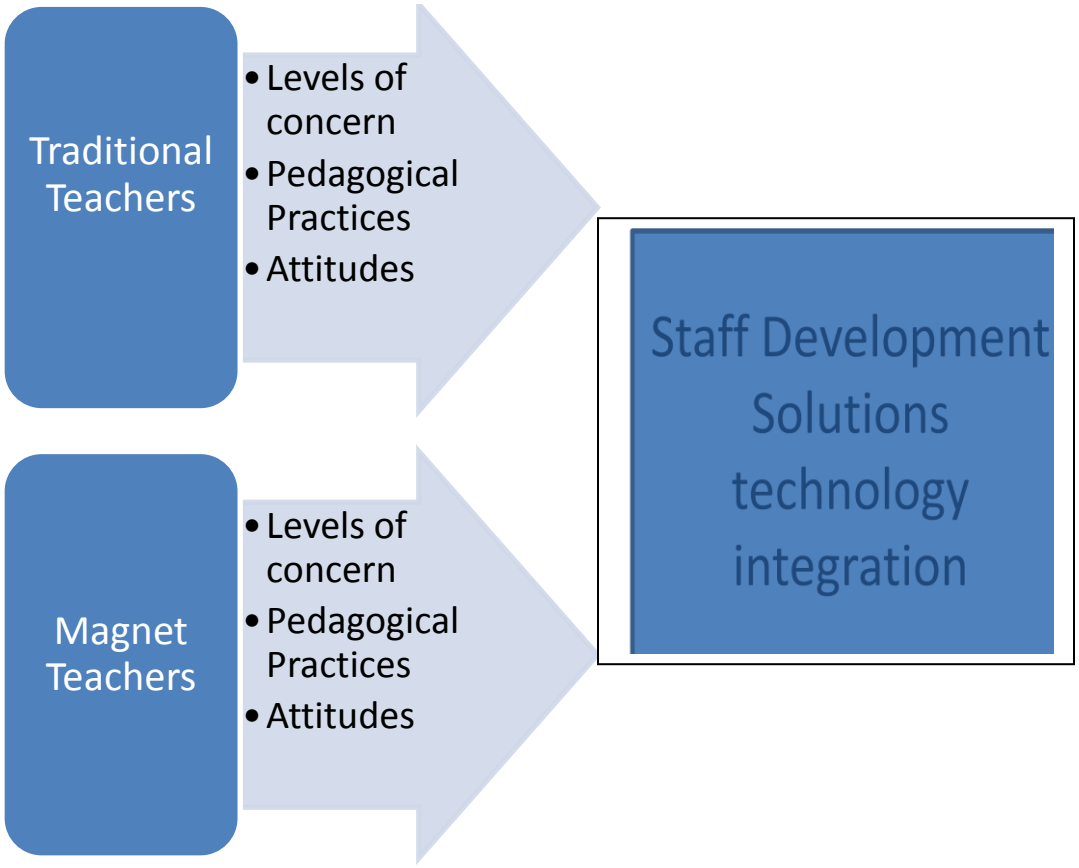


Illustration 2: Staff Development Support Diagram

Traditionally magnet schools have been composed of handpicked children from middle class families who are seeking specialized instructional formats that cater to the talents and

interest of its students (Neild, 2004; Smrekar, 2000). Magnet school teachers, in theory, are charged with the challenge of motivating a group of students who are considered academically astute (Doyle & Levine, 1984; Neild, 2004). Perceivably, expectations and demands for success for this particular group of teachers and students are relatively high in respect to the communities in which they serve. This being said, the question may arise "are magnet school teachers more proactive when it comes to technology integration as an instrument to service their students needs than their comprehensive school counterparts?"

Comprehensive/traditional schools do not have the luxury filtering the students in which they service. Comprehensive schools are nonselective schools aimed at servicing students within a local community (Conant, 1959; Hammack, 2004). Many of the students being serviced in these schools, mostly minority and poor, enter and leave with weak academic skills and are inadequately trained for future education or the workforce (Kemple, Herlihy, & Findings, 2004). Many of today's opportunities for employment have shifted from the industrial age to a more global one which relies heavily on the ability to interpret and operate within a technology rich environment (Marx, 2006). With national reports of school failures, student dropouts at an all time high, and a general disconnect with school by students at comprehensive schools the question can be formulated "are comprehensive high school teacher doing enough with technology as an instrument to service its student population?"

When looking at both magnet schools and comprehensive schools and their success rates an investigation of teachers and their instructional strategies for success are worth investigation. Doyle & Levine (1984) discusses that magnet schools offer a setting in where teachers are more receptive to reform. However, they also recognized that magnet schools may set higher academic standards but their organizational structure is no different than other schools service students in

the same age group. The current study wishes to investigate any pedagogical differences among traditional and magnet school teachers when dealing with technology as an instrument to aid in the servicing of the students in which they serve.

## Statement of Problem

Traditional classroom teachers are being asked to integrate technology into their instructional practices. These demands have been met, by some, with great resistance. The hesitance to reform is largely in part due to teachers concerns, attitudes, and fundamental pedagogical beliefs. In order to get the remaining reluctant teachers to address the demands of modern society and prepare our students for global competition, professional development must be implemented to support these different levels of concerns and attitudes of teachers toward technology and a more constructivist epistemology.

### Purpose of the study

The purpose of this study was to determine the differences between traditional and magnet school teachers in concerns, attitude, and pedagogy as it relates to the use of technology in their classroom. The information gained could be essential in providing an outline for professional development that would enhance the use of technology in more of today's classroom. The study attempted to identify barriers that would prevent reluctant teachers from fully embracing technology integrated tools into their classroom in support of authentic tasking and assessment.

## Research Questions

1. What is the relationship between teachers' constructivist behaviors and their attitudes towards integrating technology into classroom instruction?

2. Is there a relationship between teacher attitudes towards informational technology and the integration of technology into classroom instruction?

3. Are there identifiable differences in the level of constructivist behavior between magnet and comprehensive high school teachers?

4. Is there a difference in attitudes toward the use of technology for instructional purposes in magnet school teachers and comprehensive high school teachers?

5. Is there a difference in terms of the level in which technology is integrated on the magnet school level than that of comprehensive high schools?

**Open-ended Questions**

1. What obstacles/barriers have you experienced that affect your level of confidence in adopting technology in classroom instruction?
2. In what ways would you like to increase the level in which you use technology in your classroom?
3. What helped or might help facilitate your adoption of technology in classroom instruction?

## Significance of the Study

The technology available to classroom teachers is unlimited. The process of being able to use it well and guiding students through a maze of misinformation is crucial to the teaching and learning process. Technological advancements have placed the whole world at our students' fingertips. No longer are we solely dependent on the classroom teacher as the lone source of information. The driving force to integrating these technologies into learning experiences lies with the individual classroom teacher. Teachers' concerns about technology integration along

with their pedagogical practices can be the essential when relating these new innovations to supporting student achievement. With this study, investigating both traditional and magnet schools, identifiable connections can be determined in such a manner that common threads will be woven in was to develop professional development ease teachers concerns about technology. The ultimate conclusion of these findings would be an effort to support the education and advancement of all students.

## Assumptions of the Study

1. Professional development opportunities are equally accessible through the local professional development center for all participants.
2. No one pedagogical idea stands isolated from the others, it is assumed that one will be more dominant than the others.
3. Magnet school teachers take advantage of available technology at a higher rate than traditional classroom teachers.
4. Change is not complete unless teachers feel that their concerns have been addressed and they have time to practice and reflect on preconceived as well as new attitudes and/or beliefs.

## Limitations of the Study

1. Sample is limited to one particular school district
2. Time to evaluate participants over an extended period of time to record changes in attitudes, beliefs, and concerns while new professional development ideas are implemented
3. The generalization of the study across district borders.

## Definition of Terms

**Attitudes** – feelings or perceptions

**Beliefs** – long lasting items of conviction

**Comprehensive/Traditional Schools** – neighborhood public schools where children are zone by their addresses.

**Concerns** – feelings, attitudes, thoughts, ideas, or reactions an individual has related to an innovation (Hord & Loucks, 1980).

**Magnet Schools** – public schools that provide incentives to parents and students through specialized curricular themes or instructional methods (Goldring & Smrekar, 2000).

**Pedagogy** – the practice or science of teaching

**Professional Development** – professional training offered to teachers as a component of continual learning that ensures that teachers are familiar with new methods of teaching and adapting their methods of teaching to changes in the social environment as well as dealing with diverse student populations.

**Technology Integration** – the use of computing devices such as desktop computers, laptops, handheld computers, software, or internet in K–12 schools for instructional purposes (Hew & Brush, 2007).

## Conclusion

This chapter has offered an overview of what this study contains. The following chapters provided evidence to support the current study in the form of a literature review. Also, a chapter on methodology used to support the current study will be found. A chapter dedicated to the finding of this study will be presented. Finally, chapter five is dedicated to the discussion of implications of the current study including limitations and suggestions for future research.

# CHAPTER TWO: REVIEW OF LITERATURE

## Introduction

Increasing demand in educational support has shifted traditional classrooms to integrate technology into instructional practices. Some of the most innovative and promising practices in education involve technology (Becker, 1998; Rakes, 2007; Swan, Hooft, Kratcoski, & Schenker, 2007). These practices provide great educational capabilities for teachers to implement technology in their classroom instructions. Research findings suggest learning in technology rich environments may help close gaps in academic performance between special needs and general education students (Swan, et al., 2007). In order to apply educational technology effectively in classrooms, teachers should prepare themselves to use technology resources well. "If technology use can encourage successful learner-centered instructional practices that positively affect student achievement, it is important to identify factors that promote and/or prevent technology adoption" (Rakes, 2007). Teachers' pedagogical views can be the driving force to integrate these new innovations in ways that support student achievement. More constructivist teaching methods should be adapted by classroom teacher in order to reach the full potential and educational value of technological resources.

Despite all the technological innovations available, there is little advancement in using technological tools (Brownell, 1997). With the exception of post-secondary institutions effectively implemented various computer programs and other technological tools, K–12 schools are less active in such technological changes (Brownell, 1997). Only a marginal number

of K–12 schools and teachers went forward with integrated technology into their classroom instruction. One of the problems with technological advances in general education has been a lack of success in integrating technology into the curriculum (Bernauer, 1995). Recently, rapid technological progress has driven a majority of the remaining K–12 institutions to reconsider their views on teaching and training processes in order to obtain satisfactory result on both state and national benchmarks.

## Types of Schools

### Magnet Schools

The idea of magnet schools has been in existence since the 1970 (Neild, 2004). Magnet schools provided local school systems an alternative for student education long before the recent popularity of voucher programs and charter schools. According to Goldring and Smrekar (2000), magnet schools served as incentives to parents and students, offering specialized curricular themes or instructional formats, with the idea of improving scholastic standards and providing a range of individualized programs that caters to the talents and interest of its students. With this idea in mind, have magnet school teachers integrated their use of technology in their classroom instructional strategies at a greater rate than a more traditional/comprehensive classroom teacher? There are obvious advantages that magnet schools possess that comprehensive schools do not enjoy. In most cases, children who attend magnet programs are hand-picked students who are "higher achievers" from middle class socio-economic backgrounds (Neild, 2004). A major difference, worth investigating, is that magnet schools differ from comprehensive schools in pedagogical emphasis, not intellectual disparities among their students (Doyle & Levine, 1984). Doyle and Levine (1984) goes further to suggest that "magnet schools offer a setting in which teacher-generated reform can

take place." The demands and expectations of these students and their teachers are perceived greater by the communities in which they represent. Teachers at magnet programs are expected to challenge students who are considered highly motivated learners with advanced skills (Doyle & Levine, 1984; Neild, 2004). One study suggested that although magnets schools may set higher academic standards, their organizational structure is no different from other schools that service students in the same age group (Doyle & Levine). If this is the case, there will be little change in instructional strategy. The incorporation or reluctance to incorporate technology will parallel that of a traditional/comprehensive classroom teacher. However, if the alternative is true and magnet program teachers are truly innovators in a setting which allows for teacher-generated reform, then the idea of greater technology integration by these teachers should be more apparent than teachers in a traditional more comprehensive setting.

**Comprehensive High Schools**

When evaluating the comprehensive high school concept in American education one would look at the model outlined by James B. Conant in 1959 (Conant, 1959; Hammack, 2004). A comprehensive high school is a nonselective high school aimed at servicing students within a local community. These comprehensive high schools, sometimes known as traditional high schools, offer a variety of programs for the student body while maintaining an interest in forging communicable bonds among its hosted population (Hammack, 2004). According to Conant (1959) high school education did not involve issues of pedagogy only, but also included social and political ones as well. "Education can inculcate the social and political ideals necessary for the development of a free and harmonious people operating an economic system based on private ownership and the profit motive but committed to the ideas of social

justice" (Conant, 1959). The framework for this system has shifted to address a different content of student. Many students who enter these comprehensive high schools enters and often leaves with weak academic skills and are inadequately trained for future education or the workforce (Kemple, Herlihy, & Findings, 2004). Schools as a whole are being asked to restructure educational programs, balancing students' abilities with societal needs (Marx, 2006). This is becoming more difficult as the faces of these comprehensives schools changes. Large shifts in demographics are asking schools to service a diverse group of students that are largely minority and poor (Hammack, 2004). Under these conditions educators are asked to engage a larger variety of student learners, who in some cases have become disenfranchised with the learning process. Reports of academic disengagement, failures, and dropouts have many shuffling for improvement ideas (Hammack, 2004).

## Technology Trends

With the onset of computers and other electronic devices a world which once seemed unlimitedly miles apart now lies at the end of your fingertips. "The pace of change, fueled by technology, is unrelenting" (Marx, 2006). In today's high access world global information can be downloaded from home, the office, a cell phone, or any number of personal digital assistants (PDA) devices. News papers and televised news broadcasts have become a less important source for many when it comes to keeping up with local and global society. The changes felt by technological innovations have expanded well past how we obtain information into how we operate in our everyday lives. Many of today's opportunities in employment are based on the ability to interpret and operate within a technology rich environment. The shift from the industrial age to a global knowledge one has placed challenges on today's schools to prepare students for a system enriched in a global knowledge/information age (Marx, 2006). This challenge was made clear by President

Barack Obama (2009), forty-fourth president of the United States, as he addressed the nation in his inauguration address.

