

DIGITAL ONE-TO-ONE IMPLEMENTATION:  
THE TEACHERS' CONCERNS IN THE  
CHANGE PROCESS

by

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## ABSTRACT

Most current research on digital one-to-one initiatives are self-reports from schools with limited research based findings. The purpose of this research was to determine the stages of concern for teachers in a southeastern state school district with the innovation of digital one-to-one. Using the theoretical framework of the Concerns Based Adoption Model (CBAM), this study employed a cross sectional survey design based on the Stages of Concern (SoC) dimensions of the CBAM. A demographic survey and a Stages of Concern Questionnaire (SoCQ) were completed by 116 teachers. Descriptive statistics and quantitative analyses (MANOVAs) of the data were conducted. The study analyzed the independent variables (personal and academic demographics) along with the dependent variable (SoC).

This study results placed the teacher concerns primarily at the *Self Level* – not really concerned about the innovation but concerned about their own role in the adoption and the impact on them. It was also found that teachers’ personal demographics (gender and age) did not impact their SoCs. Further results found that tenure status and years of experience influenced stages of concern, as indicated by high scores in *Self-Level* concerns (Stages 0-2). The findings of this study can be used to a) guide future research into concerns of teachers with digital one-to-one and b) help change facilitators understand the importance of teachers in the change process of adopting an innovation.

## DEDICATION

Working on this dissertation has been a journey full of many detours. However, I have been determined not to allow these obstacles to detour me from achieving this goal. I have the following people to thank for their love, encouragement, support, and above all patience with me: 1) the late Dr. Olivia H. Sanders – my mentor/mother figure; 2) Andrea Yeldell – my daughter; 3) Henry and Shirley Yeldell – my parents; 4) Buryl Jones – love of my life; 5) Edward, Sonya, Marinda, Andrea, Tracy, Anthony, Michael, and Frederick – siblings; 6) Jasmin, Jayla, DeAndra, Michelle, Chelsea, Danielle, Chloe, Cailyn, and Kennedy – nieces; 7) Dr. Patricia Sims; and 8) Dr. Michele Wallace.

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## CHAPTER I: INTRODUCTION

*Race to the Top* and *No Child Left Behind* have sparked key education reforms (Culp, Honey, & Mandinach, 2003). Across the nation, school districts strive to implement initiatives to transform students into 21st century learners. As a result, teachers and students are living and working in a new age that requires skills beyond the traditional reading, writing, and mathematical skills. Technology is the new driving force in the educational arena. The passage of *No Child Left Behind* (NCLB) challenged educators to help every child achieve at higher levels. Included in NCLB is the recommendation that, by the eighth grade, all students should be technologically literate along with repeated references that technology be an important source of support for teaching and learning across the curriculum (Culp, Honey, & Mandinach, 2003).

The requirements of NCLB included, not only rethinking, and realigning the industrial age model of education, but also improving the tools available to support the change. Information age schools must effectively employ technology to better meet the needs of students, parents, teachers, and administrators. Revisions to NCLB in 2005 by Congress incorporated the National Education Technology Plan (NETP) written by the US Department Office of Educational Technology. This plan was devised as a part of a national strategy and guide for using technology effectively to improve student achievement directly or through integration of other systematic approaches to reform. The NETP was finalized in 2010 and presents a model of learning powered by technology with goals and recommendations in five essential areas: learning, assessment, teaching, infrastructure, and productivity (tech.ed.gov, 2015).

The world has become increasingly dependent on technology. Parents and students expect public education to include the integration of computers and other digital formats into the classroom. Researchers cite access to iPhone, digital equipment, laptops, Nooks, email, instant messaging, and other technological components as the Digital Age. According to Ringstaff and Kelly (2002), the use of technology in the classroom places the teacher in a quandary, one that encourages the need for pedagogical restructuring and change; and another that impedes the change itself. Student learning in this age of technology requires educators who can offer innovative instructional practices and a positive learning environment that allows for a transformation in teaching and learning.

As the cost of technology decreases, school systems find it economically feasible to implement one-to-one, wireless, laptop initiatives. The hope is to open an electronic portal of 21<sup>st</sup> century learning skills for every student. Eliminating the old paradigm of content mastery, a one-to-one initiative lends itself towards promoting critical thinking skills. Activities conducted in support of digital one-to-one initiatives include improving buildings' technology infrastructures, purchasing laptops/net books and iPads, and adopting electronic textbooks and other educational resources.

The objective of digital one-to-one initiatives is to place computers into the hands of every child, not just within the school building computer labs. The challenge is to move beyond adoption and perpetuate widespread emphasis on consistent use by the teachers to improve instruction and benefit the student. However, the vitality of digital one-to-one depends on the teacher.

Studies by Penuel (2006) and Lowther, Ross, and Morrison (2003) looked beyond the phenomenon of teacher perception and concerns and focused primarily on the technological

impact on resources, training and student achievement, attendance, and attitudes. To bring success to educational initiatives, it is crucial to recognize the implementation of an educational initiative as a process, not a single event (Hall & Hord, 2011). Hall and Hord (2011) emphasized the importance of measuring, understanding, and addressing the concerns and perceptions of the teachers in this change process.

Early studies of digital one-to-one initiatives tended to focus on the technology and its impact on student achievement, attendance, and attitudes (Penuel, 2006). Additionally, studies included the aspects of the technological impact on resources (Lowther, Ross, & Morrison, 2003; Penuel, 2006) but completely bypassed the phenomenon of teacher perception and concerns with the initiative and the impact of teacher perception upon the success of the initiative itself (Donovan, Hartley & Strudler, 2007; Hall & Hord, 2011; Marzano, Zaffron, Zraik, Robbins & Yoon, 1995; Raulston & Wright, 2010).

### **Statement of the Problem**

Nationally, educators are in the midst of a paradigm shift that is affecting the teacher, teaching environment, and the student learning environment. As teachers struggle with disparities in student achievement and the failure/inability of traditional instructional practices to erase those disparities, they endure increasing criticism and pressure to promote technology-rich classrooms aligned with 21<sup>st</sup> century skills. Additionally, they must demonstrate a readiness for emerging technology that continues to accelerate at a rapid rate. Possessing openness to emerging technologies is critical. Lei and Zhao (2008) stated that digital one-to-one computing is one of the fastest growing, yet most controversial phenomena in American classrooms. The last decade has witnessed a dramatic increase in the number and scope of digital one-to-one projects.

Warschauer (2005) suggested that merely adding technology to traditional classrooms does not prepare students to navigate a difficult and growing technological society. Several factors determine the success or failure of technology innovations in the classroom. However, the comfort level of the teacher with the technological changes that occur in the classroom is key in determining the efficiency of instruction in the classroom. The teacher's attitude and beliefs are critical to effective use of technology for teaching and learning.

### **Theoretical/Conceptual Framework**

This study employs the Concerns Based Adoption Model (CBAM) as a theoretical framework to offer research-based constructs and tools to understand, facilitate, and evaluate teacher concerns and perceptions of the implementation of digital one-to-one educational initiative. In other words, the framework allows researchers to examine individual concerns at various times during the process of adopting an innovation. CBAM has been highlighted as a useful framework for understanding the evolution of educator's questions and concerns during adoption and implementation of innovations. The model is comprised of three components (a) stages of concern, (b) levels of use, and (c) innovation configurations. Stages of concern was the focus of this study. This component is based upon understanding that for an innovation to succeed, it is critical to address the concerns of the people charged to implement it.

### **Statement of Purpose**

The purpose of this research was to utilize the CBAM dimension, Stages of Concern (SoCQ), to determine the stages of concern for teachers in a southeastern state school district with the innovation of digital one-to-one. It is imperative that we study what people do and how they interact during educational initiatives. If we are to better understand the success or failure of current educational initiatives, the evaluation of digital one-to-one must encompass the people

involved and the context of the initiative. Since teachers are the main facilitators of classroom activity, it would seem necessary to understand their concerns during the implementation process of the digital one-to-one initiative in a school system in one of the southeastern states.

### **Research Questions and Null Hypothesis**

The questions and hypothesis guiding this research included the following:

1. What is the highest peak SoC for teachers with the innovation of digital one-to-one;
2. What is the second highest SoC for teachers with the innovation of digital one-to-one;
3. Is there a difference in the SoC of teachers with the innovation digital one-to-one based on their (a) personal demographics and (b) academic demographics; and  
H<sub>01</sub>: There is no difference in the SoC of teachers with the innovation digital one-to-one based on their (a) personal demographics and (b) academic demographics.

### **Method**

A survey design was employed for this study. The Concerns Based Adoption Model (CBAM) in the form of a Stages of Concern Questionnaire (SoCQ) diagnostic tool was used to determine teacher concerns during the digital one-to-one initiative in a southeastern school system setting. The questionnaire provides researchers with individual and group composite views of the stages of concerns held. The reason for this study was to clearly define the key concerns of teachers during the change process.

The primary source of data was derived from the Stages of Concern Questionnaire (SoCQ) online survey tool. The survey was tailored to fit the needs of this digital one-to-one

initiative. The SoCQ survey is a Likert-based series of 35 reflective questions that allow the participant to rate his or her perceptions on an eight-point scale from irrelevant (0) to very true of me now (7). The peak score and secondary score were selected as the independent variables for investigation. Additional data was collected on the participants' demographic and academic characteristics. The SoCQ was tested for both internal consistency (alpha-coefficients range between .66-.86) and reliability (test/retest reliability ranges from .65-.86) (Donovan et al., 2007; Hall & Hord, 2011). Research questions 1 and 2 were analyzed using descriptive statistics. Research question 3 was a statistical analysis of significance completed using MANOVAs.

### **Significance of the Problem**

As previously stated, the implementation of any educational initiative is a system level process, not a single event (Marzano et al., 1995; Hall & Hord, 2011). It is crucial in the initial implementation stage to measure, understand, define, and address the perceptions and concerns of the teachers involved in the initiative. This will help bring an overall system-wide success to the program (Hall & Hord, 2011). Little empirical research has focused on studying teachers as key change agents in educational initiatives. Most information about digital one-to-one implementation comes from evaluation reports relying heavily on perception data, self-reports, and/or idiosyncratic methods (Dawson, Cavanaugh, & Ritzhaupt, 2006). However, the literature indicates teachers play a major role in the adoption and implementation of digital one-to-one projects (Fullan, 2007). For educational implementations of digital one-to-one, it is important to describe the ways teachers can be enablers or barriers to change. This research will aid in filling the gap in existing research on teacher concerns in the change process during a digital one-to-one initiative.

## **Assumption and Limitations**

This study assumed that research participants provided honest answers to the survey. This study also had the following limitations:

1. The study was restricted to one school district in a southeastern state.
2. Conclusions were drawn from the teacher self-reports of their personal experiences and perceptions.
3. The cross-sectional designs of the study limit the views of the respondents to a specific time and does not accurately represent views of participants over a continuum.
4. This study is limited to the concerns of teachers as measured by the SOCQ. The SOCQ isn't designed to provide respondents the opportunity to provide additional information.