> For everywhere we look, there is work to be done. The state of the economy calls for action, bold and swift, and we will act — not only to create new jobs, but to lay a new foundation for growth. We will build the roads and bridges, the electric grids and digital lines that feed our commerce and bind us together. We will restore science to its rightful place, and wield technology's wonders to raise health care's quality and lower its cost. We will harness the sun and the winds and the soil to fuel our cars and run our factories. And we will transform our schools and colleges and universities to meet the demands of a new age. All this we can do. And all this we will do... (Obama, 2009)

Schools in America are called upon to prepare students to compete for employment in fields that require skills which rapidly evolve and for jobs that do not currently exist (Aubin, 2009). Gary Marx (2006) has listed the skills and knowledge students will need to face the new era as following:

1. Basic management and entrepreneurial skills
2. The need to collaborate with others
3. The ability to separate truth from fiction as they explore conflicting information that is expanding exponentially
4. Critical and creative thinking skills
5. Technology savvy
6. An understanding of different cultural backgrounds

Schools are able to meet these challenges by better preparing students to use the sources of technology available to them responsibly and with ethical morals. The focus of schools needs to be

on developing curriculum that embraces 21st technology tools as a catalyst to developing skills and enhancing the classroom experience (Aubin, 2009).

## Teaching Models

### Traditional Model

One of the more commonly used instructional strategies incorporated in today's classroom would be Direct Instruction (DI). The term "Direct Instruction" refers to a rigorously developed, highly scripted method of teaching that is fast-paced and provides constant interaction between students and the teacher (Lindsay, 2001). This form of instruction, coined in 1968 by Siegfried Engelmann, is very teacher centered and holds the classroom teacher accountable for what the student does or does not learn. In this model the teacher is the expert on topics, demonstrating desired responses. The teacher's role is much like a broadcaster that reports directly to students what they want them to know, while the students' role is to pay attention, take notes, and memorize salient information for testing (Strom & Strom, 2009). The pre-scripted lessons do not allow room for exploration of ideas. The student investigation of independent concerns becomes secondary to procedure and practice. The assumption of the DI model is that the teaching will accelerate learning (Engelmann, 1997; Lindsay, 2001). This is achieved through a process of chunking information together, only pulling that information which would result in desired outcomes. Generalizations or rules are taught in order to apply basic understandings to more abstract problems (Engelmann, 1997). This process may work for early elementary children who are building a foundation for learning. However, the process of oral and rote reciting as an independent component of learning is not working in the secondary settings. This could be one of the causes when considering that adolescents are losing interest in learning once they reach the secondary level. There seemingly appears to be some sort of disconnect among students and learning following the primary education

years. Considering the number of hours adolescents spend with technology–video games, email, cell phones, and computers has impacted how they interact, interpret information and how they learn (Aubin, 2009).

**Non-Traditional Model**

With the influx of technologies available to today's students, puts learning directly into their hands is becoming more advantages to the learning process. The student becomes empowered, able to explore topics that are deemed interesting to them. Under these conditions the classroom teacher is no longer considered the sole source of information. With the occurrence of computers and technological achievements, the opportunities in education, research, observation, and results analysis largely increased and gave a chance for further development of the educational curriculum (Bernauer, 1995). Currently, more students learn how to use computers in the libraries, at their homes or dormitories, and at Internet hotspots located at various public places such as restaurants and parks throughout the community (Becker, 1998). They use these technological tools in order to communicate, exchange pictures and files, search for assorted information, and many other recreational activities. Students then return to a traditional classroom disappointed by the lack of opportunity to further develop their expertise in technology in school (Strom & Strom, 2009).

Electronic books have become more popular among young learners. The majority of these students prefer to look for information in online libraries or search engines than go to a local library where they may have to stand in long lines and then read printed materials, which can be rather hard to manipulate (Becker, 1998). The children of today have evolved from traditional learners onto individuals who are heavily influenced by technology. Many students have claimed a disconnect between life online after school and methods of learning in the classroom (Strom & Strom, 2009).

## Constructivism

Constructivism as a theory of learning has its historical constructs in the works of John Dewey (Dewey, 1916) as well as the works of Jean Piaget (Piaget, 1973) and Lev Vygotsky (Vygotsky, 1978). In the constructivist view of learning, the learner uses their own experiences and prior knowledge to create an understanding that makes sense to them. Glenda Rakes (2007) outlines a constructivist learning environment as having the following four characteristics:

1. The student construct their own learning
2. Learning depends on a link between new information and existing understanding of the student
3. Social interaction is critical to the learning process
4. Authentic learning tasks are important for learning

Constructivism is a theory of knowing (Matzen & Edmunds, 2007). As a learner, the learning process becomes more meaningful if the knowledge gained relates to the student's current situations. This understanding is obtained through a sequence of authentic tasks which allows the student to learn through exploration. The student relates the gathering of new ideas to past experiences of successes and failures. In traditional classrooms, students are typically not provided with whole, dynamic learning experiences, but rather with limited, arbitrary activities (Rakes, et al., 2006). The constructive approach to education allows both the student and the teacher to become more active or interactive in the learning processes. The constructivist style of learning challenges the student to apply their knowledge of previous subjects and relate such knowledge to current task. These associations to prior knowledge helps to bring the learning experience from a passive auditoria state into a real live, breathing substance that will make the experience outlast the activity. Research suggests that ready access to a variety of technologies

makes certain kinds of teaching and learning more possible (Becker, 1998; Dunn & Rakes, 2009; Swan, et al., 2007). The use of these technologies also grants the classroom teacher the freedom to give more authentic assessment of their students' performance. This assessment process allowed teachers the ability to take advantage of the different tools that will assist in the students' education. A change in the instructional use of computers was found to be dependent upon understanding the instructional practices needed to use technology while teaching the curriculum (Matzen & Edmunds, 2007).

**Constructivist Behaviors**

In many studies the connection between the use of technology and constructivism are parallel. Teacher beliefs concerning their personal ability to effectively use technology and their belief regarding the potential effect on student achievement is quite possibly a significant factor in determining what actually happens in the classroom (Rakes, Fields, & Cox, 2006). A large reason for this reluctance, among K–12 teachers, to use technology in their classrooms depends heavily on their own pedagogical views of learning. The philosophy of constructivism is not new to education, but the ways in which it is applied to education are still evolving ( Rakes, et al., 2006). It is the classroom teacher who institutes change in classroom instruction. Many teachers and students agreed, technology integration resulted in higher quality student work, and pre-to post-test gains as well as analysis of student work revealed high levels of conceptual understanding (Swan, et al., 2007). There was a significant positive correlation between the change in general instructional practices and change in the instructional use of computers. The relationship between constructivist compatible instructional and technology use continues (Matzen & Edmunds, 2007). Research documents changes in teaching and learning in a ubiquitous computing classroom and suggests that these

changes may be related to the supports such environments provide for new representation, conceptualizations, and uses of knowledge that ubiquitous computing environments afford (Swan, et al., 2007). It is the conclusion of the research found that the connection between technology use in the classroom and pedagogical views was interconnected to a constructivist epistemology.

Largely absent in this discussion of teachers changing their instructional style and the role of technology as a catalyst in that process is a focus on the teacher and how he or she thinks and learns (Dexter, Anderson, & Becker, 1999). In a case study, Dexter, Anderson, and Becker (1999) noted that a majority of teachers classified as constructivist believed that computers helped them make the change to more constructivist practices. Constructivist teachers were acknowledged as those who frequently incorporated creative instructional practices, innovative interdisciplinary themes, individual or group projects of some complexity and duration, and used content linked to student interests and/or personal concerns. These teachers' practices reflected a belief that understanding is deeper and long lasting when students are cognitively engaged with ideas that are personally meaningful (Dexter, et al., 1999). Constructivist teachers in essence do not adhere to traditional assessment tools. Teachers labeled as constructivist chose to incorporate complex qualitative judgment, going well beyond fixed-choice, short answer paper and pencil test (Dexter, et al., 1999). Teachers in these constructivist classes sometimes gave students representational choices and encouraged students constructions and sharing in a variety of representational forms, including presentations to audiences beyond the classroom (Swan, et al., 2007). The integration of technology in the instructional practices of teachers allows education to become limitless, regardless of any geographical limitations. This can only be successful if the teacher identifies

their role. Teachers will act more as facilitators by helping students' access information, process it, and communicate their understanding (Dexter, et al., 1999). The classroom teacher encourages the thinking process, knowing when to allow the student's exploratory side to venture and when to step in with suggestions to get the student back on track. It is the teacher's responsibility to keep the students actively involved and engaged. Most importantly, the classroom teacher faces the challenges of being able to authentically access the student's progress. It is argued that a student doesn't really learn unless that student is able to explain what has been learned.

There are still teachers who may use technology in ways that support the traditional models of instruction. These teachers may be described as weak constructivist teachers. Weak constructivist teachers were described as teachers who incorporate a greater-than-average focus on understanding concepts rather than merely automating skills or remembering facts, and made use of interpersonal processes as well, including discussion. Weak constructivist teachers may still rely on grading, recognition, or the promise of future benefits as a motivator. Teachers may use technology in ways inconsistent with their general instructional practices because many see technology as a new, and somewhat unfamiliar, tool (Matzen & Edmunds, 2007).

Still Dexter, Anderson, and Becker (1999) were able to identify a third group of teachers in which they labeled as non-constructivist teachers. In their observations they found that these teachers

> believed that the primary objects of learning are the mastery of a set of skills, the recall of important facts, and the learning of discipline-valued abstract concepts through direct listing, reading, note-taking, and practice in the solving of related problems or examples. (Dexter, Anderson, & Becker, 1999)

Even though students must learn facts and basic skills, the data suggest that emphasis on advanced reasoning skills promotes higher student performance ( Rakes, et al., 2006). Given this information a majority of these teachers still chose to implement more of a routine structured learning environment that is most frequently related to traditional classrooms. Despite substantial grant-funded infusion of money for training and equipment, these teachers still perceived their ability to use technology as extremely limited, whether because of lack of access to equipment or lack of time to use technology ( Rakes, et al., 2006).

Many of the non-constructivist teachers who now serve in the classroom were trained under a more traditional view of education. In order for these teachers to learn to implement the proper use of technology into instructional goals they must transform their own pedagogical ideas. Transformation can take place from traditional to constructivist epistemologies in relation to collective and individual perspectives (Hung, Tan, & Koh, 2006). When constructivism is used effectively, teachers incorporate the ideas of students to prepare the lesson that they will teach in their classrooms (Rakes, et al., 2006). In their research Dexter, Anderson, and Becker (1999) found that the most mentioned influence on teachers' changed practices was insights about their own effectiveness, gained as a result of reflection. Teachers must be introduced to ideas in a constructivist setting. When teachers are provided with technology professional development focusing primarily on technical skills, they may fall back on technology uses consistent with their existing instructional practices simply because they have not been provided with an alternative vision for the use of technology (Matzen & Edmunds, 2007). These types of professional development experience in theory will more than likely result in little to no technology integration.

The idea of integrating technology into the classroom lies with the classroom teacher. It is the classroom teacher that controls the environment in the classroom. In essence, it is the classroom teacher who decides how much and what kinds of technology will be used in their classrooms (Oncu, Delialioglu, & Brown, 2008). When discussing this topic, one must consider that there are barriers that exist which may hinder epistemological transformation. A teacher's epistemology, according to Wetzel (2002), is a product of an individual's prior knowledge base, development, and professional experiences. Simply exposing teachers to technology does not equal a teacher's willingness or ability to integrate these technologies into their lessons (So & Kim, 2009). Teachers must find substance and reason behind fundamental changed to their philosophies. New innovations introduced to teachers who are reluctant to change must be shown evidence where these innovations serve the purpose of promoting students' learning experiences; dissemination information; and improving communication, assessment, and student practice better or more efficiently than the current system (Oncu, et al., 2008). A paradigmatic shift in pedagogical approaches to education must exist for such changes to exist (Dexter, et al., 1999; Wetzel, 2002). Wetzel (2002) suggest that teachers who are resistant to change experience reluctance primarily because of their concerns regarding "the influence of instructional technology integration on their preparation, beliefs, and values." One research study identified six areas of concern when it came to integration technology into curriculum (Hew & Brush, 2007). These areas are listed as: resources, institution, subject culture, attitudes and beliefs, knowledge and skills, and assessment. These concerns must be addressed in order for teachers to feel comfortable implementing new instructional strategies and tools.

## Application of Technology in the Classroom

The results of various studies support technology integration, suggesting that technology increases the ability of many students to learn mathematics and other science subjects because students who regularly used the computer-based learning practice methods found mathematics, science and other similar subjects very interesting and simple (Downs, Carlson, Repman, & Clark, 1999; Nguyen, Hsieh, & Allen, 2006; Schallert, 2006). The main reason for such feedback after using computer-based and web-based techniques is that the computer provides flexible features and enjoyable ways of learning. This process increases the student's ability to spend more hours at a computer to complete his/her tasks without feeling bored as with the traditional type of assignments and assessment tools.

Recently, more middle and junior high schools have given preference to computer-enhanced problem-based learning (PBL) environment on students' learning skills and attitudes toward such subjects as science, mathematics, and chemistry. A computer-enhanced PBL provides new and different means for students to develop problem-solving skills, reflect on their own learning, and develop a deep understanding of the content domain (Schallert, 2006). Using constructivist-appropriate measures, such learning environments should lead to higher achievements than more traditional learning environments (Rosen & Salomon, 2007). Technological achievements have been proven to greatly influence the education field when more computer-and web-based techniques and tools are included into educational curriculum. Computer-based and web-based K–12 school techniques help students to improve their analytical skills and attitude towards the subject itself. According to the National Council of Teachers of Mathematics, mathematics games may be the best way to ensure that students get the basic mathematical skills they need to be successful in life, while at the same time promoting

an enjoyment of mathematics and motivation to teach such subjects (Schallert, 2006).

Computer-based tools lead to the following positive results: creating a sense of challenge and accomplishment, promoting curiosity, and encouraging a sense of personal control. The results from Schallert's (2006) study showed the students' abilities to perceive scientific information quickly and easily. The students were able to implement their knowledge in science while completing certain tasks and assignments. These results are very supportive to some other studies that evaluated the effectiveness of the computer-enhanced PBL atmosphere. The findings of Schallert's (2006) study suggest that a computer-enhanced PBL programs are promising in helping sixth-graders gain science knowledge.

The use of computer games in the classroom can be used to increases students' attitude toward mathematical scores. Van Eck (2006) showed that participants who used advisement more often than others would have higher attitude toward mathematics scores. He also showed that participants in the non-competitive simulation and game conditions would have more positive attitude toward mathematics than those in the competitive simulation game conditions. Computer games are able to increase learning skills, promote persistence, and provide positive affective response toward instruction. Van Eck's (2006) research suggest that it would be more useful to make investigations that are more systematic in its approach when evaluating both the positive and negative influences of technological tools, computer games and/or programs on classroom practices and students' outcomes.

Many teachers reported, in the findings of Swan, Hooft, Kratcoski, and Schenker (2007), that ready accessibilty of visual representation in the ubiquitous computing classroom helped lower performimg students better understand key concepts. It is the belief of some education circles that technology has established itself as having a useful impact on classroom

practices and student outcomes. In the study of middle school students the research supports the idea that there have been increases in students' science and mathematics achievement and self-efficacy for learning these subjects after their engagement in a computer-enhanced PBL environment (Schallert, 2006).