## **Definition of Key Terms**

*Concerns Based Adoption Model.* CBAM is an empirically-based conceptual framework which outlines the development of individual experiences as they implement an innovation.

*Digital Age.* Access to iPhones, digital equipment, laptops, nooks, email, instant messages, and other technological components.

*Digital Learning.* The integration of many different types of technology tools and electronic communication within a school in addition to computers, hardware, and software.

*Laptop Computer.* A portable computer that can run on a rechargeable battery and can fit in a person's lap.

*One-to-one Laptop Initiative.* A learning environment where students and teachers have access to a wireless laptop computer at school and home.

*Paradigm Shift.* Represents a change in the commonly held belief about a specific concept or idea. A paradigm shift occurs over time and transform in a series of reiterations as a result of change.

## CHAPTER II: REVIEW OF LITERATURE

### **Purpose**

According to Windschitl and Sahl (2002), much of the technology implementation literature about how and why teachers transform their instructional practices and pedagogical orientations offers only anecdotal evidence devoid of strong theoretical framework. The purpose of this review of literature is to provide a synthesis of the empirical literature as it relates to 1) digital one-to-one initiatives; and 2) the concept of educational change among teachers. The chapter begins with an overview of digital learning and the history of digital one-to-one; followed by a discussion of key findings on digital one-to-one initiatives and influences on technology adoption; and concludes with a discussion of Concerns Based Adoption Model (CBAM) as a theoretical framework for understanding teacher change and adoption during a digital one-to-one implementation.

### **Digital Learning**

The wake-up call to America for education began with the launching of Sputnik by Russia in 1957 (Culp, Honey, & Mandinach, 2003). Competing in space required a rigorous math and science curriculum. The federal government made money available for innovative approaches, which included using technology as a learning tool. Initial attempts to use the computer in education concentrated on the improvement and efficiency of instruction. However, the work of Seymour Papert, a professor of mathematics at Massachusetts Institute of

Technology, formulated the idea to use computers as an opportunity for intellectual expansion (Johnstone, 2003).

In 2001, the International Society for Technology in Education (ISTE) and other stakeholders created and released the National Educational Technology Standards for Administrators (NETS·A). To accommodate the widespread function of technology in the workplace and the need to create learning environments aligned with technology and career shifts, ISTE updated these standards in 2009 (Richardson, Bathon, Flora, & Lewis, 2012). The adoption of these standards has led to a steady increase in the availability of technology in schools. Bebel and Kay (2010) argued that political leaders viewed providing students access to technologies as contributing to long-term national economic prosperity.

Through a partnership with ISTE, the US Department of Education, and other agencies, the National Educational Technology Standards for Students (NETS) were authors in an effort to identify technology standards for students in primary and secondary schools. The NETS Project addressed the following areas: 1) basic skills; 2) ethical and social issues related to technology use; 3) using technology for productivity; 4) using technology for communication; 5) using technology for research; and 6) using technology for problem solving and decision-making. The NETS Project provided teachers with benchmarks for effective technology integration. Lowther, Ross, and Morrison (2003) postulated that technology integration impacted student learning by increasing the opportunities for higher order critical thinking and analysis, and synthesis of material in the classroom. While technology helps education where it is already doing well, technology does little for mediocre educational systems and dysfunctional schools. Proponents have argued that students can overcome educational hurdles but rigorous research fails to show the educational impact of technology (Toyama, 2015).

## Digital One-to-One

The catalyst of one-to-one initiatives began in 1985 with the commercially driven Apple Based Classrooms of Tomorrow, or ACOT, which introduced the use of technology in the educational setting (Sandholtz, Ringstaff, & Dwyer, 1997). Since then, the definition of the term “laptop initiative” has changed radically with the progression from desktop based, self-contained single units to wireless, networked, laptop computers with Internet capabilities for both home and school use for staff and students. As the costs of technology have dropped tremendously, school systems now find it economically feasible to launch one-to-one, wireless, laptop initiatives (OWLI) with the hopes of opening an electronic portal with positive teaching and learning ramifications for every student.

Most information about digital one-to-one implementation comes from evaluation reports relying heavily on perception data, self-reports, and or idiosyncratic methods (Dawson, Cavanaugh, & Ritzhaupt, 2006). The digital one-to-one has mixed reactions because of the lack of hard evidence on the effectiveness on student learning across all grade levels (Lei & Zhao, 2008). Garthwait and Weller (2005) pointed to a growing band of literature that suggests a high ratio of computers to every student as changing teaching dynamics in the classroom. Penuel (2006) stated that educational technology research on the educational community’s knowledge about digital one-to-one has not kept up with the expansion of these initiatives or with their breadth. The majority of research on digital one-to-one initiatives have been self-study reports by schools, districts or states, rather than peer reviewed research aimed at evaluating the effectiveness and consequences of laptop programs (Zucker, 2004). In 2010, Greaves, Hayes, Wilson, Gielniak, and Peterson studied digital one-to-one implementations in almost 1,000 schools across the country. The findings were published in *Project Red, the Technology Factor:*

*Nine Keys to Student Achievement and Cost Effectiveness.* The Project Red study found the most effective schools in digital one-to-one implementation understood the second-order change and the importance of key implementation factors. Project Red defined second order change as change mechanisms that increase student performance among all student populations and the change is sustainable with varying economy and other factors. Examples of second order change in school are as follows: change to address each student with personalized instruction programs, exchange of seat-time requirements for demonstrated proficiency, and change focused from teacher to student as customer.

Johnstone (2003) wrote about the earliest implementation of one-to-one computing in Melbourne, Australia. During the 1990s, the Methodist Ladies College implemented a compulsory computer program which began with their fifth-grade classrooms. The parents were asked to pay for the computers. By 1995, digital one-to-one initiatives had spread across the country and most students and teachers across Australia were equipped with laptops.

According to Warschauer (2006), the events in Australia led to Microsoft Corporation's interest in one-to-one computing in America. First, there were trips for educators to Australia and then conferences were held in Washington. By April of 1997, the *Anytime Anywhere Learning Program* initiative was established. It was estimated that by 2002 thousands of schools across the United States and countries around the world would participate in this initiative.

Since the first one-to-one laptop initiative in Melbourne, American K-12 education has increasingly employed digital one-to-one to address various teaching and learning challenges (Russell, Bebell, & Higgins, 2004; Zucker, 2004). According to Maninger and Holden (2009), there are over 1,000 laptop initiatives in progress over the school districts in the nation. The initiatives have identified at least one of the following as the major goal: closing achievement

gaps, elimination of the digital divide, preparing students for the 21<sup>st</sup> century work force or transforming teaching and learning (Angelo, 2001; Gulek & Demiritas, 2005; Levin, 2004; Levin & Wasmuth, 2004). The configurations have varied to meet the needs of the school district whether it be all students have laptops to take home, mixed classes with laptop and non-laptop students, or as a classroom set in which teacher checks out a cart of digital devices for student use during a class period (Fletcher, 2006; Sahl & Windschitle, 2000).

Under the leadership of Papert (Warschauer, 2006), Maine initiated one of the first one-to-one initiative in the United States. He advised the state not to proceed unless the ratio of student laptops was one-to-one so every student in the seventh-grade classroom was mandated to have a laptop. The Maine study was comprised of one of the two largest evaluation studies conducted in the United States. The former governor of Maine, Angus King, had a goal to find the state an economic advantage by preparing students to learn in a new way with 21<sup>st</sup> century workforce tools. This became known as the Maine Learning Technology Initiative (MLTI) (Muir, Knezek, & Christensen, 2004).

MLTI relied upon a mixed digital one-to-one configuration with some schools making use of mobile carts of laptops checked out by the teacher or concentrated models. There was a state task force which spent two years planning the seventh-grade implementation. The task force created a state-wide teacher development system with set learning goals and provisions for adequate resources for the technology (Muir, Manchester, & Moulton, 2005). The first full year of implementation in 2002-2003 included only seventh grade but each year added a new grade level. This led to over 34,000 seventh and eighth grade students, 3,000 teachers in 243 middle schools with laptops. The three data collection periods were fall 2002, spring 2003, and fall 2003.

Regarding teacher usage, overall the study found that teachers increased their use of laptops over the 15-month period. The data indicated that teachers who used their laptops most had greater technology skills, higher participation in professional development, and more classroom experience with laptops. Observed student usage also increased over the evaluation period. Researchers collected and analyzed more than 26,000 student surveys and teacher surveys. There were 39 site visits, 24 observations, and depending on the group there were several interviews.

Overall, the research team conducted interviews with 38 parents, 49 technology coordinators, 60 principals, 234 teachers, and 169 students. The obstacles that schools, teachers, and students faced fell into three areas: support, coordination, and expenses. For example, about 70% of teachers indicated they lacked time to improve their skills and integrate technology into their curriculum. Furthermore, 70% of the teachers preferred students take the laptops home but only 40% of schools allowed students to do so. Additionally, 70% of the superintendents found the laptops increased expenses in a variety of areas to include computer hardware, printer supplies, and technical support. A final measure of a 60% to 70% increase was noted in system expenses (Silvernail & Lane, 2004).

Another ground-breaking digital one-to-one initiative happened in Henrico County Schools in Virginia from 1997-2004 and has been recognized as a benchmark for digital one-to-one initiatives. Henrico provided 26,000 students with iBook computers. Mark Edwards (2014), who was superintendent at the time, stated it was not possible to evaluate the impact of the implementation because the implementation of the digital one-to-one initiative varied widely across the schools. He moved from Virginia to implement another digital one-to-one in Mooresville Graded School District (MGSD) in Mooresville, North Carolina. Zucker and

McGhee (2005) reported wide-spread use by students and faculty in MGSD led to an increase in student directed and collaborative learning which resulted in gains in student achievement.

MGSD's digital one-to-one conversion took place from 2007-2011. The district served approximately 5600 students in seven schools. The demographics were 72% Caucasian, 18% African-Americans, 8% Hispanic, 2% other, 12% special education, 7% English learners, and 40% free and reduced lunch. The district's economy was struggling with an economic downturn. MGSD adopted a second-order change principle as the core tenet of their digital conversion. For example, to increase the success of all students and change from teacher centered to student centered, instead of adding on to the old ways of teaching and learning, they implemented technology from ground up to guide the demands of a 21st Century workplace not only as students having digital skills but being able to collaborate, create, and engage in independent research. This model of implementation created a gap in the way teachers and students used technology. Student access to emerging technologies forced teachers to reconsider their instructional practices (Becker, 2000).

### **Teacher: Technology and Change**

Using data from the ACOT study, Sandholtz, Ringstaff, and Dwyer (1997) determined that teachers who had regular access to computer technology over several years' time experienced significant changes in their instruction. However, this did not happen until the teachers acknowledged their beliefs regarding teaching and learning. It was found the more the innovation caused changes, the more teachers needed to face their beliefs about schooling. These perceptions were key towards teacher acceptance of the technology.

Wang (2002) postulated further on this idea by investigating pre-service teachers' perception of their role in the classroom with computers. The sample population for the survey

study was 78 pre-service teachers beginning their student teaching in US territory in the Pacific Rim. Wang based the study on the thesis that pre-service teachers' perceptions play a significant role in determining their future teaching behavior. The study concluded that the student teachers' teacher-centered behavior instead of student-centered with the computers was based on their personal experiences as a student.

Holcomb (2009) and Donovan, Hartley, and Strudler (2007) have supported the existence of an association between teacher or staff perceptions and a successful change implementation process in education. Holcomb (2009) reviewed the most widely accepted explanations offered by researchers for the pros and cons of digital one-to-one initiatives which include: cost, infrastructure needs, parental support, and staff development. Two key areas emerged as the means to a successful initiative: implementation methodology and staff development. In addition, there were demonstrated benefits to student achievement, as well as, documented failures. She stated, "The success of a 1:1 initiative can hinge on the ability and comfort levels of teachers to effectively integrate laptops into their teaching" (p. 53). Therefore, a caveat exists that the constructions of digital one-to-one initiatives go beyond the technology; to also address professional development, training, and support of teachers.

Donovan, Hartley, and Strudler (2007) found that teacher perceptions and training have a direct impact upon technology integration. Using Concerns-Based Adoption Model (CBAM) of change as their theoretical framework, they investigated the concerns of teachers in the early stages of a one-to-one laptop initiative. Their study suggested that teachers have multiple levels of concerns during digital one-to-one initiatives including both their personal comfort levels with technology and the integration of technologies into their teaching methodology. The authors agreed with Hall and Hord (2010) that for an innovation adoption to be successful and sustained,

training should be directly related to the teacher concerns as identified by the CBAM. Based upon the findings, three recommendations were offered as necessary points of emphasis for similar innovation adoptions: 1) align professional development and teacher concerns; 2) give teachers a voice in innovation adoption; and 3) understand that change is a process.

Teachers look at the technology in digital one-to-one initiatives as an add-on to instruction rather than as instructional tools that can enhance instruction (Cuban, 2001). Cuban (2001) found that computers have been oversold and under used in schools. Primarily this happened because teachers continued to use the computer technology provided by digital one-to-one initiatives in ways similar to established practices and pedagogies. He wrote, “because teachers are gatekeepers to school and classroom improvements, their perceptions, beliefs, knowledge, attention, motivation, and skills come into play” (p. 106-107).

Effective and meaningful integration of digital one-to-one initiatives is not easy and is dependent upon several variables. Becker and Riel (2000) suggested that teachers highly involved with professional development are more likely to adopt constructivist teaching philosophy and integrate technology into their instructional setting and use computers meaningfully. On the contrary, Windschilt and Sahl’s (2002) study of three middle school teachers with a ubiquitous technology presence and continuous professional development did not result in increased use of technology for instruction. Becker and Rantz (1999) further explained integration of technology depended on teacher beliefs. A case study of digital one-to-one initiative at a high school in south Louisiana by Broussard, Hebert, Welch, and VanMetre (2014) identified the top five techniques used by teachers related to teacher technology use in the adoption process of an initiative as follows:

1. Organizing instructional material: Preparing digital content in advance of a lesson and making that content available to students prior to or during the lesson, primarily, via Moodle or Edmodo;
2. Supporting learner-centered activities: Using tools including but not limited to Moodle, Edmodo, and other internet applications to create learning activities in which students interact with the content or each other and the teacher synchronously or asynchronously both during and outside classes;
3. Using internet for extended learning: Taking advantage of the wealth of Internet content or interactive activities to provide or enhance face-to-face instruction, to engage students in learning beyond the classroom at hand or to provide reinforcement or remediation for students who did not meet benchmark expectations;
4. Addressing content standards: Using technology as the primary or singular method of content delivery where very little to no teacher-driven instruction occurs; learning new concepts/skills independently through technology-mediated methods; and
5. Supporting higher-order thinking: Creating opportunities where students demonstrate creativity and innovation in technology-dependent manners not otherwise possible.  
(p. 41)

To sustain classroom digital one-to-one innovation, researchers have recommended teachers be a central part of planning and implementation of the initiative. The teacher's perception about the new initiative is often considered obsolete. Often long after the new instructional technology implementation is well underway are teachers called upon to change their skills, beliefs, and classroom pedagogy; while also trying to create innovative practices to meet student needs and contend with growing class sizes, insufficient training, and planning time. Given the complexity of new technology initiatives, teachers as innovators can be better supported by an understanding of the nature and management of change during the classroom implementation process (McLaughlin & Talbert, 2006). All types of events can affect a teacher's perception of how easily an innovation like laptops will be implemented. Thus, understanding the nature of change can hold implications for teachers working through the technology adoption process.

According to Fullan (1992), planned change is generally recognized as a myth. Therefore, frontloading a new digital one-to-one initiative with resources, training, timelines, and

strategies and expecting them to remain static throughout implementation is unrealistic. He argued that frontloading participation or buy-in is not necessary in order to claim teacher ownership. Ownership of the change is a process that increases during the implementation. Fullan (2001) described four factors that characterize change based on the extent to which they influence teacher implementation. He theorized that understanding the nature of change in terms of the following factors of need, clarity, complexity, and quality/practicality can support effective implementation of innovations.

Huberman and Miles (1984) suggested that teachers must perceive or feel that the need for change is significant to persist in their efforts to implement a technology initiative. Hope (1997) wrote that too often school leaders inserted a technology change initiative, prescribed some implementation strategies, and provided a day or so of initial vendor initiated professional development training. This “sit and get” technical training on software is argued further by Kanaya, Light, and Culp (2005) as often being disconnected from the teacher’s curricular needs, personal interests, and prior knowledge.

Change also requires clarity about purposes and processes. Rogers (1995) recognized that people who are sincerely trying to implement innovations may become frustrated because of unspecified changes. Fullan (2001) warned about false clarity in which change is oversimplified and teachers later discover the implementation involves more than what was described. Teachers must be clear about the important feature of an innovation or what should be done differently. When schools are considered learning organizations, according to Brandt (2003) people can identify where they are in the change process and articulate the changes they are endeavoring to make. This flexibility, however, is rooted in the learning organization’s willingness to re-orient people to think about existing relationships, structures, regulations, and values differently.

Fullan (2001) suggested that great success can come from teachers and schools engaging in complex reform; but also, noted that failure happens as well. Growing pains are a natural part of the process but unexpected cultural problems arise when schools fail to recognize the various logistical, political, societal, and personal demands associated with change from complex innovations. School cultures most likely to engage in complex change are already designed for collegiality, participatory decision making, and continuous improvement.

In regard to the innovation itself, the quality and practicality of the change is important. Fullan (2001) made a valid point that if teachers perceive an innovation to be of poor quality with inadequate support and resources, the conclusion is drawn that the innovation is unimportant. He further implied when this happens the leadership has put the adoption ahead of implementation which leads to teacher innovation frustration in the classroom.

Positive relationships between what people perceive as the relative advantages and compatibility of an innovation and adoption rate is noted as a positive relationship by Rogers (1995). He found that prior to the innovation people quickly adopt an innovation which seemed to have attributes that superseded things previously available or utilized. Further he postulated when the attributes of an innovation are compatible with things such as teacher's beliefs, values, or student needs, teachers tend to embrace change more rapidly.

### **Influences and Barriers on Technology Adoption**

How and why teachers decide to adopt or reject new innovations have been described by various models. Ertmer (2005) found that the decision to adopt and use technology rested solely on the beliefs of the instructor. Walczuch, Lemmicnk, and Streukens (2007) discovered that personalities of adopters made a difference in the utilization of technologies. Zhao and Cziko (2001) devised a model for instructional technology adoption based on Powers perceptual control

theory which examined teachers' perceptions of reality and their effort to act in ways to achieve their internal goals. They found that the uptake of technology was lagging behind the evidence supporting the benefits of technology and the financing to support it. However, there are three specific conditions that had to be present for instructors to utilize the technology: 1) instructors must believe that the technology can help pursue a higher order goal while maintaining continuity; 2) instructors must believe that they are competent and supported enough to implement; and 3) instructors need to feel that they will have sufficient funds and resources to implement the use of the technology. Anderson (1999), Jaber and Moore (1999) Sandholtz (2001), and Steel and Hudson (2001) have shown that understanding the individual adopter can provide a better understanding of the overall diffusion of an innovation, in this case digital one-to-one.

Bai and Ertmer (2008) identified first and second order barriers which inhibited the adoption of technology. The first order barrier pertained to lack of hardware and software, time, and necessary support. Second order barriers were more intrinsic values held specifically by faculty. These included teacher beliefs systems about teaching and learning, as well as, their familiar teaching practices, which can affect meaningful technology integration. They concluded that second order barriers proved more difficult to overcome and a more limiting factor in faculty adoption of technology.

Bitner and Bitner (2002) along with Howland and Wedman (2004) have found that lack of training is identified as a barrier to adoption of technology. Bitner and Bitner (2002) pointed to a systematic need to provide teachers with basic knowledge of technology. Howland and Wedman (2004) along with Jaber and Moore (1999) confirmed that increased utilization and understanding following training sessions, continuous and specifically designed training to better

address the needs of teachers is relevant. The research by Howland and Wedman (2004) revealed that 86% of the teachers studied pointed to their peers or self-discovery (80%) as the most common means to gain experience with technology. Sahin and Thompson (2007) found adoption rates negatively impacted by lack of time for utilization.

Demographical factors have been shown to have little impact on the adoption of technology. Sahin and Thompson (2007) found no significant difference in participant demographics (gender, academic year, etc.) and the level of use of technology by teachers. Li and Linder (2007) similarly found no differences in adoption in the demographic areas of gender, age, and academic rank; but did find significant differences in professional area, level of education, and teaching experience.

Table 1 presents a summary of factors affecting technology adoption. The first column shows factors affecting technology adoption while the second column shows research identifying the factor. By evaluating individual adopters, researchers can understand the adoption process of an innovation through specific population (barrier group). The importance of individuals in the process leads investigators to evaluate and implement plans based on individual adopters.