Another impact of the technology on the educational process in the classroom is using the web-based assessment in school instead of traditional assessment (Downs, Carlson, Repman & Clark, 1999). In a recent study, there have been documented results of research that evaluate the difference between web-based assessment and traditional assessment as it influences student learning. Nguyen, Hsieh, and Allen (2006) did a study on the impact of web-based assessment and practices on students' mathematics learning attitudes. The results concluded that web-based assessment gives a lot of benefits to the student/teacher relationship and is useful and effective for the curriculum and classroom instruction. Another benefit of using a web-based assessment tool is that the teachers can improve students' mind-set and enthusiasm toward the learning subject. Based on the results of research (Nguyen, et al., 2006), web-based assessment gave opportunities to students to practice more, test themselves, regulate themselves, and make evaluation of their knowledge and skills by themselves.

While an increasing number of teachers and professors support the usage of computer tools in the classroom, others think that technology mainly has negative effects on the educational process. Schallert (2006), emphasized the usage of PBL in the classrooms can present some unsolicited challenges. Technology integrated into the classroom and in education methods can have some bad points, such as making plagiarism an easy way for the students to complete their assignment (Norton, 1994). In recent years, the Internet became one of the main technological achievements and advantages in the world. Its main positive and

efficient feature is that it helped millions of people to ease the process of finding necessary information very quickly and precisely. The internet has led to some negative results such as plagiarism in students' research papers, which recently became one of the main problems of the schools and universities (Paterson, 2007).

The problem of plagiarism became especially crucial after the revolution of globalization and instant communication as a means of accessing information. Charlie Lowe is a writing professor at Grand Valley State University near Grand Rapids and the spokes person of the Conference on College Composition and Communication (CCCC). According to her point of view, the main problem of plagiarism is that the teachers are trying to catch the students on plagiarized papers and make them guilty until the opposite is to be proved. Charlie Lowe thinks that the software for detecting the plagiarized papers can set the tone for an unhealthy and bad atmosphere for writing among the students. A s she emphasizes, "We [teachers] have to teach students about plagiarism, but if all we do is catch them without taking responsibility for the process, how do they learn about the proper use of research material? Technology is no substitute for good teaching" (Paterson, 2007).

Some educators are totally against technology in education and support the old methods and techniques of teaching students how they can properly write the research papers, use citations and references, paraphrasing, etc. (Robson & Whitesitt, 1999). A British company developed a software program called Computational Forensic Linguistics (CFL), which provides students with some good options and aids to help them write their own papers without using plagiarizing. For example, the program includes search detection service to cite the research for the student. Its Copy Checker is one of the software features that help the students avoid plagiarism (Paterson, 2007). In addition, the software provides "notes with work"

function that divides the PC screen into two windows allowing the student to see the data and write his/her own paper at the same time. Moreover, this program is very friendly to the students since it allows them to copy and paste, but at the end helps to make the right citations and see the difference between the primary data and what the student can write by him/herself. Those kinds of programs can help students a great deal. As a result, gradually they inspire the students to write the whole paper by themselves avoiding plagiarism (Paterson, 2007).

## Transformational Leadership

The idea of transformation existing ideas in order address present and future needs is not a new idea. Change and adjustment are key components attributed to school success. These changes can only take place if the infrastructure is guided by strong leadership. Transformational leadership is one such style of leadership that can guide needed change. The inventiveness of transformational leadership is not a new thought. The idea of transformational leadership was first developed by James McGregor Burns in 1978 and later extended by Bernard Bass as well as others (Liontos, 1992). Both Burns and Bass based their work on political leaders, Army officers, or business executives. Transformational leadership builds personal and social identification among its members with the mission and goals of the leader and organization (Bass, Avolio, Jung, & Berson, 2003). Avolio (2003) believes this can build on these initial levels of trust by establishing a deeper sense of identification among followers with respect to the unit's values, mission, and vision.

In recent years, views on the direction of school leadership changed greatly with new demands placed national performance and accountability. Much like many concepts in education, transformational leadership as it relates to education has been adopted from studies of what works in the fields of business and military operations. Evidence shows that there are

similarities in transformational leadership whether it is in a school setting or a business environment (Liontos, 1992). Transformational leadership contains four components: charisma or idealized influence (attributed or behavioral), inspirational motivation, intellectual stimulation, and individualized consideration (Bass & Steidlmeier, Ethics, Character, and Authentic Transformational Leadership Behavior, 2004). As it relates to schools, Liontos (1992) writes that he has found that transformational leadership pursues three fundamental goals:

1. Helping staff develop and maintain a collaborative, professional school culture. This means staff members often talk, observe, critique, and plan together.
2. Fostering teacher development. Teacher's motivation for development is enhanced when they internalize goals for professional growth.
3. Helping teachers solve problems more effectively. Transformational leadership is valued by some because it stimulates teachers to engage in new activities and put forth that "extra effort".

Previous forms of leadership have not offered such liberties that are allowed by transformational leadership. Instructional leadership encompasses hierarchies and top-down leadership, where the leader is supposed to know the best form of instruction and closely monitors teachers' and students' work (Liontos, 1992). This form leadership can limit teacher creativity and influence needed to support the reluctant learner. Another form of leadership evaluated by Liontos (1992) was transactional leadership. Transactional leadership involves contingent reinforcement. Followers are motivated by the leaders' promises, praise, and rewards; or they are corrected by negative feedback, reproof, threats, and disciplinary actions (Bass & Steidlmeier, Ethics, Character, and Authentic Transformational Leadership Behavior, 2004). Transactional leadership is based on an exchange of services (from a teacher, for

instance) for various kinds of reward (such as a salary) that the leader controls, at least in part (Liontos, 1992). Transactional contingent reward leadership "establishes clear standards and expectations of performance, which builds the basis of trust in a leader (Bass, Avolio, Jung, & Berson, 2003). This form of leadership, much like instructional leadership, limits the teacher's ability to make independent decisions or mistakes and learn without threat of reprimand. The transformational leader will accept that there will be failures and blind canyons along the way. As long as they feel progress is being made, they will be happy (Straker, 2002).

Transformational leaders provide an inspiring vision of goals that can help overcome self-interest and narrow factionalism in organizations and nations (Nye, 2008). In the field of education this can prove to be vital to the construction and operation of a productive learning organization. Transformational leaders involve staff in collaborative goal setting, reduce teacher isolation, use bureaucratic mechanisms to support cultural changes, share leadership with others by delegating power, and actively communicate the school's norms and beliefs (Liontos, 1992). When applied properly a transformational leader can create an environment that raises the level of local conditions and aspirers both the leader as well as the led. The transformational leader treats each follower as an individual and provides coaching, mentoring and growth opportunities; transformational leaders are concerned about developing their followers into leaders (Bass & Steidlmeier, Ethics, Character, and Authentic Transformational Leadership Behavior, 2004). This type of thinking will allow for a greater collaborative effort among group members. The transformational leader thus takes every opportunity and will use whatever works to convince others to climb on board the bandwagon. The transformational leader has to be very careful in creating trust, and their personal integrity is a critical part of the package that they are selling (Straker, 2002). Transformational leadership builds personal and social identification among its

members with the mission and goals of the leader and organization (Bass, Avolio, Jung, & Berson, 2003). Transformational leadership practices have a sizable influence on teacher collaboration, and significant relationships exist between aspects of transformational leadership and teachers' own reports of changes in both attitudes toward school improvement and altered instructional behavior (Liontos, 1992).

One of the major concerns with the idea of transformational leadership is that the leader is not an authentic transformational leader. Most leaders have a profile of the full range of leadership that includes both transformational and transactional factors (Bass & Steidlmeier, Ethics, Character, and Authentic Transformational Leadership Behavior, 2004). Transformation is not enough. Good leadership is not merely inspiring people with a transformational vision but also involves a capacity for creating and maintaining the system and systems and institutions that allows both effective and moral implementation (Nye, 2008). Maintaining high standards of performance, Avolio (2004) adds, appear to require both transformational and transactional leadership.

One way that a leader can reinforce change is through a strong professional development program. Hargreaves (2005) stated connecting teacher development to student learning ultimately focuses clearly on student learning as the outcome of professional development activities. In order to build communities that learn, leaders may need to challenge and change well-established aspects of teachers culture (Robinson & Timperley, 2007). In teacher professional development that benefits students as well as teachers, leaders are proactive in addressing and supporting teachers in making changes (Robinson & Timperlry, 2007). The success of a learning organization seems to be measured by the skills of the professional learner as well as the leader's ability to support and foster professional learning.

According to Braimoh (2008) learning is a continuous phenomenon and therefore, no one, irrespective of age position, riches or popularity, will ever deliberately or inadvertently wish to stop learning.

## Professional Development

On-going professional development can serve as the catalyst for addressing the concerns of transitioning teachers. Professional development should include strategies that create meaningful change in schools. Research is becoming increasingly clear that schools most successful in creating are those functioning as learning organizations or schools where every person and the organization itself are consciously and continuously learning (Kottkamp & Osterman, 2004).

> Professional development is critical to ensuring that teachers keep up with changes in statewide student performance standards, become familiar with new methods of teaching in the content area, learn how to make the most effective instructional use of new technologies for teaching and learning, and adapt their teaching to shifting school environments and an increasingly diverse student population. (Lawless & Pellegrino, 2007)

Hargreaves (2005) explains that in a knowledge society, teachers must be equipped to teach students from all socioeconomic strata, and to bring out the best in all of them. Thus, teachers need to engage in the kind of professional development that promotes teacher learning, so that they can effectively carry out the highly complex task of fostering student learning.

One such form of professional development is collaborative Continuing Professional Development (CPD). According to researchers at the University of Texas:

> Continuing Professional Development essentially involves a cycle in which individual participants reflect on their practice and make self-assessments of their knowledge and skills, identify learning needs in order to create a personal learning plan, implement or act on the plan, then evaluate the effectiveness of the plan in relation to their practice (Pharmacy, 2008).

Teacher collaborative CPD gives teachers the opportunity to practice and learn without threats or fear of making mistakes. Lieberman and Miller (2001) discussed that teachers, through proper professional development, can get use to new ways of working: struggling with difficult problems and contexts, expecting and receiving supportive and critical comments, and being with fellow teachers who are committed personally and professionally to improving their teaching and learning as a lifelong commitment. Collegial interaction depends on the participation of the entire learning community as they apply theory to meet the specific needs of the actual school. "A new paradigm of the teaching profession is needed, one that recognizes both the capacity of the profession to provide desperately needed school revitalization and the striking potential of teachers to provide new forms of leadership in schools and communities" (Crowther, Kaagan, Ferguson & Hann, 2002). According to research conducted on collaborative CPU (Cordingley, Bell, Rundell, & Evens, 2005), when properly implemented, teachers have reported changes in behaviors which include:

1. Greater confidence amongst the teachers.
2. Enhanced beliefs amongst teachers of their power to make a difference to pupils' learning.
3. The development of enthusiasm for collaborative working, notwithstanding initial anxieties about being observed and receiving feedback

4. A greater commitment to changing practice and willingness to try new things.

All of these behavior modifications are essential to the learning process when dealing with changing prospective as well as addressing concerns based theories. .

The Concerns-Base Adoption Model (CBAM) (Hall, 1973) is a tool that can aid in the process of outlining professional development by investigating individual's experiences as they implement a new innovation (Hord & Loucks, 1980; Oncu, et al., 2008; Rakes, 2007). Viable professional development for the integration of technology has to consider the intent to produce long term pedagogical changes to individuals' practices. This process may take years to fully incorporate. The idea of change is a personal experience with individual concerns, which need to be considered and addressed by local change agents when implementing new programs or new technology tools (Wetzel, 2002). According to Hord (1980), there are four basic assumptions addressed by the CBAM that helps underline the approach professional development: change is a process, not an event; change is accomplished by individuals first, then institutions; change is a highly personal experience; and change entails developmental growth in both feelings about and skills in using new programs.

According to research Continual Professional providers must centralize their activities around how teachers learn (Evans, 2002; Fraser, 2005; Guskey, 2002). This process should include addressing the teachers concerns as well as connecting them to a learning community that fosters a positive learning experience. By creating learning communities each teacher is afforded the opportunity for dialogue among peers who are experiencing similar successes and failures. According to the research conducted by Pickering (2007), the most effective teacher learning is derived when teachers exchange personal experiences without fear of persecution or ridicule. If successful Pickering (2007) believes that three key process will take place: 1. Self-

aware engagement with their learning and consideration about their learning; 2. Real collaboration that leads to change in practice; and 3. a growing sense of responsibility for their professional development.

Before change can take place one must indentify a personal need to modify their personal beliefs or habits. These changes in teachers are directly related to a teacher's pedagogical practices. In order to bring about pedagogical change professional development providers must provide opportunities for the teachers to connect with what it is about their current practices need to change (Daly, 2009). This concept requires extensive teacher self-awareness along with opportunities for continuous involvement in choices about Professional development activities. Changing practices is not a quick fix and the journey expands over an extensive period of time. Change is directed related to knowledge and understanding obtained through a process of practice-based developments which engages the learner and enhances the learning experience (Guskey, 2002). The learning experience becomes more meaningful when the learner has an opportunity to self-reflect as well as communicate their personal experiences with others who have embarked on a similar adventure.

Through Collaboration with peers teachers are able to make sense of the changing world around them. Wenger (1998) identifies this collaborative effort as a "community of practice" where the group builds knowledge together through practice and a shared network of experiences among its members. Literature that supports continual professional development acknowledges that a collaborative approach is essential to an effective design (Cordingley et al., 2005, 2007; Scrimshaw, 2004; Pickering 2007). According to research conducted by Fullan (2001) collaborative practices are outlined by five key concepts:

1. Teachers engage in frequent, continuous and increasingly concrete and precise talk about teaching practices.
2. Teachers frequently observe each other teaching and provide each other with useful evaluations of their teaching.
3. Teachers and administrators plan, design, research, prepare and evaluate teaching materials together.
4. Expect Implementation dips (A smooth implementation can actually be a sign that not much is changing.).
5. Change is a process, not an event.

The benefits of a successful collaboration component to continual professional developments have been identified as a good source of obtaining peer support as well as means for soliciting specialized expertise as a teacher journeys on their day-to-day practices, observations and reflections (Cordingley et al., 2005).

The goal of successful professional development in schools where new innovations are introduced is to change behavior which will lead to school improvement (Hord & Loucks, 1980). Ultimately, fundamental change comes from within an individual. Changes to attitudes and beliefs are a critical component to change. According to Bodur, Brinberg, and Coupey (2000) a person's belief controls their attitude toward a specific subject. . If implemented correctly the teacher begins to develop a growing sense of responsibility for their own professional development (Pickering, 2007). According to Pickering (2007) most of the teachers he interviewed were satisfied with their continual professional development opportunities provided over the last five years. The teachers felt a need for personal growth and that there needed to be a balance between personal and system (school and national) needs.