Table 1

*Factors Affecting Technology Adoption*

| Factors Affecting Technology Adoption                   | Research Identifying Factor  |
|---|--|
| Training for instructional technology                   | Bitner & Bitner, 2002; Howland & Wedman, 2005; Jaber & Moore, 1999; Koehler et al., 2004; McNaught et al., 2000; Schrumm et al., 2003  |
| Available time for instructional technology development | Schrumm et al., 2003; Cardenas, 1998; Koehler et al., 2004; McNaught et al., 2000; Sahin & Thompson, 2007  |
| Faculty motivation                                      | Bitner & Bitner, 2002; Dusick, 1998; Peluchette & Rust, 2005; Reznich, 1997; Bai & Ertmer, 2008; Keenqwe et al., 2009; McNaught et al., 2000   |
| Fear of change  | Bitjner & Bitner, 2002; Falvo, 2003; Steel & Hudson, 2001; Willis et al., 2003   |
| Needs of students                                       | Appana, 2008; Bitner & Bitner, 2002; Cardenas, 1998; DenBeste, 2003; McNaught et al., 2000; Steel & Hudson, 2001; Sugar, Crawley, & Fine, 2004; Zayim et al., 2006   |
| Institutional support                                   | <i>Anderson, 1997; Bitner &amp; Bitner, 2002; Falvo, 2003; Howland &amp; Wedman, 2004; Koehler et al., 2004; Jaber &amp; Moore, 1999; McNaught et al., 2000; Sandholtz, 2001; Schrumm et al., 2003; Thompson, 2007; Zayim et al., 2006</i> |
| Institutional reward structure                          | Anderson, Varnhagen, & Campbell, 1998; Howland & Wedman, 2004; McNaught et al., 2000; Zatim et al., 2006   |
| Perceived usefulness of instructional technology        | Schrumm et al., 2003; Steel & Hudson, 2001; Zayim et al., 2006   |
| Demographics of adopters                                | Li & Linder, 2007; Rogers, 2003; Sahin & Thompson, 2007; Zayim et al., 2006  |

**Theories of Adoption**

Other researchers have worked from a systems theory foundation to describe stages or levels of change (Ellsworth, 2000; Rogers, 1995, Hall & Hord, 1987). Hall and Hord (2011) wrote that, in many ways, today's innovations and initiatives represent major change that is often more complex, subtle, and sophisticated than we think. Symbolically, it is as if implementers

were expected to back up, get a running start, and leap across the Grand Canyon. However, what is needed is an implementation bridge. Just like real bridges, different change efforts require varying lengths, degrees of stability, and combinations of supports (Hall & Hord, 2011).

When change is assumed to be an event Hall and Hord (2011) contend there is no bridge. Eventually, adopters of the new approach are expected to make giant leaps across a chasm. These innovations are likely to be complex, deep, and wide and attempted jumps result in injury and failure. This is true for individuals, school districts, and larger systems. This metaphor of an implementation bridge represents moving from the earlier or less advanced stages to the later or more advanced stages of the three dimensions of the Concerns-Based Adoption Model (CBAM): stages of concern, levels of use, and innovation configurations.

Although this study utilized the CBAM as its framework, it is essential to understand adoption theories are based on the individual's decision to either accept or reject a given innovation. According to Straub (2009), adoption is a behavior change, and adoption theory examines individual change while diffusion theory evaluates changes across a population over time.

### **Concerns-Based Adoption Model**

An example of a systems theory model that is an empirically grounded theoretical model for successfully implementing instructional technologies is the Concerns-Based Adoption Model (CBAM). Hall's (1987) Concerns-Based Adoption Model is based around the individual's experience with the adoption process. The model is constructed around six assumptions: 1) change is a process, not an event; 2) change is accomplished by individuals; 3) change is a highly personal experience; 4) change involves developmental growth; 5) change is best understood in

operational terms; and 6) the focus of facilitation should be on individuals, innovations, and context

The model (see Figure 1) confirms that three distinctly different influences affect change: change facilitators, resource systems, and the user system culture. The change facilitator is responsible for determining the concerns of the users using a variety of methods which include probing and intervening. Change facilitator uses informal and systemic ways to probe individuals and groups to understand them. The change facilitator can then draw from the resource system to meet the needs of the user system. The change facilitator is informed through three dimensions with diagnostic data to provide interventions – actions that effect change and facilitate teacher use of new program and practices (Hall & Hord, 1987).

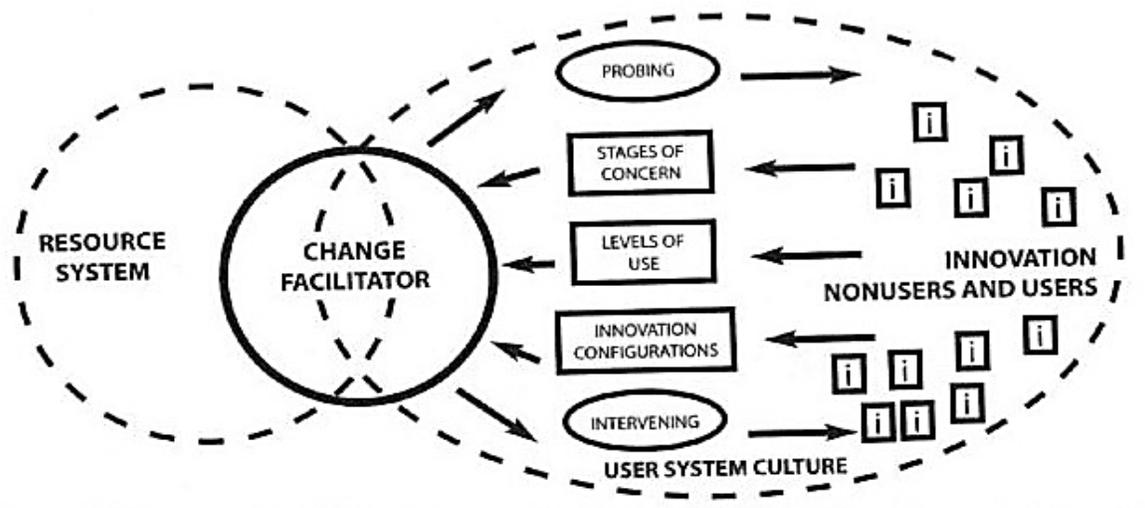


Figure 1. Concerns-based adoption model (George, Hall, & Stiegelbauer, 2006)

CBAM has three diagnostic dimensions: a) stages of concern, b) levels of use, and c) innovation configuration. The three dimensions have a different role in the assessment of an organizations adoption process. Utilization of the CBAM is based upon its function as a process model. It is constructed on the assumption of the presence to two primary systems and the temporary system. The user and resource systems are primary. The collaborative adoption

system is temporary. The resource system is referred to as the institution sponsoring change. The user system in the CBAM is the innovation adopter. For the system of change to work the resource system should be designed to transfer power to the user system-the adopter as the innovation adoption process occurs. The temporary collaborative system exists as a facilitator of the adoption being composed of both primary systems. Understanding the process model of CBAM enables administrators to use the model accordingly; so, that the temporary collaborative system is used for feedback between the user and resource system while being operated by the change facilitator (Hall & Hord, 1987; George, Hall, & Stiegelbauer, 2006).

CBAM was designed for the educational setting, which is one of its strengths. It can provide researchers with both quantitative and qualitative data depending on which of the multiple components of the instruments are used (Anderson, 1997; Hall & Hord, 1986). The objective behind CBAM is to provide a tool to assist in figuring out group or individual needs during an innovation adoption process. Hall and Hord (1986) established twelve unique principles (see Table 2) that describe the change process. These principles typically present themselves, or at least surface, as underlying themes of the change process. Providing feedback about how the change process is unfolding is important. The CBAM provides change facilitators with a method to evaluate a given implementation plan and subsequent adoption rate. Each of the CBAM diagnostic dimensions can be used to measure the implementation process. The data can be used to plan next steps of the implementation (Hall & Hord, 2011).

Table 2

*The Twelve Principles of Change According to Hall and Ford (1986)*

| Process                        | Change is a process not an event   |
|--------------------------------|--|
| Development and Implementation | There are significant differences in what is entailed in development and implementation of an innovation |
| Organization and Individuals   | An organization does not change until the individuals within it change                                   |
| Innovations                    | Innovations come in different sizes and can be either products or processes                              |
| Interventions                  | Interventions are the actions and events that are key to the success of the change process               |
| Outcomes                       | There will be no change in outcomes until new practices are implemented                                  |
| Administrative Leadership      | Administrative leadership is essential to long-term change success                                       |
| Mandates                       | Mandates can work  |
| Change Unit                    | The school is the primary unit for change  |
| Facilitation                   | Facilitation is a team effort  |
| Resistance                     | Appropriate interventions reduce resistance to change  |
| Context                        | The context of the school influences the process of change   |

CBAM, name proposed in 1973, is based on the contention that change facilitators should see innovation from the viewpoint and concerns of the first line users. The model is comprised of three dimensions for describing and evaluating teachers' engagement with and implementation of proposed change or innovations: stages of concern (SoC), levels of use (LoU), and innovation configuration (IC). Any of these three dimensions can be used to analyze the adoption process independently or together to address the needs of the change facilitator. Each

of these is an independent concept: SoC (pertains to feelings and beliefs); LoU (pertains to innovation use); and IC (refers to the characteristics of an innovation based on the assumption that innovation comes in all shapes and sizes). The first two deal directly with adoption, implementation, and integration. IC was later added when researchers noted that an innovation's configuration impacted level of use. For this study SoC was used to investigate teachers concerned during the change process of the innovation of digital one-to-one (Hall & Hord, 1987; Hall & Hord, 2011).

### **Stages of Concern (SoC)**

According to Hall and Hord (1987), the SoC dimension describes how teachers feel about and perceive change through the innovation. Using tools such as questionnaires and interviews help change facilitators ascertain teacher concerns. Understanding teacher's concerns help change facilitators adjust their behaviors and address change from a teacher's vantage point.

The first column of Figure 2 represents the three levels of concerns: self concerns, task concerns, and impact concerns. Columns two and three shows the stages of concern associated with each level in column one. Self-concerns consist of Stage 0 – Stage 2 concerns (unconcerned, informational, and personal), while task concerns consist of Stage 3 concerns (management) and impact concerns consist of Stage 4 – 6 concerns (consequences, collaboration, and refocusing) (Hall & Hord, 1987; 2006, 2011).

|        |   |               |   |
|--------|---|---------------|---|
| IMPACT | 6 | Refocusing    | The individual focuses on exploring ways to reap more universal benefits from the innovation, including the possibility of making major changes to it or replacing it with a more powerful alternative.   |
|        | 5 | Collaboration | The individual focuses on coordinating and cooperating with others regarding use of the innovation.   |
|        | 4 | Consequences  | The individual focuses on the innovation's impact on students in his or her immediate sphere of influence. Considerations include the relevance of the innovation for students; the evaluation of student outcomes, including performance and competencies; and the changes needed to improve student outcomes.   |
| TASK   | 3 | Management    | The individual focuses on the processes and tasks of using the innovation and the best use of information and resources. Issues related to efficiency, organization, managing, and scheduling dominate.   |
|        | 2 | Personal      | The individual is uncertain about the demands of the innovation, his or her adequacy to meet those demands, and/or his or her role with the innovation. The individual is analyzing his or her relation to the reward structure of the organization, determining his or her part in decision making, and considering potential conflicts with existing structures or personal commitment. Concerns also might involve the financial or status implications of the program for the individual and his or her colleagues. |
| SELF   | 1 | Informational | The individual indicates a general awareness of the innovation and interest in learning more details about it. The individual does not seem to be worried about himself or herself in relationship to the innovation. Any interest is in impersonal, substantive aspects of the innovation, such as its general characterizes, effects, and requirements for use.   |
|        | 0 | Unconcerned   | The individual indicates little concern about or involvement with the innovation.   |

*Figure 2.* The stages of concern about an innovation

### **Interpreting the Stages of Concern**

Upon completing the Stages of Concern Questionnaire (SoCQ), a concerns profile is created from the relative levels of intensity (i.e., calculated score for each stage of concern). The profile provides graphical representation of the concerns of an individual or group as they relate to the innovation. The wave form on the graph peaks in the area where the individual or group

has the largest concentration of concerns. Figure 3 shows how in an ideal setting the hypothesized wave motion can be demonstrated by an individual or group as they move through various stages of change dealing with an innovation over a period of time. Three to five years is the time frame for the scores of a given concern to change enough for a shift to occur between stages (Hall & Hord, 2006).

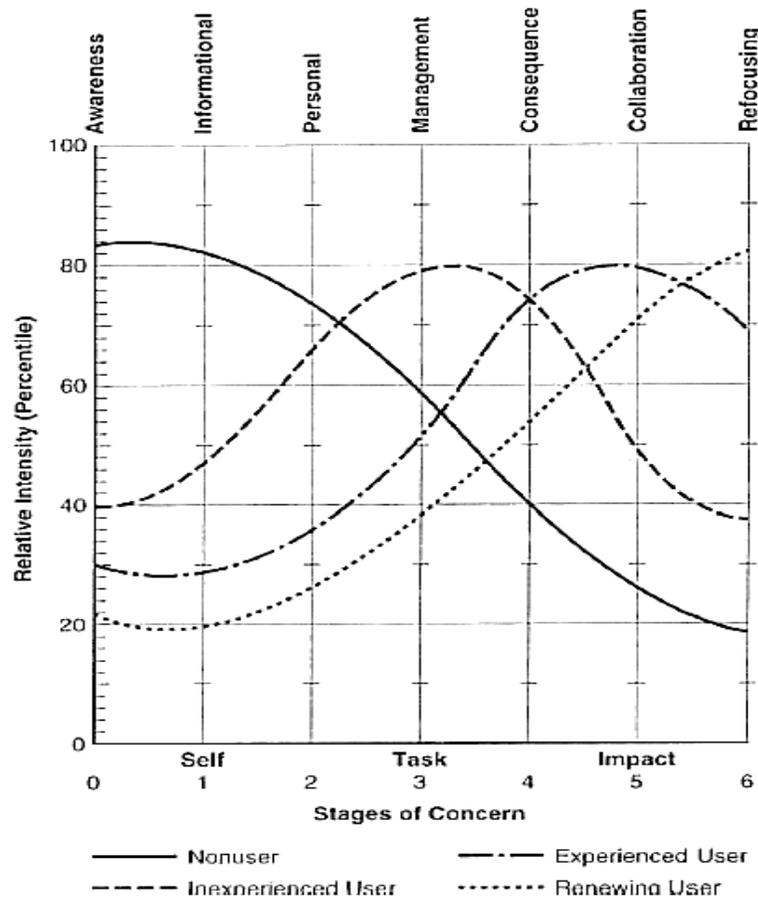


Figure 3. Ideal wave motion development of SoCs

The researcher can determine which concerns are intense (peaks) and those of no concern (valleys) by matching the corresponding peak and valley to the definition of the SoC in Figure 3. George, Hall, and Stiegelbauer (2006) characterized the SoC profiles of individuals as they move from *nonuser* to *renewing user* as a *hypothetical wave*. They suggested that as individuals move from nonuse (nonuser) to little awareness of an innovation (inexperienced user) to

beginning use (experienced user) and more sophisticated use (renewing user), their concerns move through defined stages. There is a well-defined movement from left to right: Stages 0, 1, and 2 being the most intense, then shifting to Stage 3, and finally registering their highest level of concerns at Stages 4, 5, and 6. Furthermore, as individual's feelings and perceptions change over time about the innovation, the curve will move forward like a wave. Innovation acceptance will result in decrease in the self stage while increasing intensity in the impact stages. Thus, the intensity in movement results in the wave motion on the individual SoC profile (Hall & Hord, 2006; George, Hall, & Stiegelbauer, 2006).

A non-user profile wave has high intensity at the self level (Stages 0, 1, 2) and lowest intensity at the impact level (Stages 4, 5, 6). The non-user is highly concerned with the impact of the innovation on them. An inexperienced user profile wave has high levels at task (Stage 3) and varying levels of intensity at Stages 2 and 4. The lowest intensity is in Stages 0, 1, 5, and 6. The group has little knowledge of the innovation but most concerns are with the time and coordination of the innovation. An experienced user profile wave has high intensity at Stages 4 and 5. There is a tailing down of intensity to Stage 6. Their lowest intensity stages are 0,1, 2, and 3. This group is familiar with the innovation and concerned about the impact of the innovation on students and working with others. The tailing down suggests they do not have other ideas to compete with the innovation. A renewing user profile wave has the ideal left to right intensity. The lowest intensity is at the Self Level (Stages 0, 1, 2) There is a distinct movement across the stages and the highest intensity is at Stage 6. The user is very aware of innovation and is considering ways to expound on the innovation or replace it (George, Hall, & Stiegelbauer, 2006).

## **Critique of the Concerns-Based Adoption Model**

As previously mentioned one of the strengths of CBAM is the design for the educational setting. It can provide researchers with quantitative and qualitative data depending on the instrument used for research. One of the major biases is the top-down implementation and the reliability and the validity of tools. In response to this criticism a fourth and last dimension, qualitative interviews was added to the original model (Berger & Morag, 2016). However, Straub (2009) postulates CBAM as being one of the most frequently used models to describe the teacher adoption process. While the model claims anyone can be a change facilitator, when a teacher is the change facilitator, CBAM limits his/her role to being a cheerleader instead of reflecting upon the change itself. The teacher is focused on facilitating student change instead of reflecting upon self-change. Additionally, there can be overlapping of steps and stages due to human behavior and implementation; therefore, researchers have found integrating data provided by the three diagnostic tools difficult. Most research uses the first diagnostic tool, SoC. Very few research studies use the entire CBAM model to study integration of technology (Anderson, 1997; Berger & Morag, 2016). Hall and Hord (1987) recommended gathering intense observational data and undergoing training to apply the CBAM model to fidelity.

## **Other Dimensions of Concerns-Based Adoption Model**

**Levels of use (LoU).** Like SoC, the LoU dimension has seven levels: 0-VI. LoU explores the extent to which teachers are using the new technology in terms of frequency and proficiency. Change facilitators ascertain teacher's use of the innovation through tools such as observations and self-report surveys.

Level 0 is non-use. At this level, the teacher demonstrates little or no interest in the instructional technology. Level I is orientation. At this level, the teacher explores or acquires

information about technology. Level II is preparation. At this level, the teacher makes plans for first time use. Level III is mechanical use. At this level, the teacher centered-level use for day to day teacher needs. Level IV is refinement. At this level, the teacher makes student centered adaptations based on knowledge of students. Level V is integration. At this level, collaborates with other teachers to benefit the school community. Level VI is renewal. At this level, the teacher explores new developments to possibly make major changes or seek other alternatives to the instructional technology (Hall & Hord, 1987).

**Innovation configuration (IC).** The focus of the IC dimension is on the characteristics of the innovation itself. The goal is developing a checklist of components as how to best use the instructional technology in its various configurations. Hall and Hord (1987) stated that this checklist is designed to help guide professional development, evaluation studies, and practice by answering three fundamental questions: 1) what are the innovation's key components; 2) what will be observed in the classroom; and, 3) what will the students and teachers do while the innovation is in use?

For this study, the SoC was utilized to determine the concerns of teachers. By evaluating the concerns, the researcher was able to understand the level of adoption for digital one-to-one. The research provided an understanding of where the current teachers in the southeastern state district stand in the adoption process of the digital one-to-one initiative. This understanding could lead to the development of professional development to address teachers' concerns.

CHAPTER III:  
METHODOLOGY

**Introduction**

One-to-one computing initiatives that provide laptop computers for students to use at home and at school are expanding throughout the United States. These initiatives are designed to facilitate transition in schools from occasional, supplemental use of computers to more frequent and 24/7 access to curriculum needs (Pea & Roschelle, 2002). The purpose of this qualitative research was to utilize CBAM dimension SoCQ to determine the stages of concern for teachers in a southeastern state school district with the innovation of digital one-to-one. Three research questions guided this study. They included the following:

1. What is the highest peak SoC for teachers with the innovation of digital one-to-one;
2. What is the second highest SoC of teachers with the innovation of digital one-to-one; and
3. Is there a difference in the SoC of teachers with the innovation digital one-to-one based on their (a) personal demographics and (b) academic demographics?

Using the CBAM in the study enabled the research to focus on teachers in the change process.

**Setting**

The school district was in southeastern United States. It has a population of 24,000 students and 2,600 teachers and administrators. There are 36 schools: seven high schools, two magnet high schools, six middle or junior high schools, and 21 Pre-K through elementary

facilities. Each elementary school includes a Pre-K program with the mission of preparing students to begin school. In 2012, this district became a pioneer in digital learning by embarking upon the largest digital one-to-one initiative in the United States. The program placed laptops in the hands of each student grades 3-12 and placed iPads/tablets in grades K-2.

### **Participants**

Once IRB approval was received, a letter of notification was sent to the school district office. Within a week, a district committee convened to make sure the study met the school district's research guidelines. Upon district approval, a request for participation was emailed to purposively selected school system administrators at the elementary and secondary school level. During one of their weekly faculty meetings, the administrator solicited voluntary teacher participants to complete the online survey for this study.

### **Sample Size Calculation**

A statistical power analysis was performed for sample size estimation. According to Cohen's (1988) criteria, an effect size  $f = 0.15$  is considered to be a medium. An F-test with MANOVA global effects of an  $\alpha = .05$  and power = .80 the projected sample size needed with this effect size (G power) was approximately  $N=110$  for the simplest between/within group comparison (see Table 3). However, there were 116 participants that responded to the survey. Thus, the proposed sample size  $N+$  was more than adequate for the main object of this study and allowed for expected attrition and our additional objective of controlling possible mediating/moderating factors, subgroup analysis, etc.

Table 3

*G Power Analysis Sample Size*


---

|           |   |
|-----------|---|
| F tests - | MANOVA: Global effects  |
| Options:  | Pillai V, O'Brien-Shieh Algorithm   |
| Analysis: | A priori: Compute required sample size  |
| Input:    | Effect size $f^2(V) = 0.15$<br>$\alpha$ err prob = 0.05<br>Power (1- $\beta$ err prob) = 0.80<br>Number of groups = 2<br>Response variables = 8   |
| Output:   | Noncentrality parameter $\lambda = 16.5000000$<br>Critical F = 2.0313801<br>Numerator df = 8.0000000<br>Denominator df = 101<br>Total sample size = 110<br>Actual power = 0.8087762<br>Pillai V = 0.1304348 |

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### Research Method

This study employed a survey research design. Fowler (2009) stated that surveys are a method for producing statistics that are quantitative. The data were collected by asking the subjects questions and then utilizing their answers as data points in an analysis. The survey and the responses were stored by the Southwest Educational Development Laboratory (SEDL). The SEDL is nonprofit research, development, and dissemination organization which developed and provided permission for use of the Concerns Based Adoption Model(CBAM) in this study.

The internet delivery method was chosen over traditional methods to increase convenience, security, and privacy. The SEDL also recommended the utilization of the online version of the Stages of Concern Questionnaire (SoCQ). The electronic version of the SoCQ provided an increased convenience to the respondents and the survey administrator. Security and

privacy were also increased by decreasing the number of individuals that interacted with the survey. Individualized invitations ensured that only the invited individual completes the survey.