Pickering (2007) also reported that attitudes were shaped by interrelationships built upon structural and cultural factors that included teachers' career stages, age, and subject affiliation. Reports given by Guskey (2002) revealed that a successful continual professional development plan should be evaluated using five levels in which professional development can be judged: 1. Participants' reaction, 2. Participants' learning, 3. Organizational support and change, 4. Participants' use of new knowledge and skills, and 5. Students' learning outcomes. The research on collaborative continual professional development models have proven to provide growth within the individual teacher utilizing a support system that fosters improvements in student success.

## Conclusion

Traditional instruction, such as Direct Instruction, gradually moves away from the strict didactic approach. It becomes less uniform as it comes to incorporate constructivist-like elements such as team work and team based problem solving, which are then reflected in achievement measures (Rosen & Salomon, 2007). With the rapid changes in technology as the tool of the future, classroom teachers are faced with demands to become more interactive in the schools' learning process. In fact, statewide expectations and instructional emphases, such as performance assessment, or a new instructional focus adopted at their school, like cooperative learning (Dexter, et al., 1999). Schools are transforming whether traditional classroom teachers are ready or not. For constructivist epistemologies to be formed within school communities there should be authentic and evolutionary processes through which these pedagogies can be established between all parties and levels in the schooling system (Hung, et al., 2006). Experiences, local circumstances, and needs influenced the change teachers decided to make and the approaches they decided to take (Dexter, et al., 1999). In today's

educational settings those instructional decisions have shifted towards the use of technology as a reflection of constructivist pedagogy. Using constructivist-appropriate measures, such learning environments should lead to higher achievements than more traditional learning environments (Rosen & Salomon, 2007).

The research in this review of literature leads to possible future research questions. An investigation as to what types of professional development would best serve as a change agent for teachers switching from a more traditional epistemology into a constructivist-technological one. How do students respond to technology integrated constructivist classrooms after being trained in a more restricted environment? School official who are pour money into technological equipment are asking teachers to integrate these tools into classroom instruction. It would be more beneficial to study the connection that changes the mindset of teachers and students as they explore the use of technology as educational tool.

The key to properly using technology in classrooms to support student success is largely based on proper professional development. When teachers see technology modeled using constructivist compatible, student-centered approaches, they are likely to use it in that way (Matzen & Edmunds, 2007). Most constructivist-oriented teachers in the Dexter, Anderson, and Becker (1999) study explicitly stated that the school-wide initiative or program which triggered the changes they made had been crafted to promote a constructivist view of learning. When teachers become more comfortable with technology to the point where they can integrate it more effectively, they use it in ways that emphasize a more constructivist, learning-centered approach (Matzen & Edmunds, 2007). It is the classroom teacher who is the true agent of change and it is the individual teacher who decides to use technological tools in the classroom in a constructivist manner. To make these decisions teachers will draw upon

their knowledge and expertise of what works in the classroom (Dexter, et al., 1999). Teachers' strong, basic technology skill levels appear to provide teachers with a comfort level with computers needed to support constructivist teaching practices ( Rakes, et al., 2006). In order for that knowledge to include the use of computers, teachers must have opportunities with computers, modeling of how they work in instruction, and opportunities to reflect on their, and the computer's, role in the learning process (Dexter, et al., 1999). Technology use was compatible with new teacher roles, reported Matzen and Edmunds (2007), with several teachers reporting that technology led them to give their students more control after they witnessed what students were able to do. This can only take place if teachers are given the support to see and make changes for their own personal assessment. A supportive context with rich professional development experiences and a professional culture that encourages reflection and trying new approaches will produce the learning necessary for technology use to become a part of a teacher's decision making (Dexter, et al., 1999). This interaction may depend at least partly on the type of professional development received (Matzen & Edmunds, 2007).

# CHAPTER THREE: METHODS

## Introduction

Educational debate has questioned how to keep reluctant learners engaged in the education process as well as efforts to stay globally competitive. Some of these discussions have encouraged the use of technology in the educational setting (Becker, 1998; Rakes, 2007; Swan, Hooft, Kratcoski, & Schenker, 2007). In many aspects educators have done a good job adapting to new innovative practices involving technology. However, there are still a few educators who have been sluggish about adapting technology into their classroom practices (Brownell, 1997). In order to convert the remaining non-technology integration teachers a shift to a more constructivist mind set with time to practice and adjust (Cuban, Kirkpatrick, & Peck, 2001; Dunn & Rakes, 2009). These changes are not easily accepted and may take extended time to obtain. Time, concerns, beliefs, and attitudes are key components of change (Wetzel, 2002).

In this study I have attempted to identify factors that relate to teachers' willingness to integrate technology into classroom instruction. Teachers were asked to respond to questions concerning their personal concerns, attitudes, beliefs and pedagogical behaviors as they considered using technology integrated instruction in their classrooms. Previous research has suggested that teachers must be willing to accept a change in pedagogical practices as a major component of integrating technology effectively into classroom instruction. In order to implement change, a strong source of professional development is needed to allow teachers to transition through this process. When dealing with this transition it is thought that an individual

flows through a maze of concerns that need to be addressed before true adoption can be accomplished. To obtain maximum potential from technological tools, the classroom teachers are likely to be asked to adopt a more constructivist approach to the instruction and learning process.

## Role of Researcher

The role of the researcher for this study was to collect data and examine results for commonality as well as differences of high school teachers who teach in both magnet and comprehensive high schools. At the time of this study the researcher was a certified core teacher within the school system in which the schools were selected. To aid in the process of elimination bias and/or an obligation to participate, the researcher recused the school at which he was currently employed from the study. Other measures were taken for the remaining seven schools to help eliminate bias and/or obligation on the part of participants which have been outlined in the data collection section.

## Purpose of the Study

The purpose of this study was to determine if there were any differences between traditional and magnet school teachers in concerns, attitudes, and pedagogy as these related to the use of technology in their classrooms. The study has attempted to identify barriers that would prevent reluctant teachers from fully embracing technology integrated tools into their classrooms in support of authentic tasking and assessment. The data collected would be essential in providing an outline for professional development that would enhance the use of technology in more of today's classrooms.

## Significance of Study

The technology available to classroom teachers is unlimited. The process of being able to use technology well and guiding students through a maze of misinformation is crucial to the teaching and learning process. The driving force to integrating these technologies into learning experiences lay directly with the classroom teacher. Teachers' concerns about technology integration along with their pedagogical practices can be essential when relating these new innovations to supporting student achievement. This study has investigated both traditional and magnet school teachers to identify connections that can be woven into common thread for the development of continuous professional development programs that will ease reluctant technology using teachers concerns about technology.

In order to construct meaningful change in a culture certain elements must exist. Instructional leaders must guide a transformational change in pedagogy in order to ensure longitudinal transitions between education and developing technologies. By addressing the needs and concerns of his constituents the transformational leader allows ownership to be transferred to the individuals who are expected to complete the given task. This study has attempted to identify the concerns of in-service teachers as they incorporate technological resources into their classroom instruction. The evidence found can be used to anticipate obstacles or predict levels of concerns in professional development offered to the remaining reluctant technology using teachers. Continual professional development must be offered to support teachers as they transition thought the change process. Professional development needs to offer its participants opportunities to practice and make self-assessments of content knowledge and skills. This allows participants opportunities to identify learning needs and create personal learning goals. These self determined plans can be implemented and evaluated as it relates to

ongoing practice. This collaborative continuing professional development allows for support from others transitioning through the same process at different levels. This procedure will hopefully ease the transition of incorporating technology as instructional support for student achievement.

## Research Design

The design of this study consisted of a mixed methods approach. The mixed method approach combined the collection and analyzing of both qualitative and quantitative data (Creswell, 2003). In this study both components were collected concurrently. The addition of open-ended questions to the survey was incorporated to gain insight from teachers on their personal feelings/concerns with the process associated with integrating technology as well as what would be needed to help foster technology integration into their classroom instruction. Individual teacher surveys were used to gather data needed to explore teachers' attitudes, beliefs, and concerns about adopting technology into instructional strategies. A different tool was used to determine teachers' overall pedagogical practices in regards to their classroom instruction. The study attempted to answer a sequence of questions aimed at gaining an in-depth look at teachers' processes for integrating technology.

## Research Questions

### Quantitative Research Questions

The following quantitative research questions were used in this study.

1. What is the relationship between teachers' constructivist behaviors and their attitudes towards integrating technology into classroom instruction?
2. Is there a relationship between teacher attitudes towards informational technology and the integration of technology into classroom instruction?

3. Are there identifiable differences in the level of constructivist behavior between magnet and comprehensive high school teachers?

4. Is there a difference in attitudes toward the use of technology for instructional purposes in magnet school teachers and comprehensive high school teachers?

5. Is there a difference in terms of the level in which technology is integrated on the magnet school level than that of comprehensive high schools?

**Qualitative Research Questions**

The following qualitative research questions were identified in the study.

1. What obstacles/barriers have teachers experienced that affect their level of confidence in adopting technology in classroom instruction?

2. In what ways would teachers like to increase the level in which they use technology in the classroom?

3. What helped or might help facilitate teachers' adoption of technology in classroom instruction?

## Description of Sample

The participants targeted in this study were from seven schools within the same school system. The participating school system is located in an urban section of south-central Alabama. It is one of the largest school systems in Alabama servicing approximately 32,000 students with about 4,500 employees. The district has 59 schools with eight of these schools identified as secondary high schools. Three of the schools are identified as magnet high schools while the remaining four are listed as comprehensive/traditional high schools with one serving as an alternative school. By definition magnet schools are public schools that provide incentives to parents and students through specialized curricular themes or instructional methods (Goldring &

Smerkar, 2000). According to the district's website the magnet programs in this district offer curricular themes in the area of science, performing arts, technology, and accelerated academics to international studies. Comprehensive/traditional high schools are described as neighborhood public schools where children are zoned by their addresses. This particular district describes its traditional high schools as schools with a full range of curriculum complemented by cultural arts, music, foreign languages, technology, career-technical education, and athletic programs. This study did not include alternative high schools these were omitted from the pool of potential participants.

Because of the nature of this study the researcher chose purposive sampling as a way to target participants. Purposive sampling is a non-probability sampling method that is used to identify participants according to preselected criteria (Mack, Woodsong, MacQueen, Guest, & Namey, 2005). The only criterion for the participants of this study was that they teach in one of four core academic areas and on grade levels nine through twelve. The sample was collected from a possible 206 core academic high school teachers. One hundred thirty teachers responded to the survey in its entirety. The response rate for this particular study was 63%.

## Instrumentation

In an attempt to measure teachers' concerns, attitudes, beliefs, and constructivist related teaching practices the subjects were asked to complete a questionnaire. The questionnaire was designed to be taken in one meeting and to last only 10 to 15 minutes. All questionnaires were delivered to the teacher's individual hub-site or school and administered by the primary researcher. All questions were answered via long form with pencil and a paper copy of the questionnaire.

The questionnaire (see Appendix 1) was developed to gather data from teachers who teach one of four core academic subjects: English, Mathematics, Social Studies/History, and Science. The questionnaire was constructed by combining two pre-existing instruments. The researcher added three open-ended questions in order to give the participants an opportunity to freely discuss their personal opinions which may not have been expressed directly through the regular questioning process. Participants were also asked to answer basic demographic questions. Demographic questions were used to identify relevant information concerning the participants. The questionnaire asked participants to disclose information about which core subject area they taught, what was their highest degree obtained, at which of the two types of schools, magnet or comprehensive, are they employed, and the number of years teaching experience they have in the classroom.

The two pre-existing instruments that was used to construct the current instrument was the Teachers' Attitudes Toward Information Technology (TAT) which was developed for the study of the effects of informational technology integration education on the attitudes of teachers (Christensen & Knezek, 2000). This instrument was designed to measure teacher attitudes toward informational technologies such as e-mail, internet use, multi-media technology resources, and other technology resources integrated into classroom instruction. The TAT was designed to measure instructional use of technology. The instrument also addressed technology for teacher productivity; however, this section was removed from the current questionnaire because the researcher did not find it to be relevant to the current study. The TAT was originally validated in 1997 on a group of 147 teachers from six K–12 schools in a large public school district in Texas. The instrument was developed with the contributions from 14 computer attitudes questionnaires:

1. The Computer Attitude Scale (Gressard & Loyd, 1986)
2. The Computer Use Questionnaire (Griswold, 1993)
3. The Attitudes Toward Computers Scale (Reecec & Gable, 1982)
4. The Computer Survey Scale (Stevens, 1982)
5. The Computer Anxiety Rating Scale (CARS) (Heinssen, Glass, & Knight, 1987)
6. The ATC(Attitudes Toward Computers) (Raub,1981)
7. The CAIN (Computer Anxiety Index) (Maurer & Simonson, 1984)
8. The BELCAT (Blombert-Erickson-Lowery Computer Attitude Task) (Erickson, 1987)
9. The Attitude Toward Computer Scale (Francis, 1993)
10. The Computer Attitude Measure (CAM) (Kay, 1993)
11. The Computer Attitude Questionnaire (CAQ) (Knezek & Miyashita, 1993)
12. The Computer Attitude Items (Pelgrum, Janssen Reinen, & Plomp, 1993)
13. The Computer Attitudes Scale for Secondary Students (CASS) (Jones & Clarke, 1994)
14. E-Mail (D'Souza, 1992)

All of the above mentioned instruments measured in part one or more of the following conditions as it relates to computers and technology integration: Confidence, anxiety, usefulness, awareness, general attitude, efficiency, or capability. Christensen (1997) used Cronbach's alpha to establish internal consistency reliability with the alpha coefficients ranging from .93 to .96.

Table 1

*Alpha Reliability Coefficients for Original Survey*

| Subscales | Alpha | No. of Variables |
|---|---|---|
| Electronic Mail (e-mail) | .93 | 10 |
| Internet Usage | .95 | 10 |
| Multimedia Usage | .96 | 10 |
| Technology Resources | .96 | 10 |

The questionnaire was used to measure teachers' attitudes and beliefs on integration technology into classroom instruction. The original instrument gathered data on five separate scales. For the purpose of this study the researcher averaged across all items retained to obtain a scale value to represent teachers' instructional use of technology. For this research study the researcher decided to omit one of the scales, computers for professional productivity. The researcher ran Cronbach's alpha, for the current study, to establish internal consistency reliability with the coefficients ranging from .93 to .97. The full scale reliability for the current study was .95.

Table 2

*Alpha Reliability Coefficients for Current Survey*

| Subscales | Alpha | No. of Variables |
|---|---|---|
| Electronic Mail (e-mail) | .94 | 10 |
| Internet Usage | .93 | 10 |
| Multimedia Usage | .97 | 10 |
| Technology Resources | .96 | 10 |

The subscales in the initial instrument were constructed using semantic differential items from Zaichkowsky's (1985) Modified Personal Involvement Inventory. Semantic items are usually hand coded with a number from 1–7 each participant marks between an adjective pair which represents a person's perceived significance of the indicator based on intrinsic needs, values, and interests (Zaichkowsky, 1985). In the current research study the researcher decided to reduce the number of spaces between the adjective pairs from seven to five in order to be more uniformed with the other components of the current survey.

Four of the items on each subscale had the "negative" adjective position on the left-hand side of the scale. The remaining six items have the "positive" adjective located on the left-hand side of the scale. The alternating design of the scale was an attempt to eliminate participant bias by helping ensure that participants do not place a scoring mark in all the right-hand column of the objects. This procedure requires that the researcher reverses any negatively worded items before scoring the instrument. The Predictive Analytics Software (PASW) 18 software was used to generate an average score combining all components from the four 10 item subscales. This average will constitute the participant's attitudes towards technology.

The second part to this questionnaire is designed to identify teachers' self analysis of the stage of concern when integrating technology into classroom instruction. The instrument used to measure the relationship of attitudes to stages of adoption was the Stages of Adoption of Technology (Christensen & Kenzen, 1997) indicator. This instrument was based on the Concerns-Based Adoption Model (Loucks, Newlove, & Hall, 1975). The adoption model targets behaviors of innovators as they progress through various levels of use. The scale in this study was used to gauge the level of comfort educators have as they travel along a technological continuum. Since this scale was a single item self-assessment the internal consistency reliability measures cannot be calculated for the data gathered from it.

The third section of the current survey, the open-ended qualitative research questions section, was constructed to allow teachers the opportunity to elaborate on experiences that have encouraged or discouraged them from using technology as they develop their lessons. The idea and placement of these questions were to give participants an extra platform to express the history of their concerns, attitudes, and beliefs as these relate to technology integration. These responses will then be taken into account when developing staff development programs that can aid in transforming reluctant technology-using teachers into more progressive technology integrators. In order to eliminate bias when coding the open-ended responses the researcher solicited help from a neutral party to recheck participants' responses for possible themes or code association.

The final section seeks to identify the teachers' major pedagogical behaviors as they relate to constructivism. To assess this portion of the questionnaire the researcher chose to incorporate the Constructivist Behavior Questionnaire (Rakes, 1999). The fourteen item questionnaire was originally developed from a review of literature which described constructivist

behaviors in teachers (Brooks & Brooks, 1999). In the process Brooks and Brooks (1999) identified key perceptions from classroom teachers and their classroom constructivist behaviors. Rakes' Constructivist Behavior Questionnaire (1999) asked respondents to report their frequency of each constructivist behavior ranging from one = Never to five = Daily. Responses to these questions were then used to summarize the individual teacher's constructivist score. The original reliability alpha for this questionnaire was (N = 435) ranged from .88.

## Data Collection Procedures

The data collected came from seven different high school sites in the same district. Four of these sites are comprehensive high schools while the remaining three are magnet high schools. The data collection process started with the researcher requesting and gaining permission to enter each site and collect data for both the district and local site administrators.

Once permission was received, in writing, the researcher contacted each site individually and requested a date and time to come in and address the school's faculty during a group faculty meeting. All participants at each site were gathered in one location, after the regular school day, and asked to participate. All willing participants were then instructed on how to complete the survey.

Prior to addressing potential participants the researcher prepared the meeting room. The individual questionnaire along with the informed consent letter and a pencil were placed in a legal envelope and positioned at each of the tables of the meeting room. At the appropriate time the researcher addressed the faculty via recruitment script (see Appendix 3).

The script asked if the prospective participants were willing to participate in the study. Those that agreed to be participants were then given instructions on answering the questionnaire. After instruction the participants were then asked to complete the questionnaire, which only took

about 10 to 15 minutes. At the conclusion of the time period, all participants were asked to return their questionnaires in their original envelope to its position at each of the tables. Envelopes were then collected and the researcher thanked the faculty for their time, collected envelopes and departed from the site.

## Data Analysis

The questionnaire used to collect data for this study can be broken down into three different sections: teacher attitude and adoption to technology, an open-ended questioning assessment, and a constructivist behaviors inventory. These questions were designed to answer eight research questions, in which this study was designed. Descriptive statistics were run to describe characteristics of the participants. Pearson product-moment correlation was used to evaluate responses as a way to answer research questions one and two. An analysis of covariance was used to answer questions three through five. Three one-way ANOVAs were used to assess each of the prescribed questions. Univariate analysis of variance was run to evaluate results. The remaining three questions, questions six through eight, were coded and run through PASW 18 for frequency as an attempt to describe categorical variables.

## Limitations

One of the major limitations to this study is its relatively small sample size. With only one district and only seven schools represented generalization on a wide scale may be limited. There is also an unequal balance between the number of magnet school teachers, 36, and the number of comprehensive school teachers, 94, represented in this study. There also remains the possibility of participant biases to questions they answered in a group setting.

## Conclusion

The methodology of this study was developed with the intent to determine what, if any, relationship exists between teachers at comprehensive and magnet high schools and their concerns about technology integration, along with their pedagogical practices as they relate to integrating these technological tools into their classroom instruction. The researcher modified and combined two surveys, which have been proven to have internal reliability, and administered the new survey instrument (see Appendix 1). Participants completed the survey in one sitting and anonymously returned the survey to the researcher. The data was recorded in a spreadsheet, utilizing a PASW 18 program, tested for internal reliability and analyzed for correlations. Chapter IV of this study will communicate a comprehensive analysis of all data collected.

# CHAPTER FOUR: RESULTS

## Introduction

This chapter reveals the findings for this research study. The purpose for this study was to investigate the differences between traditional and magnet school teachers in concerns, attitude, and pedagogy as they relate to the use of technology in their classroom. The previous chapters outline the bases of this study. Chapter Three gave details of the steps that were used to conduct this research. Chapter Two also included information concerning the definitions of traditional and magnet schools, traditional and non-traditional learning, technology trends, educational application of technology, teacher pedagogy, educational leadership, and continuous professional development. A combination of two separate instruments created by Christensen and Rakes respectfully was used to address the five research questions.

The statistical analyses used in this chapter included correlations and separate one-way ANOVAs between-group analysis of covariance's to determine statistical significances. The remaining three questions used a qualitative analysis method because these questions were open-ended. These research questions and their results are presented in this chapter.

## Description of Population

A total of 206 core teachers were identified within the same school system in central Alabama. A total of 206 surveys were distributed among four schools, four comprehensive high schools and three magnet high school. One hundred thirty teachers agreed to participate resulting in the same number of surveys returned to the researcher. The calculations revealed

that 63% of the identified core academic high school teachers were participants in this study. Data obtained from this study were collected and entered into a PASW data file. The results of the demographic section of this study can be found in Table 3. Of the 130 respondents, thirty-four of them taught English, thirty-three were Mathematics teachers, thirty-three of them taught Social Studies/History, and thirty were Science teachers.

Table 3

*Subject Taught by Participants*

| Categories | Frequency (n = 130) | Percent |
|---|---|---|
| English | 34 | 26% |
| Mathematics | 33 | 25% |
| Social Studies/History | 33 | 25% |
| Science | 30 | 23% |

Table 4 shows the results collected from the participants concerning their highest degree obtained. There were forty-two teachers who held bachelor's degrees, seventy-six teachers with master's degrees, three teachers holding AA specialist certification, three teachers with doctoral degrees, and six teachers who did not respond to the question concerning highest degree obtained.

Table 4

*Highest Degree Obtained by Participants*

| Categories | Frequency (n = 130) | Percent |
|---|---|---|
| Bachelor | 42 | 32% |
| Masters | 76 | 58% |
| Specialist | 3 | 2% |
| Doctorate | 3 | 2% |

The pool of teachers ranged from various years of teaching experience. Teachers who responded ranged from first year teachers up to veterans with thirty-six years of classroom experience. The average number of years of teaching experience among all participants was twelve. Table 5 denotes the breakdown of teachers as it relates to the type of school, magnet or comprehensive, which each participant taught. There were thirty-six magnet school participants and ninety-four comprehensive high school participants who responded to the study.

Table 5

*Types of School Participant Represents*

| Categories | Frequency (n = 130) | Percent |
|---|---|---|
| Comprehensive | 94 | 72% |
| Magnet | 36 | 28% |

### Teachers' Constructivist Behavior and Technology Integration

The first research question addressed concerns with the connections between teachers' constructivist behaviors and their willingness to integrate technology into their classroom instructional practices. A Pearson product-moment correlation coefficient was computed to assess the relationship between teachers' constructivist behaviors as it relates to teachers' willingness to implement more technological infused practices into classroom instruction. The data reveal no violation of normality, linearity, or homoscedasticity. There was a positive correlation between teachers' constructivist behaviors and their willingness to integrate technology into their classroom instructional practices, which was statistically significant, $r = .420$, $n = 130$, and $p < .001$. The coefficient of determination is represented by $r^2 = (.420)^2 = .1764$. The coefficient of determination indicates that 17.6% of the variance in teachers' willingness to integrate technology can be accounted for by its linear relationship with constructivist behaviors.

### Teachers' Stages of Adoption and Technology Integration

The second research question addressed concerns with the connections between teachers' stages of concerns as it relates to their own personal comfort level with using technology and their willingness to integrate technology into their classroom instructional practices. The results of the statistical analysis using Pearson's Product-moment Correlation can be found in Table 5. A Pearson Product-moment Correlation coefficient was computed to assess the relationship between teachers' personal comfort with using technology and how it translates into the teachers' willingness to implement more technological infused practices into classroom instruction. The data reveal no violation of normality, linearity, or homoscedasticity. There was a positive correlation between teachers' stages of concerns as it relates to their own personal

comfort level with using technology and their willingness to integrate technology into their classroom instructional practices, which was statistically significant, $r = .435$, $n = 130$, and $p < .001$. The coefficient of determination is represented by $r^2 = (.435)^2 = .1892$. The coefficient of determination indicates that 18.6% of the variance in teachers' willingness to integrate technology can be accounted for by its linear relationship with constructivist behaviors.

**Comparison of Constructivist Behaviors**

For question number three a one-way between-group ANOVA was conducted to determine if there was a difference in the constructivist behaviors of teachers who teach at magnet schools and those who teach at comprehensive high schools when it comes to teachers' use of technology in the classroom. The independent variable was the type of school each teacher taught (magnet or comprehensive). The dependent variable consisted of the individual teachers' response to the constructivist behaviors section of the researcher's survey. Results from the ANOVA indicated that there was not a statistically significant effect in the constructivist behaviors of teachers who teach at magnet schools and those who teach at comprehensive high schools when it comes to teachers' use of technology in the classroom, $F(1, 128) = 2.379$, $p = .129$, with a small effect, partial eta squared = .02.

**Comparison of Attitudes**

Question number four also utilized a one-way between-group ANOVA was conducted to determine if there was a difference in the attitudes of teachers who teach at magnet schools and those who teach at comprehensive high schools when it comes to teachers' use of technology in the classroom. The independent variable was the type of school each teacher taught (magnet or comprehensive). The dependent variable consisted of the individual teachers' response to the stages of concerns adoption model for technology awareness section on the researcher's survey.

Results from the ANOVA indicated that there was a statistically significant difference in the attitudes of teachers who teach at magnet schools and those who teach at comprehensive high schools when it comes to teachers' use of technology in the classroom, $F(1, 128) = 6.46$, $p = .012$, with a small effect, partial eta squared = .05.

**Comparison of Technology Integration**

In order to address question number five a one-way between-group analysis of variance was conducted to determine if there was a difference in the ease of technology integration expressed by teachers who teach at magnet schools and those who teach at comprehensive high schools when it comes to teachers' use of technology in the classroom. The independent variable was the type of school each teacher taught (magnet or comprehensive). The dependent variable consisted of the individual teachers' response to the teachers' self assessment on technology integration section on the researcher's survey. Results from the one-way between group ANOVA revealed that there was a statistically significant difference in the teachers' self assessment on technology integration of teachers who teach at magnet schools and those who teach at comprehensive high schools when it comes to teachers' use of technology in the classroom, $F (1, 128) = 4.23$, $p = .042$, with a small effect, partial eta squared = .03.

The remaining three questions were open-ended questions. All results have been coded by the researcher. In order to remove potential bias each response was independently recoded by an outside source. A comparison of codes was conducted for consistency of interpretation. Frequency tables were run, utilizing PASW 18 statistics software, for each of the open-ended questions and presented in this chapter in the form of pie charts.

The first open ended-question asked the participants to offer their opinion on any obstacles or barriers that may have affected their level of confidence when adopting technology

into their classroom instruction. All responses were coded and validated by an outside source. Once coding was complete the responses were tallied. Results from the analysis are represented in Figure 3. The coding reveled four major themes: equipment issues, professional development, limited access to online sites, and funding. The percentages of the responses are as follows: 44% listed issues with equipment; 27% sited professional development as an obstacle; 27% considered limitations to outside sites due to restrictions created by school system personnel as a barrier; another four percent believed funding remains an issue to consider; and another 4% listed other issues outside of the four major themes.

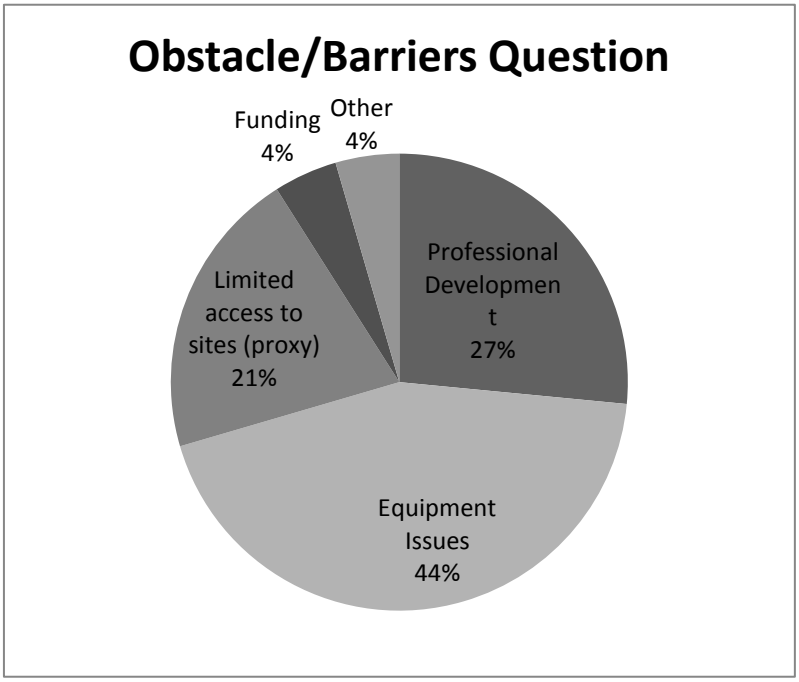


*Figure 3*. Obstacle/Barriers Pie Chart

The second open ended-question asked the participants to expound on what they would like to see as a way to increase the level of technology incorporated into classroom instruction. All responses were coded and validated by an outside source. Once coding was complete the responses were tallied. Results from the analysis are represented in Figure 4. The coding

revealed four major themes: equipment issues, professional development, limited access to online sites, and funding. The percentages of the responses are as follows: 36.7% listed issues with equipment; 29.4% sited professional development as an obstacle; 28.4% considered limitations to outside sides due to restrictions created by school system personnel as a barrier; another 1.8% believed funding remains an issue to consider; and another 3.7% listed other issues outside of the four major themes.