Internet construction of the survey was completed using the guidelines set forth by the SEDL. The first section of the survey included the SoC questions from the SEDL with one change. The *innovation* component of the SoCQ was changed to *digital one-to-one*. The second section of the survey contained customized questions to ascertain the independent variables of the study: (a) personal demographics and (b) academic demographics. The online version of the survey consisting of the two sections was designed by SEDL so that individuals needed no more than basic computer skills to complete the survey.

## **Instrumentation**

### **SoCQ Questionnaire**

The Concerns Based Adoption Model (CBAM) is a change model that examines the relationship between the user and resource system of an innovation. The SoCQ is a self-report instrument developed to capture the feelings of the users of the innovation (in this case, teachers) in the change process. It is one of three diagnostic tools (dimensions) that comprise the CBAM. The SoCQ online survey is a Likert-based series of thirty-five reflective questions that allow the participant to rate his or her perceptions on an eight-point Likert scale from irrelevant (0) to very true of me now (7). For example, participants responded to statements such as I am concerned how the innovation effects students; I would like to know the effect of the innovation on my professional status; and I would like to know what other faculty are doing in this area.

### **Development of the SoCQ**

The SoCQ was designed as one piece of the CBAM to assess the feelings, perspective, and attitudes of individuals as they are faced with some type of innovation. Hall and Hord

(1987) designed the SoCQ to be a systematic method for researchers to conduct studies where the reliability of data is important. This study used a cross-sectional survey. The SoCQ was constructed with three different sections: introduction, demographic, and the actual 35 Likert-scaled items based on the SoCs. The researcher customized the SoCQ to the questions as they are written on the instrument in the Appendix A.

### **Revised SoCQ for Digital One-to-One**

The first portion of the SoCQ was an introduction to survey and terms. The second portion was customized and provided directions and definitions to individuals completing the survey. This portion of the survey indicated the innovation (digital one-to-one) being studied in the instrument. The general term of innovation was replaced with digital one-to-one in each respective SoCQ subset of the survey.

The third portion of the survey was utilized to collect demographics. For this study's purpose, the representation is as follows: (a) personal demographics: age and gender (see Table 4), and (b) academic demographics: tenure status, teaching level, highest degree, and years of teaching experience (see Table 5). This information provided descriptive statistics of the respondent as well as the basis for analysis for this research. The final section of the survey represented the SoCQ. The 35 questions investigated each of the seven areas of concerns. As stated previously, the general term of *innovation* was replaced with *digital one-to-one*. This change is found in the following questions: 7, 11-13, 15-18, 20-22, 26-29, 31-34, 36-37, 39, and 41. These questions and corresponding areas of concern are identified in Table 6.

In addition, the researcher made a change to question nine on the questionnaire. The original statement was as follows: I am more concerned about another innovation. The researcher input another innovation the school system does with student assessments. This

district in the southeastern state conducted a district student assessments beginning, middle, and end of the year that was not required by the state or used by nearby systems. However, this data guided teacher instruction for the state assessment.

Table 4

*Questionnaire Breakdown for Personal Demographics (Independent Variable)*

| Variable | Scale Type                       | Question | Data Type   | Coding Method                                    | Topic Examined |
|----------|----------------------------------|----------|-------------|--|----------------|
| IV       | Multiple-choice, single response | 1        | Categorical | 20-29 (0)<br>30-39 (1)<br>40-49 (2)<br>50-59 (3) | Age            |
| IV       | Multiple-choice, single response | 2        | Dichotomous | Male (0)<br>Female (1)                           | Gender         |

Table 5

*Questionnaire Breakdown for Academic Demographics (Independent Variable)*

| Independent Variable | Scale Type (Data Type)                            | Original Coding  | Secondary Coding | Dichotomous Coding |
|----------------------|---|--|------------------|--------------------|
| Tenure Status        | Multiple-choice, single response<br>Categorical   | Non-Tenured (0)<br>Tenured (1)   |                  |                    |
| Teaching Level       | Multiple-choice, single response<br>Categorical   | Elementary (0)<br>Secondary (1)  |                  |                    |
| Highest Degree       | Multiple-choice, single response<br>Categorical   | Bachelors (0)<br>Masters (1)<br>Ed. S. (2)<br>Doctorate (3)                                    |                  |                    |
| Teaching Experience  | Multiple-choice, single response<br>(Categorical) | 0-5 years (0)<br>6-10 years (1)<br>11-20 years (2)<br>21-30 years (3)<br>31 years – higher (4) |                  |                    |

*Note.* Survey instrument is in the appendices.

## Reliability and Validity

The SoCQ had been tested for both internal consistency (alpha-coefficients range between .66-.86) and reliability (test/retest reliability ranges from .65-.86) (Donovan et al., 2007; Hall & Hord, 2011). In addition, Hall and George (1979) performed reliability testing on the SoCQ. The researchers utilized a stratified sample of 830 teachers and professors to determine internal reliability of the SoCQ. The alpha coefficients for the seven scales ranged from 0.64 to 0.83, as shown in Figure 4. Two weeks later, a subset of 171 teachers were asked to complete the SoCQ again. The 132 teachers that completed the second round of the SoCQ returned correlations of 0.65 to 0.86 (see Figure 4). Hall and George (1979) felt these statistics indicated satisfactory reliability levels for the SoCQ.

*Coefficients of Internal Reliability for Stages of Concerns Questionnaire.*

| Stage | 0    | 1    | 2    | 3    | 4    | 5    | 6    |
|-------|------|------|------|------|------|------|------|
| Alpha | 0.64 | 0.78 | 0.83 | 0.75 | 0.76 | 0.82 | 0.71 |

*Note.* N = 830 (Hall et al., 1977, p. 7)

*Test-retest Correlations on the Stages of Concern Questionnaire*

| Stage | 0    | 1    | 2    | 3    | 4    | 5    | 6    |
|-------|------|------|------|------|------|------|------|
| Alpha | 0.65 | 0.86 | 0.82 | 0.81 | 0.76 | 0.84 | 0.71 |

*Note.* N = 132 (Hall et al., 1977, p. 7)

*Figure 4.* Coefficients of reliability and test-retest correlations

The manual provided by Hall reported that the coefficients varied as mentioned above. Many other investigators used the numbers without examining the reliability of their own SoCQ data. However, several researchers checked the reliability (see Figure 5) and their data found that reliabilities of the seven sub-scales were generally low. The Stages 0 and 6 subscales were found unreliable (Cheung, Hattie, & Ng, 2001).

*Alpha Reliability Coefficients Reported in Past Studies*

| Study                                 | Subscale |      |      |      |      |      |      |
|---------------------------------------|----------|------|------|------|------|------|------|
|                                       | 0        | 1    | 2    | 3    | 4    | 5    | 6    |
| Hall et al. (1977, N = 830)           | 0.64     | 0.78 | 0.83 | 0.75 | 0.76 | 0.82 | 0.71 |
| Bailey & Palsha (1992, N = 142)       | 0.42     | 0.67 | 0.77 | 0.64 | 0.79 | 0.77 | 0.61 |
| Jibaja-Rusth et al. (1991, N = 00)    | 0.12     | 0.48 | 0.78 | 0.86 | 0.88 | 0.61 | 0.54 |
| Shotsberger& Crawford (1996, N = 376) | 0.45     | 0.66 | 0.72 | 0.69 | 0.60 | 0.77 | 0.52 |
| Shotsberger& Crawford (1996, N = 273) | 0.42     | 0.58 | 0.71 | 0.63 | 0.64 | 0.74 | 0.48 |

*Figure 5.* Alpha reliability coefficients reported in past studies

Cheung, Hattie, and Ng (2001) conducted a comparative analysis study of four alternative Stages of Concerns Models. Their study's purpose was to provide an extensive analysis of the psychometric and conceptual problems of Hall's 35-item SoCQ. The focus was on the reliability, construct validity, and simplex structure of the SoCQ data. The results of the study found that none of the alternative models investigated yielded a good fit for observational data. This indicated that using these other models in education would be dangerous. Secondly, the research supported Hall's conceptualization of SoC. Empirical evidence exists to show the teachers in the study experienced an intense progression through stage five rather than seven stages. Finally, Stage 0 seems to be missing some constructs or isn't relevant to SoC. Therefore, the researchers suggested that future research should explore any missing variables between Stage 0 and Stage 1.

### **Independent Variables**

The independent variables are categorized as follows: (a) personal demographics; and (b) academic demographics. Personal demographics contained two independent variables: gender and age range. Academic demographics included four independent variables: tenure status, teaching level, advanced degree, and teaching experience. The SEDL agreed to provide the researcher with the ability to modify the SoCQ to create specified groups for analysis. The

researcher added specific questions to the SoCQ to measure each of these independent variables. The researcher performed subgroup analysis for each of the independent variables.

### **Dependent Variables**

The dependent variables are the seven SoCs: unconcerned 0) informational; 1) personal; 2) management; 3) consequences; 4) collaboration; 5) and 6) refocusing. The information in Table 6 shows a mapping of the dependent variables to the questions on the SoCQ. The loading of the questions onto their respective SoCQ is displayed in Table 7. Each of the SoCs were composed of five unique questions.

Table 6  
*Stages of Concern Questionnaire (Dependent Variable)*

| Peak Score        | Digital One-to-one     | Data Type |
|-------------------|------------------------|-----------|
| <b>Impact</b>     |                        |           |
| Refocusing (6)    | Q8, Q15, Q26, Q28,Q37  | Ordinal   |
| Collaboration (5) | Q11, Q16, Q24, Q33,Q35 |           |
| Consequences (4)  | Q7, Q17, Q25, Q40, Q38 |           |
| <b>Task</b>       |                        |           |
| Management (3)    | Q10, Q14, Q22, Q45,Q40 |           |
| <b>Self</b>       |                        |           |
| Personal (2)      | Q13, Q19, Q23, Q34,Q39 |           |
| Information (1)   | Q12, Q20, Q21, Q32,Q41 |           |
| Unconcerned (0)   | Q9, Q18, Q27, Q29, Q36 |           |

*Note.* Survey instrument is in the appendix.

Table 7

*Questionnaire Breakdown for Dependent Variables Related Questions SoCQ*

| Item | Variable | Scale Type   | Data Type | Coding Method   | Topic Examined                     |
|------|----------|--------------|-----------|---|------------------------------------|
| 7-41 | DV       | Likert Scale | Ordinal   | 1 Stage 0<br>2 Stage 1<br>3 Stage 2<br>4 Stage 3<br>5 Stage 4<br>6 Stage 5<br>7 Stage 6 | PD Peak SoC for Digital One-to-one |

**Data Collection**

The researcher was granted permission by the Institutional Review Board (IRB) of The University of Alabama to complete the study. Permission was also granted to the researcher from SEDL to use the SoCQ. Based upon the population sample 200 surveys were ordered. Due to the convenience, security, and privacy; the internet was the delivery method for the survey. Internet construction of the survey followed established guidelines from SEDL. The primary source of data was derived from the Stages of Concern Questionnaire (SoCQ) online survey tool. The participants took the survey during a select faculty meeting chosen by the school principal. These self-reporting questions measured individual and group concerns relating to change.