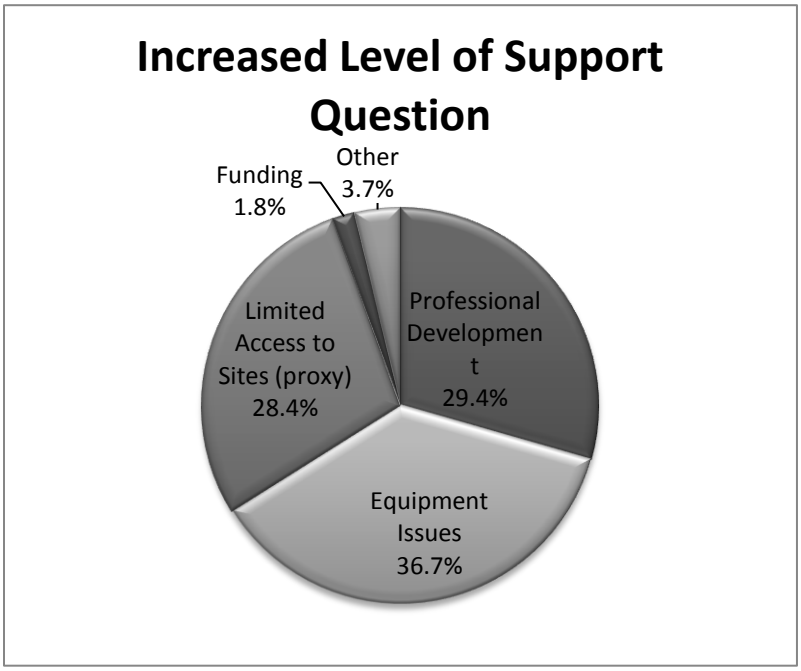


*Figure 4.* Increasing Level of Support Pie Chart

The third and final open ended-question asked the participants to offer their opinions on what might help facilitate greater use of technology by classroom teachers. All responses were coded and validated by an outside source. Once coding was complete the responses were tallied. Results from the analysis are represented in Figure 5. The coding reveled four major themes: equipment issues, professional development, limited access to online sites, and funding. The

percentages of the responses are as follows: 34.2% listed issues with equipment; 41.4% sited professional development as an obstacle; 13.5% considered limitations to outside sites due to restrictions created by school system personnel as a barrier; another 8.1% believed funding remains an issue to consider; and another 2.7% listed other issues outside of the four major themes.

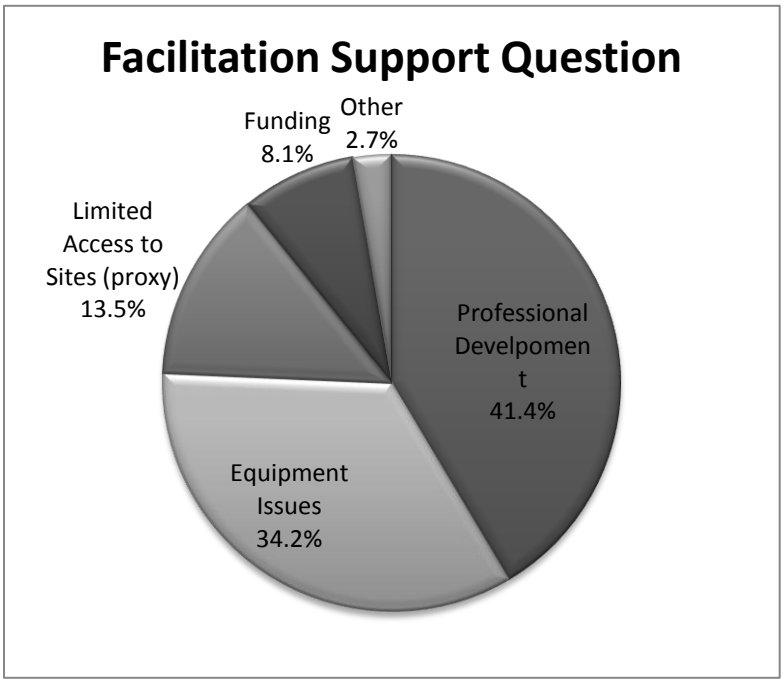


*Figure 5*: Facilitation Support Pie Chart

Upon conclusion of the open-ended questions evaluation there were three recurring themes. Participants express concerns over equipment issues when identifying barriers and obstacles the may prohibits technology use. Equipment also tied into items needed to increase the level of support for the integration of technology. As a third area of concern, equipment issues was addressed by the participants as a "need to be addressed item" if facilitation of technology will take place.

## Conclusion

This chapter has discussed the results from this study. All of the participants were practicing teachers in a core content area (33 Math teachers, 30 Science teachers, 33 History teachers, and 34 English teachers) in the same school district. The district included 206 core content area teachers, where 130 chose to participate. Out of the 130 participants 36 or 28% held teaching positions in the district's three magnet high schools. The remaining 94 or 72% of the teachers held teaching positions at traditional comprehensive high schools.

All of the participants are at schools where they have full access to technology resources. There was a positive correlation found between teachers' constructivist behaviors and their willingness to integrate technology into their classroom instruction. There was also a positive correlation found when comparing the teachers' stages of concerns adoption model for the use of technology and their willingness to integrate these skills into technology integration in classroom instruction. When comparing teachers who taught at magnet schools and those who taught at comprehensive high schools, the researcher found that there were no statistically significant effects found in the constructivist behaviors of teachers who taught at magnet schools and those who teach at comprehensive high schools and their willingness to integrate technology in to classroom instruction. There was, however, statistical significance found in the comparing the same two groups when it came to the stages of concerns integrating technology and their application in the classroom. There also was a statistically significant effect found when comparing magnet and comprehensive high school teachers when investigating the importance of integrating technology into their classroom instruction. Other areas of concerns shared by the participants as the topic of technology integration were, in no particular order, professional

development, equipment issues, funding, and limited access to interactive or teacher preferred web sites.

# CHAPTER FIVE: SUMMARY OF FINDINGS, DISCUSSION, AND RECOMMENDATIONS

## Introduction

The purpose of this study was to attempt to identify factors that relate to teachers' willingness to integrate technology into classroom instruction. Teachers were asked to respond to questions concerning their personal concerns, attitudes, beliefs and pedagogical practices as they considered using technology integrated instruction in their classrooms. Previous research suggests that teachers must be willing to accept changes in pedagogical practices as a major component of integrating technology effectively into classroom instruction. In order to implement change, a strong source of professional development is needed to enable teachers to transition through this process. When dealing with this transition individuals flow through a maze of concerns that need to be addressed before true adoption can be accomplished. To obtain maximum potential from technological tools, the classroom teachers are likely to be asked to adopt a more constructivist approach to the instruction and learning process. Potentially any links found can be transformed by instructional leaders to prepare continuous professional development activities designed to enhance instructional use of technology.

## Overview

Participants of this study included core academic teachers who teach at either a comprehensive or magnet high school in the same school district in central Alabama. The researcher chose to use purposive sampling as the method for selecting participants for this

study. The use of purposive sampling allowed the researcher to use a non-probability sampling method to identify participants according to a preselected criterion (Mack, Woodsong, MacQueen, Guest, & Namey, 2005). The researcher's only criterion for the participants in this study was that they teach in one of four core academic areas and on grade level nine through twelve in comprehensive or magnet high school. Once the criterion were set the researcher was able to identify 206 possible participants in which 130 or 63% of the selected targeted group chose to participate. The following characteristics were identified for the teachers who returned the researcher's survey.

1. 34 respondents taught English; 33 taught Mathematics; 33 were Social Studies/History teachers; 30 taught Science.
2. 42 of the respondents indicated their highest degree obtained as a Bachelor's degree; 76 held Master's degrees; 3 held specialist degrees; 3 held doctorate degrees
3. 94 of the respondents taught at comprehensive high schools and 36 taught at area magnet high schools.
4. The number of years of service varied in number from one year to thirty-six years of experience.

The survey instrument used in this study was designed using two pre-existing instruments. The first was the Teachers' Attitudes Toward information Technology (TAT) which was developed for the study of the effects of informational technology integration education on the attitudes of teachers (Christensen, 2000). The TAT used five ten question scales to measure teachers' attitudes towards informational technology in the following areas: E-mail, multimedia, the internet, teacher productivity, and classroom productivity for students. The current study chose to remove the scale for teacher productivity from this study. The TAT

also included a scale designed to measure the Stages of Adoption of Technology (Christensen & Knezek, 1997). This instrument was based on the Concerns-Based Adoption Model (Loucks, Newlove, & Hall, 1975). The adoption model targets behaviors of innovators as they progress through various levels of use. The indicator in this study was used to gauge the level of comfort educators have as they travel along a technological continuum. The second pre-existing instrument was the Constructivist Behavior Questionnaire (Rakes, 1999). The fourteen item questionnaire was originally developed from a review of literature which described constructivist behaviors in teachers (Brooks & Brooks, 1999). The Constructivist Behavior Questionnaire (1999) asked respondents to report their frequency of each constructivist behavior ranging from one, never, to five, daily. Responses to these questions were then used to summarize the individual teacher's constructivist score. The researcher also chose to include three open-ended questions to allow teachers the opportunity to elaborate on experiences that have encouraged or discouraged them from using technology as they develop their lessons.

Outside of the demographics indicator the current instrument includes 58 questions utilizing seven scales. Of the 206 surveys distributed 130 were returned with usable responses on the instrument. The data was analyzed using PASW 18 Statistics Software. In the following section each of the research questions will be discussed in light of the results and prior literature.

## Summary of Findings

This section will discuss the findings of this research study as it relates to other literature on the topic. The current research study has attempted to address five research questions dealing with teacher attitudes, beliefs and pedagogical practices as they consider using technology integrated instruction into their classroom practices. This study also attempted to identify any

differences in teachers' willingness to integrate technology if they taught at a comprehensive or magnet high school.

**Research Question 1: What is the relationship between teachers' constructivist behaviors and their attitudes towards integrating technology into classroom instruction?**

A Pearson product-moment correlation coefficient was computed to address this question from the gathered data. The current research revealed that there was a positive correlation between teachers' constructivist behaviors and their willingness to integrate technology into their classroom instruction. The coefficient of determination can only account for about 18 percent (17.6%) of the variance in teachers' willingness to integrate new technologies. This percentage reflects a small significance to the parallelism. Research suggests connectivity between the use of technology and constructivism (Dunn & Rakes, 2009; Matzen & Edmunds, 2007; Rakes, et al., 2006). The small significance in the current study may suggest that many weak or non-constructivist teachers are using technology devices in the classroom in a more traditional fashion. According to Dexter, Anderson, and Becker (1999), weak or non-constructivist teachers may still rely traditional models of instruction and are more center-focused on grading, recognition, or the promise of future benefits as a motivator. These teachers are more focused on learning facts and basic skills which may limit reasoning skills promotions.

**Research Question 2: Is there a relationship between teacher attitudes towards informational technology and the integration of technology into classroom instruction?**

A Pearson product-moment correlation coefficient was computed to address this question from the gathered data. The current research revealed that there was a positive correlation between teachers' stages of concerns as it relates to their own personal comfort level with using technology and their willingness to integrate technology into their classroom instructional

practices. The coefficient of determination can only account for about 19 percent (18.6%) of the variance in teachers' willingness to integrate new technologies. This percentage reflects a small significance to the parallelism. The stage of concern question in this survey was build to reflect the Concerns-Base Adoption Model (CBAM) (Hall, 1973). The CBAM is a tool that aids in the process of developing continuous professional development by investigating participants' experiences as they navigate through new innovation (Hord & Loucks, 1980; Oncu, et al., 2008; Rakes, 2007). The small effect size of 19% in the current study suggest that there is little support for collaborative continuing professional development for these teachers on new or innovative technology integration strategies.

Questions three through five attempted to address a comparison between magnet school teachers and comprehensive school teachers and their willingness to integrate technology into their classroom instruction. Magnet schools are schools provided by local school systems that offer alternatives to traditional schooling. Magnet schools offer incentives to parents and students by offering specialized curricular themes or instructional formats intended to improve scholastic standards (Goldring & Smerkar, 2000; Neild, 2004). Comprehensive high schools, also known as traditional high schools, are nonselective high schools aimed at serving students within a local community. Comprehensive high schools offer a variety of nonspecific programs to its student body all while attempting to maintain communicable bonds among its host population (Hammack, 2004). Previous research has not been found by this researcher that reflected a comparison of magnet and comprehensive high school teachers that focuses on technology integration for instructional purposes.

**Research Question 3: Are there identifiable differences in the level of constructivist behavior between magnet and comprehensive high school teachers?**

A one-way between-group ANOVA was used to determine if there was a difference in the constructivist behaviors of teachers who teach at magnet schools and others who teach at comprehensive high schools as it relates to technology usage in their classroom instruction. To answer this question the researcher used the type of school in which the teacher taught as the independent variable and the constructivist behaviors indicator in the survey as the dependent variable. Data collected revealed that there was no real significance between what type of school a teacher taught and their constructivist behaviors. Teachers' pedagogical ideas are fundamentally based on their instructional training. Neither group showed any specific training which made them use technology in a more constructivist manned. Hence, students in both settings are receiving instruction in similar fashion. Pedagogical ideas among teachers are no different depending solely on what type of school in which the teacher teaches.

**Research Question 4: Is there a difference in attitudes toward the use of technology for instructional purposes in magnet school teachers and comprehensive high school teachers?**

In order to address this question a one-way between-group ANOVA was used to determine if any differences existed in the attitudes of teachers who teach at magnet schools and those who teach at comprehensive high schools as it involves integrating technology into instructional relevance. The independent variable was based on the types of schools each teacher taught. The dependent variable was identified from the responses that the teachers gave as they answered the stages of concerns adoption section of the current survey. There was no significant evidence that there was any difference in stages of adoption of technology in the field of instructional use. As mentioned in question two, there seems to be no ongoing adoption, by way

of professional development, for the purpose of new technologies and its integration for instructional use.

**Research Question Five: Is there a difference in terms of the level in which technology is integrated on the magnet school level than that of comprehensive high schools?**

A one-way between-group ANOVA was used to explore any differences in the ease in which teachers at magnet schools integrate technologies into instructional practices in comparison to their comprehensive high school counter parts. The type of school in which the teacher taught was identified as the independent value and the teachers' self-assessment on technology integration was identified as the dependent variable. Research from the current study indicated that there were no significant differences that related to the ease of transforming technological tools into instructional usage among magnet or comprehensive high school teachers. The classroom teacher is the controlling factor that decides how much technology is allowed into classroom instruction. This type of change depends deeply on the teacher's epistemological transformation (Wetzel, 2002). According to Wetzel (2002) epistemological transformation is based on the individual's prior knowledge base, development, and professional experiences. The current research suggests that ongoing professional development in the area of technology integration is no greater for magnet school teachers than for those teaching at comprehensive high schools. Other research suggest that changes in philosophies must be developed threw continuous professional development (Oncu, Delialioglu, & Brown, 2008; So & Kim, 2009; Wetzel, 2002).

The remaining three questions were open ended questions designed to give participants an opportunity to offer any insight on their personal experiences with integration technology into

their classroom instruction. The data was collected can be as a guide for future professional development that would address the need of its participants.

The first of the open ended questions offered a platform in which participants were asked to offer feedback on obstacles or barriers that may have effect their level of confidence when adoption new technologies for instructional purposes. Of the responses coded 44% of the teachers who answered this question displayed concerns with the equipment that are provided in the schools. With many school systems cutting back on spending new equipment may not be high on the list of necessities. New technologies are introduced at such a fast rate that it is difficult to keep pace with all of changes (Marx, 2006). The second area of concern was that of proper professional development. Twenty-seven percent of all participants who responded agreed that professional development was big change agent needed to remove barriers associated with reluctant technology use in classroom instruction. Another twenty-one percent of the participants sited institutional control as an obstacle to technology use in the classroom. Many of the teachers express frustrations over blocked sites that they felt contained valuable content that could aid in the instructional process. One participant responded that "many filters on this school system's network were designed to prevent students from accessing undesirable website but at the same time it ties the hands of the classroom teacher." Eight percent of the respondents expressed concerns in the way of funding or others that did not fit in the coded categories.

The second open response question asked participants to expound on what they felt were key areas of concern that would increase the level of technology incorporated into classroom instruction. The question revealed, once again, three major areas of concern: equipment; professional development; and institutional control. Thirty-seven percent (36.7%) of the participants stated that they would like to see some of the more outdated equipment replaces or

that they would like there classroom equipped with greater technology than just smart boards. Many teachers stated that they would use technology more if the technology was available more readily for their students. Twenty-nine percent (29.4%) of those who responded to this question requested professional development that allowed them time to practice. One of the biggest complaints I got from the respondents was that professional development only lasted one or two days and they were sent back into the classroom and asked to implement what they should have learned. Without time for practice, sharing, and positive/constructive feedback most teachers revert back to old practices (Hargreavers, 2005; Lawless & Pellegrino, 2007). The final major section of this question was tied to intuitional control. Twenty-eight percent (28.4%) wanted to see fewer restrictions from the district level allowing the individual teachers to use personal judgment as to what was appropriate material or web-sites. The final six percent (5.5%) was ideas related to funding and other responses that did not fit into the coded themes.

The final open-ended asked participants what they felt might help facilitate greater use of technology by classroom teachers. The number one suggestion rendered by participants from this question was professional development. Forty-one percent (41.4%) believed that professional development was vital to the idea of seeing more technology use in today's modern classrooms. Thirty-four percent (34.2%) of the coded data show that equipment issues would be a major concern for a school moving forward with a wider use of technology in their classrooms. limitations to sites accounted for another fourteen percent (13.5%) of what participants felt would facilitate greater use of technology in classroom instruction. Eleven percent (10.8%) of the responses collected was concerned with funding or other factors that did not fit into coded categories.

In the open-ended response queries their existed three common themes that translated across all boundaries. A large percentage of the participants felt that equipment issues was a major concern when considering obstacles/barriers that limited their confidence moving forward with trying new technologies. Similar numbers were found concerning equipment that explained what participants felt they needed to increase the amount of technology offered in their classrooms. The teachers also expressed strong sentiments about the need to address equipment issues as a way to help facilitate technology integration among other classroom teachers. In order to obtain full teacher buy in concerns about equipment must be address by site administrators before asking teachers to change their instructional practices that would incorporate technology as a feasible tool.

Another concern that appeared in large numbers in each of the open-ended questions was a need to lift limitations to current restricted web-sites. The participants felt that there were viable learning opportunities that could be accessed from using the internet but felt their hands were tied by district level filters or proxies that restricted their usage. District administrators feel the need to impose filters to limit the misuse of the internet by both district employees and students. Many of the participants have expressed experiences where many of the students they teach have found was to get around the district imposed filters which may defeat purpose of the filtering process. A workable compromise must be communicated between district and site administrators and the individual classroom teachers that would give a little more flexibility to the teacher when considering appropriateness of the material.

The third concern that was expressed in each of the open-ended questions was the need to provide adequate professional development. Responses from the participants revealed that too often workshops or training only lasting one or two days with no follow-up and full expectations

are expressed that the new concepts or strategy be followed. With professional development being listed as both a barrier and a means of jump-starting the use of technology integration by classroom teachers is an important observation. In the researchers opinion offering one or two day training is not the professional development needed to stimulate the use of technology. Continual Professional Development or professional development that provides real time to implement will be a stronger solution than a meaningless set of instructions disseminated in handouts and presented over a couple of days.

Surprisingly none of the open-ended question sparked major concerns over funding. In a time where budget cuts and downsizing of personnel teachers were not overly concerned about the money it would take to incorporate technology into classroom instruction. For the most part the teachers who participated in this study feel there are funds available to update equipment and provide professional development. The third issue of lifting restrictions wouldn't cost the school system any more money.

The concerns that the teachers have in the areas of equipment and proxies must be addressed by the district and site levels before being able to introduce any professional developments. One of the key components of change is participant buy-in. In order for these teachers to feel comfortable building new experiences they have to feel that their basic needs are met. In order to get teachers to incorporate new or even existing technologies they need to feel confident that the equipment is available and that it's going to function properly. A craftsman can only be as good as his tools will allow. The idea to have the freedom to become more authentic in assessments and instructional strategies stems directly from the classroom teacher feeling that they have a certain level of control in how a lesson is presented. The whole idea of constructivism is to identify prior knowledge experiences and expand into new ones basted off of

where the students want to go. Well, most of today's students' prior knowledge and experiences stem from the use of the internet. One may not always agree with the quality of what they gather from this resource but it is undeniable that it has a major influence on society. By removing some of the restrictions a classroom teacher may be able to guide the student through a maze of misinformation and teach them to be more critical of the information they receive and disseminate.

## Discussion

The ultimate evaluation for the success of an educator is based on how well they prepare their students to become productive member of society. In today's society students will need to compete globally and communicate collaboratively across boundaries previously considered unattainable. The skills and Knowledge students will need to remain competitive are ones rich in technological advances (Marx, 2006). Therefore, if teachers are to be considered successful they must find ways to incorporate these technological resources into their classroom instruction in such a manner that it reflects authentic tasking opportunities related to constructivist practices.

The current section will discuss the findings of this research paper and how it relates to the literature found in the field. The researcher chose to evaluate teachers' concerns, attitudes, beliefs, and pedagogical practices as it relates to technology integration. The current study also chose to do a parallel comparison between core magnet high school teachers and their comprehensive high school counterparts as an attempt to identify continual professional development ideas that would help foster the relationship between constructivist practices, technology integration, and classroom instruction.

In order to apply technology resources constructively in classroom instruction, teachers must be prepared to transition through a process where practice and collaborative relationships

are present in a professional learning environment. According to Dexter, Anderson, & Beck (1999) teachers may be using technology in the classroom but in a more traditional format (p. 15). In the current study teachers acknowledge the presence of technology inside their classrooms; however, large majorities use it in ways that don't coincide with constructivist practices. Teachers surveyed admit to having interactive smart-boards and digital display devices, such as Elmo's, in their classroom but many of the teachers have not tapped into their full potential. Classroom use of smart-boards resembles many older generation grade school teachers' use of chalk boards and the digital display device has merely taken the place of the overhead projector. Matezen & Edmunds (2007) observed that teachers have used technology in more of traditional format because many teachers see technology as a new and unfamiliar tool. Many of the teachers surveyed (41%) identified professional development as a major component needed to get teachers using technology in a different format.

Professional development providers and organizers must provide professional learning opportunities that cater to the needs of the individual teachers that they serve. One major component to consider when planning for professional development, which addresses changing teachers' instructional practices, is to focus on how the teacher thinks and learn (Dexter, et al., 1999). The teachers in the current study showed discomfort in the "quick-pop-popcorn" approach to professional development. Concerns over professional development opportunities, lasting one or two days without ample time to digest and integrate new practices and ideas, have left teachers reluctant to try. Collaborative continual professional development (CPD) is one form of professional development that can be utilized to produce positive results when attempting to change a school's culture. Research on CPD (pp. 31-36) has reviled much success if activities are centralized around a practice-based learning community where the learners are

engaged in the learning process able to make decisions on what needs to be learned, communicate success and failures with peer who are experiencing a similar journey, self-reflect and make changes to personal beliefs and practices. These learning opportunities must be on-going and extends across time.

The researcher chose to survey teachers from two different types of high school, magnet and comprehensive, in an attempt to identify needs, expressed by the teachers, in order to develop a CPD plan that will consider the needs and concerns of the individual as they relates to technology integration and constructivist practices. In research questions one (p. 6) the researcher tried to identify any connection between constructivist behaviors and the manner in which technology was integrated into classroom instruction. Teachers who incorporate constructivist practices usually incorporate complex qualitative judgment, while going well beyond fixed-choice, and short answer paper and pencil test Dexter, et al. 1999). The majority of the teachers (82%) in the current study fell in the categories of either weak or non-constructivist in their approach to instructional practices. The assumption can be applied that in the era of high stakes testing and annual yearly progress (AYP) many teachers have opted to assess students in a manner that best resembles the accountability assessments. This view of "teaching to the test" is not the most beneficial practice. Research conducted on computer enhanced problem-based learning (PBL) has revealed increases in students' understand of core subjects such as math and science (Schallert, 2006). In addition to Schallert (2006), Rosen & Salomon (2007) discusses how the use of constructivist-appropriate measures boost achievement in students academics more than a more traditional learning environment. When designing professional development for this group of teachers the participants must envision the advantages of such activities as web-

based assessments and computer enhanced PBL assignments. Enough time must pass for the individual teacher to assess to success of this new approach the instruction and pedagogy.

In the second question (p. 7) the researcher attempted to understand the relationship between teachers' attitudes towards informational technology and the integration of these technologies into classroom instruction. The evidence provided indicated a positive reaction between the teachers comfort level and their willingness to use technological resources. These findings were consistent with what was previously supported in the literature. Simple exposure to new technologies does not automatically yield desired results when considering teachers' willingness or ability to transfer these ideas into classroom instruction (So & Kim, 2009). Humans are creatures of habit, showing repetition with things that they have been taught and have become comfortable with, disregarding practices that seem awkward or unrehearsed. The goal when developing professional development activities is to change behaviors or habits in a way that supports school improvement (Hord & Loucks, 1980). The correlation in attitudes towards technology and its integration accounted for only 18% of the variance indication that teachers are not responding to technology in a constructivist format a t a large rate. This evidence being found CPD needs to incorporate time to practice and adapt new ideas so that the teachers are comfortable enough to formulate new and positive habits that will improve instruction and learning in the classroom.

In an attempt to better identify the needs of the teachers the researcher chose to break the teachers down into two categories based on their teaching environments, magnet and comprehensive high schools. The researcher expected to find differences in the two groups when it concerned constructivist practices. It was perceived that magnet school students on average out preformed students who attend traditional high schools. Hence, assumptions of

teachers at magnet schools providing different instructional strategies than their comprehensive counterparts existed. This was not the case. There was no supporting evidence that either group displayed any more constructivist practices than the other. It is safe to assume that instruction provided to magnet school students and instruction provide to comprehensive school students are provided in the same formats. Neither group received any more of a specialized instructional format than the other. This did not correlate with what the research suggested. According to Goldring and Smrekar (2000) magnet schools were supposed to provide an incentive to parents and students, by offering specialized curriculum themes or instructional formats. Additional investigations show no sustainable differences in teacher attitudes towards technology or the levels in which technology instruction for either group of teachers. This information is surprising give the fact that for the most part magnet programs hand-pick students who are "higher Achievers" (Neild, 2004). Magnet schools should not be focused as much on AYP goals and meeting minimal progress. They should be more flexible to incorporate more authentic tasking opportunities for their students. Doyle and Levine (1984) go further to suggest that "magnet schools offer a setting in which teacher generated reform can take place." Evidence provided in both Doyle and Levine and the current study that although magnet schools set higher academic standards, their organizational structure is no different from other schools that service students in the same age group.

Evidence in from the current study suggests a need for collaborative CPD to address pedagogical practices and the influence that technology can play in constructivist ideas. In order to institute a change in practice there are a few concerns that must be addressed on the district and sit levels. The issues of restrictions to site teachers believe have instructional value. There is also must be a commitment to provide maintenance for existing equipment as well as

a pledge to update antiquated equipment when funds permit. A conscious effort must be made to ensure equitable use of all equipment available to the site. Professional development needs to do more than introduce new technologies they need to integrate innovative practices and pedagogy to enhance the learning process. This process should include: 1. Participants' reaction, 2. Participants' learning, 3. Organizational support and change, 4. Participants' use of new knowledge and skills, and 5. Students' learning outcomes (p. 36). The evidence of success will take time and will have to be evaluated through constant reflection.

## Limitations of the Study

The findings of the current study cannot be generalized to other populations because the sample was limited to one specific school district in central Alabama. Another limitation factors was the use of survey methods. Data collected from the current survey was directly dependent upon teacher participants' willingness to respond honestly and freely to all responses. Additionally, there was an uneven distribution of magnet school teachers in comparison to comprehensive high school teachers. Of the one hundred thirty participants there were only thirty-six magnet school teachers which only accounted for about twenty-eight percent of the sample population. Time was also a limiting factor for the current factor. The research study did not extend across time in which the teachers would have had the opportunity experience continuing professional development opportunities that incorporated technological tools for instructional practices. Had this opportunity been extended perhaps participants would have recorded changes in attitudes, beliefs and concerns over a period of time and across stages. Lastly, the current study did not identify the role of the instructional leader in the process of the transformation. Future study will have to include the leadership styles of the instructional

leaders as it relates to supporting the teachers as they transition to this maze of new ideas and practices.

## Implications and Recommendations

It is difficult to deny the values found in education, and like all arts or disciplines proper tooling and training is essential to success. Some of the most innovative and promising practices in education involve technology (Becker, 1998; Rakes, 2007). These practices provide great educational capabilities for teachers to prepare their students to become productive citizen who compete in a global society. The skills and knowledge students will need to stay competitive globally embodies a rich understanding and application of technology (Marx, 2006). The driving forces to integrating these skills involving technology into learning experiences lie directly with the classroom teacher. The current study attempted to identify the attitudes, concerns, beliefs, and pedagogical practices of two groups of teachers, those who teach core subjects at magnet high schools and those core teachers who teach at comprehensive high schools, to help identify common threads as well as differences in order to develop continuous professional development practices that will increases technology use throughout its district.