To maintain anonymity of responders a coded link provided by SEDL was used for the survey. The information was stored on the SEDL website protected by user name and password only known to the researcher. There were no identifying measures taken on any survey participant.

## Data Analysis

According to studies by Donovan, Hartley, and Stroudler (2007) and Donovan and Green (2010), the data were analyzed following the guidelines and recommendations for evaluating concerns by George, Hall, and Stiegelbauer (2006) and Hall and Hord (1987). The design of the SoCQ was such that individual items reflected different concerns. First, the individual data was entered on a spreadsheet program with participants as columns and survey questions as rows. Second, because each question relates to a specific stage of concern, individual participant's raw data was converted to stage of concern data, and total points from the Likert scale items added. For example, questions 9, 18, 27, 29, and 36 all relate to stage 0: awareness concerns and questions 8, 15, 26, 28, and 37 all related to Stage 6: refocusing concerns. Table 6 provided a Stages of Concern Questionnaire synopsis.

Next, the concerns profiles were converted from raw scores to percentages. The percentile scores were retrieved from the SEDL bank. Individual concerns profile charts were created and graphed. The higher the score, the more intense the concerns at that stage. The lower the score, the less intense the concern at that stage. While analyzing concerns graphs, the focus became on the peaks and valleys, with peaks representing high-level concerns and valleys representing low-level concerns (George, Hall, & Stiegelbauer, 2006; Donovan, Hartley, & Stroudler, 2007; Donovan & Green, 2010).

To answer the research questions in this study, descriptive statistics and MANOVAs were conducted using SPSS. The dependent variables were acquired from each respondent's digital one-to-one SoC as calculated by the SoCQ. The independent variables were personal demographics and academic demographics. The data management plan summarized the analysis process (see Figure 6).

| <b>Research Question</b>   | <b>Controlled variables</b>  | <b>Dependent variables</b>   | <b>Statistical tests</b> |
|--|--|--|--------------------------|
| 1. What is the highest peak SoC for teachers with the innovation of digital one-to-one?  |  | Peak SoC   | Descriptive statistics   |
| 2. What is the second highest SoC of teachers with the innovation of digital one-to-one?   |  | Second highest SoC   | Descriptive statistics   |
| 3. Is there a difference in the SoC of teachers with the innovation digital one-to-one based on their (a) personal demographics and (b) academic demographics? | <b>Personal Demographic</b> <ul style="list-style-type: none"> <li>• Age</li> <li>• Gender</li> </ul> <b>Academic Demographic</b> <ul style="list-style-type: none"> <li>• Tenure Status</li> <li>• Teaching Level</li> <li>• Highest Degree</li> <li>• Years Teaching Experience</li> </ul> | <b>Seven SoCs:</b> <ul style="list-style-type: none"> <li>• Refocusing (6)</li> <li>• Collaboration (5)</li> <li>• Consequences (4)</li> <li>• Management (3) <ul style="list-style-type: none"> <li>• Personal (2)</li> <li>• Information (1)</li> </ul> </li> <li>• Unconcerned (0)</li> </ul> | MANOVA                   |

Figure 6. Data management plan

CHAPTER IV:  
DATA ANALYSIS

Chapter IV presents the study's findings on the SoC for teachers with the innovation of digital one-to-one. The study analyzed the independent variables (personal and academic demographics) along with the dependent variable (SoC). Descriptive statistics on teachers with one-to-one digital innovations and the results of the research questions are presented.

**Personal and Academic Demographics**

The sample population (N=116) for this study were teachers at the elementary (64%) and secondary (36%) school level with the innovation of digital one-to-one. In this study, there were more female (89%) than male (11%) respondents. Most of the respondents age were between 30 and 39 (28%) and between 40 and 49 (28%). A bachelor's degree (44%) was the highest degree of most the respondents. Moreover, many of the respondents had tenured status (32%) and had between 0 to 5 years (28%) and 11 to 20 years (28%) of teaching experience. The demographic characteristics are illustrated in Table 8.

Table 8

*Participants' Personal and Academic Demographics*

|                            | N   | %     |
|----------------------------|-----|-------|
| <b>Gender</b>              |     |       |
| Male                       | 13  | 11%   |
| Female                     | 103 | 89%   |
| Total                      | 116 | 100%  |
| <b>Age Group</b>           |     |       |
| 20 to 29                   | 16  | 14%   |
| 30 to 39                   | 32  | 28%   |
| 40 to 49                   | 33  | 28%   |
| 50 to 59                   | 29  | 25%   |
| 61+                        | 6   | 5%    |
| Total                      | 116 | 100%  |
| <b>Highest Degree</b>      |     |       |
| Bachelor's                 | 51  | 44%   |
| Master's                   | 49  | 42%   |
| Ed. S.                     | 14  | 12%   |
| Doctorate                  | 2   | 2%    |
| Total                      | 116 | 100%  |
| <b>Teach Level</b>         |     |       |
| Elementary                 | 74  | 64%   |
| Secondary                  | 42  | 36%   |
| Total                      | 116 | 100%  |
| <b>Teaching Experience</b> |     |       |
| 0 to 5 years               | 32  | 27.6% |
| 6 to 10 years              | 23  | 19.8% |
| 11 to 20 years             | 32  | 27.6% |
| 21 to 30 years             | 22  | 19.0% |
| 31+ years                  | 7   | 6.0%  |
| Total                      | 116 | 100%  |

## Research Question 1

*What is the highest peak SoC for teachers with the innovation of digital one-to-one?*

Research question one sought to determine the highest peak SoC for teachers with the innovation of digital one-to-one. The largest number of participants indicated their highest score as *unconcerned (Stage 0)* with 45% of the participants that fell within that category (see Table 9).

Table 9

*Frequency on the Highest Stage of Concern*

|   | 0   | 1   | 2   | 3   | 4  | 5  | 6   | Total |
|---|-----|-----|-----|-----|----|----|-----|-------|
| N | 52  | 11  | 17  | 16  | 1  | 2  | 17  | 116   |
| % | 45% | 10% | 15% | 14% | 1% | 2% | 15% | 100%  |

Fifteen percent of the participants indicated *information (Stage 1)* and *refocusing (Stage 6)* as their highest score on the SoC. Among the remaining participants, 14% indicated *management (Stage 3)*, 10% indicated *personal (Stage 2)*, 2% indicated *collaboration (Stage 5)*, and 1% indicated *consequences (Stage 4)* as their highest score. These findings suggest that for the teachers there are other tasks, initiatives, and/or activities that are of more concern than the innovation. Figure 7 provides a profile of highest peak stage of SoC scores. The wave resulting from the plotted SoC scores of highest peak suggests the following groups of users: a large majority of the group have little concern or involvement with the innovation (45%), an even number of the group are concerned between the effects it will have on them or exploring new ways to use the innovation or do something else (30%) and those who are focused on the issues of managing and organizing the innovation (14%).

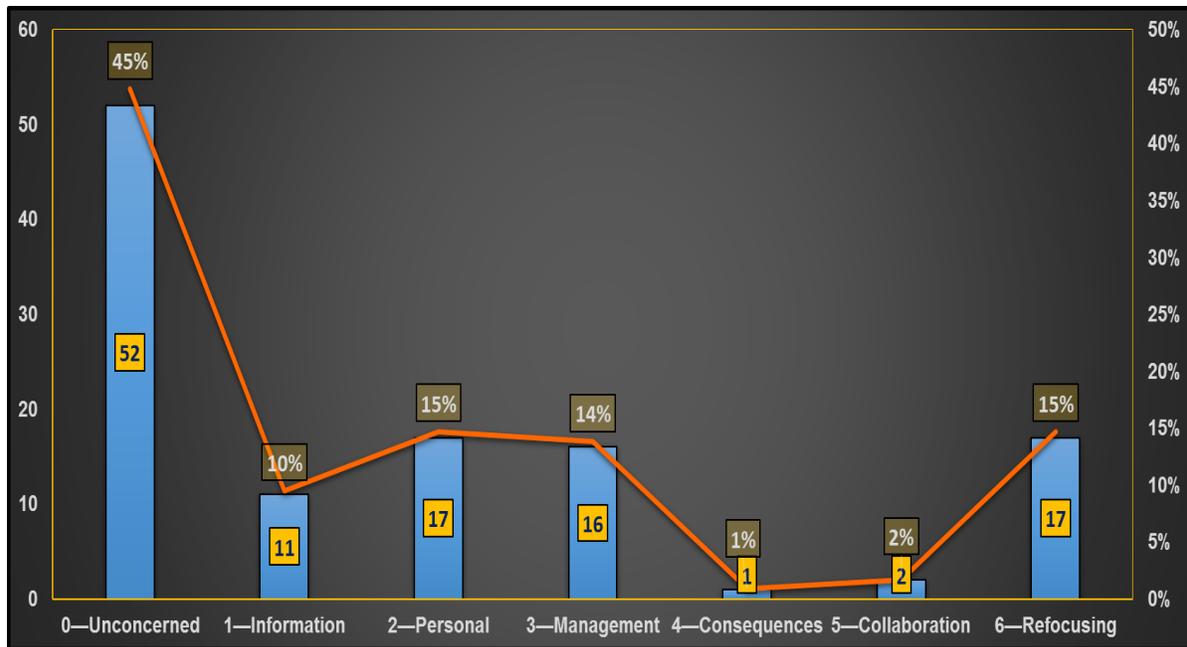


Figure 7. The highest stage of concern profile of scores

### Research Question 2

*What is the second highest SoC of teachers with the innovation of digital one-to-one?*

Research question two sought to determine the second highest peak SoC for teachers with the innovation of digital one-to-one. As shown in Table 10, 52% of teachers indicated *personal* (Stage 2) as their second highest concern followed by 48% indicating *refocusing*. Forty percent indicated *information* (Stage 1) and *management* (Stage 3) as their second highest concern, while 12% indicated *collaboration* (Stage 5). No teachers responded to *unconcerned* (Stage 0) and *consequence* (Stage 4). These findings suggest that teachers are uncertain about the demands of the innovation, how they can meet those demands, and/or their role with the *innovation* (Stage 2); however, they appear to be open in exploring ways to benefit from the innovation or finding *other alternatives* (Stage 6).

Table 10

*Frequency on the Second Highest Stage of Concern*

|   | 0  | 1   | 2   | 3   | 4  | 5   | 6   | Total |
|---|----|-----|-----|-----|----|-----|-----|-------|
| N | 0  | 21  | 27  | 21  | 0  | 6   | 25  | 52    |
| % | 0% | 40% | 52% | 40% | 0% | 12% | 48% | 100%  |

Figure 8 provides a profile of second highest peak stage of SoC scores. The wave resulting from the plotted SoC scores suggests that much of the group are concerned about meeting the demands of the innovation and/or the personal consequences for them on the job (52%), a large group have an interest in doing something else or how to change the innovation (48%), and an even number of the group are interested in the innovation but concerned about the management of the innovation (80%).