The data collected did not show any differences between magnet high school teachers and comprehensive high school teachers and the ways they integrated technology into their classroom instructions. The records also indicated that there were no differences found in constructivist beliefs among either group of teachers. Lastly, the data did not show any increases in the use of technologies for either group. Based on this information the researcher concluded that there were no differences in the types of technology or what professional developments were offered to either group of teachers. The levels of knowledge or usage were basically the same which indicates that neither group of students were receiving any greater amounts of training as

it was associated with technology use and the use of technology for authentic tasking among core area teachers. This assessment did not include any technology classes that were available at either types of school.

The overall comparison of the teachers' constructivist behaviors and the teachers' willingness to integrate technologies for authentic tasking indicated that technology is not being used to its full potential. The data suggest that a large majority of the teachers who participated in the current survey could be labeled as weak to non constructivist. Future professional development opportunity would need to focus on how to incorporate technologies in a more constructivist manor. Currently, a large majority of the teachers who participated in this study seem to be integrating technologies to support traditional learning practices. Responses from participants led the investigator to believe that there were no ongoing professional developments that dealt with constructing fundamental changes in teachers and how they see and use technology for instructional practices. Further investigation indicated that most of the teachers surveyed felt the need for updated equipment and professional development as a catalyst for a change in the culture surrounding technology integration.

Concerns identified in the current study opened avenues for future discussions and studies. These recommendations include: (1) research site administrators on how much their concerns, attitudes, beliefs, and pedagogical believes influences the culture of the school as it relates to technology integration; (2) research changes in teachers' attitudes as they journey through a constructed continuous professional development program that places emphasis technology used under the constructivist umbrella; (3) research students on how they feel the technologies learned or practices in their school has or will impact their ability to compete in a global society and what they would like to see more of in their classrooms.

## Conclusion

This study was constructed as an exploratory study aimed at being able to design a continuous professional development plan that would encourage greater use of technology in a classroom setting utilizing constructivist strategies. This study chose also to compare core academic teachers that teach at magnet high schools and comprehensive high schools. The research indicated that teachers were concerned about equipment issues, professional development, and institutional control when it comes to technology and its incorporation into classroom instruction. Many of the teachers have indicated that they are using technology however evidence suggests that they are using technology primarily for traditional methods. Based on the current study the professional development should be continuous providing teachers with time to experiment and practice with room to collaborate with others as they transition as a team through individual stages.

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Appendix 1

Teachers' Concerns, Attitudes, Beliefs, and Pedagogical Practices Concerning Technology

Questionnaire

This questionnaire is designed to assess your perceptions of the use of technology for the benefit of your students as well as gauge your constructivist behavior. It should require about 10 to 15 minutes of your time. Usually it is best to respond with your first impression, without giving a question much thought. Your answers will remain confidential.

Thank you for your cooperation!

| **Demographics:** Group Id: ____ |
|---|
| Core subject area_____ Current grade level_____ |
| Type of school: Magnet School____ Comprehensive High School____ |
| Years of teaching experience: ____ Highest degree received: ____ Does your school have access to usable technology: ____ |

**Instructions:** Choose one location between each adjective pair to indicate how you feel about the object.

**To me, the use of e-mail for instructional purposes is:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1.** | Important | ○ | ○ | ○ | ○ | ○ | Unimportant |
| **2.** | Boring | ○ | ○ | ○ | ○ | ○ | Interesting |
| **3.** | Relevant | ○ | ○ | ○ | ○ | ○ | Irrelevant |
| **4.** | Exciting | ○ | ○ | ○ | ○ | ○ | Unexciting |
| **5.** | Means Nothing | ○ | ○ | ○ | ○ | ○ | Means a lot |
| **6.** | Appealing | ○ | ○ | ○ | ○ | ○ | Unappealing |
| **7.** | Fascinating | ○ | ○ | ○ | ○ | ○ | Mundane |
| **8.** | Worthless | ○ | ○ | ○ | ○ | ○ | Valuable |
| **9.** | Involving | ○ | ○ | ○ | ○ | ○ | Uninvolving |
| **10.** | Not Needed | ○ | ○ | ○ | ○ | ○ | Needed |

**To me, the use of the internet for instructional purposes is:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **11.** | Important | ○ | ○ | ○ | ○ | ○ | Unimportant |
| **12.** | Boring | ○ | ○ | ○ | ○ | ○ | Interesting |
| **13.** | Relevant | ○ | ○ | ○ | ○ | ○ | Irrelevant |
| **14.** | Exciting | ○ | ○ | ○ | ○ | ○ | Unexciting |
| **15.** | Means Nothing | ○ | ○ | ○ | ○ | ○ | Means a lot |
| **16.** | Appealing | ○ | ○ | ○ | ○ | ○ | Unappealing |
| **17.** | Fascinating | ○ | ○ | ○ | ○ | ○ | Mundane |
| **18.** | Worthless | ○ | ○ | ○ | ○ | ○ | Valuable |
| **19.** | Involving | ○ | ○ | ○ | ○ | ○ | Uninvolving |
| **20.** | Not Needed | ○ | ○ | ○ | ○ | ○ | Needed |

**To me, the use of multimedia (podcast, photostory, movie maker, etc.) for instructional purposes is:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **21.** | Important | ○ | ○ | ○ | ○ | ○ | Unimportant |
| **22.** | Boring | ○ | ○ | ○ | ○ | ○ | Interesting |
| **23.** | Relevant | ○ | ○ | ○ | ○ | ○ | Irrelevant |
| **24.** | Exciting | ○ | ○ | ○ | ○ | ○ | Unexciting |
| **25.** | Means Nothing | ○ | ○ | ○ | ○ | ○ | Means a lot |
| **26.** | Appealing | ○ | ○ | ○ | ○ | ○ | Unappealing |
| **27.** | Fascinating | ○ | ○ | ○ | ○ | ○ | Mundane |
| **28.** | Worthless | ○ | ○ | ○ | ○ | ○ | Valuable |
| **29.** | Involving | ○ | ○ | ○ | ○ | ○ | Uninvolving |
| **30.** | Not Needed | ○ | ○ | ○ | ○ | ○ | Needed |

**For my students, using technology resources in the classroom is:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **31.** | Important | ○ | ○ | ○ | ○ | ○ | Unimportant |
| **32.** | Boring | ○ | ○ | ○ | ○ | ○ | Interesting |
| **33.** | Relevant | ○ | ○ | ○ | ○ | ○ | Irrelevant |
| **34.** | Exciting | ○ | ○ | ○ | ○ | ○ | Unexciting |
| **35.** | Means Nothing | ○ | ○ | ○ | ○ | ○ | Means a lot |
| **36.** | Appealing | ○ | ○ | ○ | ○ | ○ | Unappealing |
| **37.** | Fascinating | ○ | ○ | ○ | ○ | ○ | Mundane |
| **38.** | Worthless | ○ | ○ | ○ | ○ | ○ | Valuable |
| **39.** | Involving | ○ | ○ | ○ | ○ | ○ | Uninvolving |
| **40.** | Not Needed | ○ | ○ | ○ | ○ | ○ | Needed |

**Choose the stage that best describes where you are in the adoption of technology.**

| | |
|---|---|
| ○ | Stage 1: Awareness<br>**I am aware that technologies exist but have not used it – perhaps I'm even avoiding it. I am anxious about the prospect of using computers** |
| ○ | **Stage 2: Learning the process**<br>I am currently trying to learn the basics. I am sometimes frustrated using technological tools. I lack confidence when using technology. |
| ○ | **Stage 3: Understanding and Application of the process**<br>I am beginning to understand the process of using technology in my instruction and can think of specific tasks in which it might be used. |
| ○ | **Stage 4: Familiarity and confident**<br>I am gaining a sense of confidence in using different types of technology for specific tasks. I am starting to feel comfortable using existing technologies. |
| ○ | **Stage 5: Adaption to other context**<br>I think about technology as a tool to help me disseminate information as well as a way to investigate new ideas. I can use it in many applications and as an instructional aide. |
| ○ | **Stage 6: Creative application to new contexts**<br>I can apply what I know about technology in the classroom. I am able to use it as an instructional tool and integrate it into the curriculum. |

**To better identify your needs, please answer the following open ended questions. If additional space is needed a blank sheet will be attached.**

What obstacles/barriers have you experienced that affect your level of confidence in adopting technology in classroom instruction?

In what ways would you like to increase the level in which you use technology in your

classroom?

What helped or might help facilitate your adoption of technology in classroom instruction?

| How often do you as a classroom teacher | Scale of Implementation | | | | |
|---|---|---|---|---|---|
| | Not at all | Not very much | Some-times | Often | Frequently |
| Encourage and support student autonomy and initiative (student working independently and helping to direct their own learning)? | ○ | ○ | ○ | ○ | ○ |
| Use raw data and primary sources? | ○ | ○ | ○ | ○ | ○ |
| Use manipulative, interactive, and physical materials? | ○ | ○ | ○ | ○ | ○ |
| When explaining tasks, use cognitive terminology such as “classify,” “analyze,” “predict,” and “create”? | ○ | ○ | ○ | ○ | ○ |
| Allow student responses to drive lessons shift instructional strategies, and alter content accordingly? | ○ | ○ | ○ | ○ | ○ |
| Inquire about students’ understanding of concepts before sharing my own understanding of those concepts? | ○ | ○ | ○ | ○ | ○ |
| Encourage students to engage in dialogue, both with the teacher and one another? | ○ | ○ | ○ | ○ | ○ |
| Encourage student inquiry by asking thoughtful, open-ended questions? | ○ | ○ | ○ | ○ | ○ |
| Encourage students to ask questions of each other? | ○ | ○ | ○ | ○ | ○ |
| Seek elaboration of students’ initial responses? | ○ | ○ | ○ | ○ | ○ |
| Engage students in experiences that might result in contradictions to their initial ideas? | ○ | ○ | ○ | ○ | ○ |
| Allow wait time after posing questions | ○ | ○ | ○ | ○ | ○ |
| Provide time for students to construct relationships between/among concepts? | ○ | ○ | ○ | ○ | ○ |
| Nurture students’ natural curiosity? | ○ | ○ | ○ | ○ | ○ |

Appendix 2

Informed Consent Letter

**(NOTE: DO NOT SIGN THIS DOCUMENT UNLESS AN IRB APPROVAL STAMP WITH CURRENT DATES HAS BEEN APPLIED TO THIS DOCUMENT.)**

**INFORMED CONSENT**
**for a Research Study entitled**
**"Teachers' Concerns, Attitudes, Beliefs and Pedagogical Practices as It Relates to Technology Integration"**

**You are invited to participate in a research study** to first, discover whether there are any differences in the use of technology by magnet school and comprehensive high school teachers. Second, to seek an understanding of individual teachers as they transition through stages of technology use identifying contributing factors of attitudes, beliefs and pedagogical practices. Untimely attempting to develop staff development ideas aimed at supporting the reluctant technology integrating teacher. The study is being conducted by Jacob Holloway, a student under the direction of Dr. Paris Strom, Associate Professor in the Auburn University Department of Educational Foundations, Leadership and Technology. You were selected as a possible participant because you are either a comprehensive or magnet high school teacher teaching in a core content area within the Montgomery Public Schools System.

**What will be involved if you participate?** If you decide to participate in this research study, you will be asked to answer a questionnaire and return it in a pre-stamped self-addressed envelope via US Postal Service. Your total time commitment will be approximately 10-15 minutes.

**Are there any risks or discomforts?** The risk associated with participating in this study is the risk a breach in confidentiality. To minimize these risks, I will collect all data and record it as anonymous. All identifiable information will be removed or fictionalized in the reporting process. Finally, all data collected will be secured in a locked filling cabinet, in the home office of the principal investigate, throughout the course of data collection, analysis, and report generation.

Participant's initials _____ Page 1 of 2

**Are there any benefits to yourself or others?** If you participate in this study, you can expect to gain valuable insight into staff development ideas aimed at technology use, development, and implementation while understanding the connection between pedagogical practices best suited to support technology integration. I cannot promise you that you will receive any or all of the benefits described.

**Are there any costs?** If you decide to participate, you will incur no cost for participating. Mailing cost will be paid by the investigator.

**If you change your mind about participating,** you can withdraw at any time during the study. Your participation is completely voluntary. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Montgomery Public Schools.

**Your privacy will be protected.** Any information obtained in connection with this study will remain anonymous (*or confidential*). Information obtained through your participation may be used to fulfill the prerequisite of a dissertation as a part of the educational requirements necessary to obtain the degree of PhD in Administration and Supervision of Curriculum and the possibility of publication.

**If you have questions about this study,** *please ask them now or* contact me, Jacob Holloway at www.jkh0002@auburn.edu or my faculty adviser, Dr. Paris Strom at stromps@auburn.edu. A copy of this document will be given to you to keep.

**If you have questions about your rights as a research participant,** you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334)-844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

**HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO PARTICIPATE.**

| | |
|---|---|
| _____ | _____ |
| Participant's signature Date | Investigator obtaining consent Date |
| _____ | _____ |
| Printed Name | Printed Name |
| | _____ |
| | Co-Investigator Date |
| | _____ |
| | Printed Name |

Appendix 3

Recruitment Script

My name is Jacob Holloway, a graduate student from the Department of Educational Foundations, Leadership and Technology at Auburn University. I would like to offer you a unique opportunity to participate in a research study aimed at assisting teachers with becoming more knowledgeable and better equipped to address the constant demands to integrate more technology into their instructional practices. This will only take about 10 to 15 minutes of your time and your corporation would be greatly appreciated. My study is designed to help determine if teachers' dispositions of attitudes, concerns and pedagogical practices influence their willingness or hesitance to integrate technology into their instructional practices. I will be requesting feedback, from you the classroom teacher, in the form of a questionnaire. I am asking for teachers inputs because you are the ones facing the many challenges of meeting our students' instructional needs on a daily bases.

Although I would like to hear feedback from each one of you, unfortunately at this time I am limiting my study to core academic teachers who are currently teaching at either a comprehensive or magnet high school. If you are not a core content area teacher I ask that you not participate in this study at this time.

If you would like to participate in this research study, you will find legal envelopes placed on the tables at which you are sitting. Please open one and you will find a letter of consent. This letter

explains your rights as a participant. Quickly read over this letter asking any questions that may concern you. Please note that it is my intent to keep all information submitted to me confidential, however, there exist a slight risk of a breach of confidentiality. This study does not reflect in any way on job performance or your employment with Montgomery Public Schools. All results reported to your district will be recorded and presented as anonymous. At the bottom there is a place for your signature, by signing this letter you would have agreed to participate in this study. After signing your consent or if you decide not to participate please return your consent document to the envelope and stack them at the end of your tables for collection.

If you should find that you have questions later, please contact me at www.jkh0002@auburn.edu or my advisor, Dr. Paris Strom, at www.stromps@auburn.edu

Again, thank you for your support.