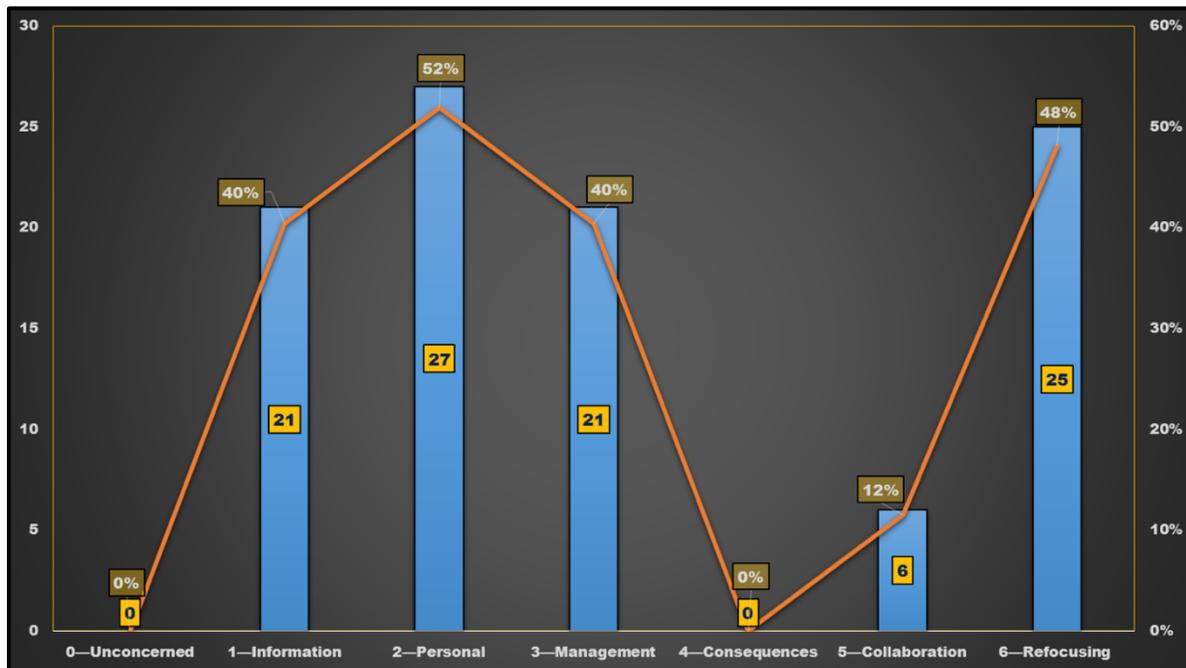


Figure 8. The second highest stage of concern profile of scores

### Research Question 3

*Is there a difference in the SoC of teachers with the innovation digital one-to-one based on their personal demographics and academic demographics?*

#### **Personal, Academic Demographics, and SoC**

Research question three sought to determine if differences existed in the SoC of teachers with the innovation digital one-to-one based on their personal demographics and academic demographics. A multivariate analysis of variance (MANOVA) was conducted to assess, separately, the effects of personal demographics and academic demographics (independent variables) on the SoC of teachers (dependent variable). Box's *M* tests and Levene's tests of equality of error variance were employed to test the assumptions of the homogeneity of covariance matrices. The effect size was calculated using partial eta squared ( $\eta p^2$ ). The partial eta squared is an estimate of the amount of the effect size because of between-group differences in the levels of the independent variables (Richardson, 2011), where the suggested effect sizes are small (.0099), medium (.0588), and large (.1379).

**Personal demographics and SoC.** A nonsignificant Box's *M* test ( $p = .714$ ) indicated that the homogeneity of covariance assumptions was met. The Lavene's test revealed that the assumption of the homogeneity of covariance was tenable for unconcerned (1) (.247), personal (.475), and consequences (4) (.318), collaboration (.120), and refocusing (6) (.507) concerns. The assumption of the homogeneity of covariance was not met for information (.026). The multivariate effect was not significant by gender,  $F(7,102) = 1.581, p = .149$ ; *Pillai's Trace* = .098), age group,  $F(28,402) = 1.232, p = .196$ ; *Pillai's Trace* = .304), nor by the interaction effect between these two independent variables,  $F(14,206) = .613, p = .853$ ; *Pillai's Trace* = .080), on the seven stages of concerns (see Table 11). Although the effects of the independent variables

and the interaction effects between the two were not significant by the most used multivariate tests (i.e., *Pillai's*, *Wilks' Lambda*), a multivariate effect with *Roy's Largest Root* was found to be significant by age group,  $F(7,105) = 1.693, p = .013$ ; *Roy's Largest Root* = .180). Univariate tests yielded no significant results for gender, age group, nor for the interaction effect between these two independent variables on the seven stages of concerns. Findings for this study suggest that personal demographics of age and gender are not significant on the stages of concern.

Table 11

*Multivariate Effects of Personal Demographics on the Seven Stage of Concerns*

|                    |                    | Value | <i>F</i> | <i>df</i> | <i>Error df</i> | <i>P</i> | $\eta p^2$ |
|--------------------|--------------------|-------|----------|-----------|-----------------|----------|------------|
| Gender             | Pillai's Trace     | 0.098 | 1.581    | 7         | 102             | 0.149    | 0.098      |
|                    | Wilks' Lambda      | 0.902 | 1.581    | 7         | 102             | 0.149    | 0.098      |
|                    | Hotelling's Trace  | 0.108 | 1.581    | 7         | 102             | 0.149    | 0.098      |
|                    | Roy's Largest Root | 0.108 | 1.581    | 7         | 102             | 0.149    | 0.098      |
| Age Group          | Pillai's Trace     | 0.304 | 1.232    | 28        | 420             | 0.196    | 0.076      |
|                    | Wilks' Lambda      | 0.725 | 1.228    | 28        | 369             | 0.200    | 0.077      |
|                    | Hotelling's Trace  | 0.340 | 1.221    | 28        | 402             | 0.205    | 0.078      |
|                    | Roy's Largest Root | 0.180 | 2.693    | 7         | 105             | 0.013    | 0.152      |
| Gender x Age Group | Pillai's Trace     | 0.080 | 0.613    | 14        | 206             | 0.853    | 0.040      |
|                    | Wilks' Lambda      | 0.921 | 0.615    | 14        | 204             | 0.851    | 0.040      |
|                    | Hotelling's Trace  | 0.085 | 0.616    | 14        | 202             | 0.850    | 0.041      |
|                    | Roy's Largest Root | 0.076 | 1.123    | 7         | 103             | 0.355    | 0.071      |

**Academic demographics and SoC.** A nonsignificant Box's *M* test ( $p = .552$ ) indicated that the homogeneity of covariance assumptions was met. The Lavene's test revealed that the assumption of the homogeneity of covariance was tenable for personal (2) (.475), and consequences (4) (.318). The assumption of the homogeneity of covariance was not met for unconcerned (0) (.035), information (1) (.07), collaboration (5) (.010), and refocusing (6) (.023)

concerns. There were statistically significant multivariate interaction effects between tenure and teacher experience,  $F(21, 219) = 1.679, p < .05$ ; *Pillai's Trace* = .416,  $\eta p^2 = .139$ ) and between highest degree and teaching experience,  $F(49, 539) = 1.387, p < .05$ ; *Pillai's Trace* = .784,  $\eta p^2 = .112$ ) on the seven stages of concerns. Table 12 shows the significant results.

Table 12

*Significant Multivariate Effects of Academic Demographics on the Seven Stage of Concerns*

|                                      |                    | Value | <i>F</i> | <i>df</i> | <i>Error df</i> | <i>P</i> | $\eta p^2$ |
|--------------------------------------|--------------------|-------|----------|-----------|-----------------|----------|------------|
| Tenure Status x Teaching Experience  | Pillai's Trace     | 0.416 | 1.679    | 21        | 219             | 0.036    | 0.139      |
|                                      | Wilks' Lambda      | 0.621 | 1.756    | 21        | 204             | 0.025    | 0.147      |
|                                      | Hotelling's Trace  | 0.551 | 1.830    | 21        | 209             | 0.018    | 0.155      |
|                                      | Roy's Largest Root | 0.420 | 4.377    | 7         | 73              | 0.000    | 0.296      |
| Highest Degree x Teaching Experience | Pillai's Trace     | 0.784 | 1.387    | 49        | 539             | 0.047    | 0.112      |
|                                      | Wilks' Lambda      | 0.411 | 1.424    | 49        | 365             | 0.038    | 0.119      |
|                                      | Hotelling's Trace  | 1.015 | 1.436    | 49        | 485             | 0.032    | 0.127      |
|                                      | Roy's Largest Root | 0.399 | 4.388    | 7         | 77              | 0.000    | 0.285      |

Univariate tests found a two way interaction effects to be significant for tenure status and teaching experience on the unconcerned (0) Stage,  $F(3, 539) = 4.078, p < .05, \eta p^2 = .137$ ).

Simple main effects analysis showed that for non-tenured teachers with 0 to 5 years of teaching experiences unconcerned (0) stage of concern were significantly higher than non-tenured teachers with 6 to 10 years of teaching experiences ( $p = .044$ ) but were the same as other non-tenured teachers with 11 to 20 ( $p = .338$ ), 21 to 30 years, and 31 plus years of teaching experiences ( $p = .422$ ). The simple main effects also found that tenured teachers were the same across years of teaching experiences at the unconcerned (0) stage of concern.

Univariate tests also found three way interaction effects to be significant for tenure status, teaching level, and highest degree on the unconcerned (0) stage,  $f(1,77) = 4.031, p < .01, \eta p^2 = .060$ ), on the personal (2) stage,  $f(1,77) = 8.717, p < .01, \eta p^2 = .102$ ), on the management (3) stage,  $f(1,77) = 4.451, p < .05, \eta p^2 = .055$ ), on the consequences (0) stage,  $f(1,77) = 7.607, p < .01, \eta p^2 = .090$ ), and on the collaboration (5) stage,  $f(1,77) = 4.878, p < .05, \eta p^2 = .060$ ) of concerns. Simple interaction effects analysis showed that non-tenured secondary teachers with a master's degree collaboration (5) stage of concern were significantly higher than secondary non-tenured teachers with an Ed.S. degree ( $p = .048$ ) but were the same as other non-tenured secondary teachers with a bachelor's degree ( $p = .502$ ) and a doctorate degree. The simple interaction effects also found that tenured elementary teachers who held a bachelor's degree collaboration (5) stage of concern were significantly lower than tenured elementary teachers who held an Ed.S. degree ( $p = .045$ ) and a doctorate degree ( $p = .022$ ) but were the same as other tenured elementary teachers with a master's degree ( $p = .052$ ). Elementary teachers who held an Ed.S. degree and a doctorate degree collaboration (5) stage of concern were also the same as other tenured elementary teachers with a master's degree ( $p = .749; p = .136$ ), respectively. Further, the simple interaction effects found that tenured secondary teachers were the same across highest degree level at the collaboration (5) stage of concern. Finally, a simple interaction effects analysis showed that teachers' unconcerned (0), personal (2), consequences (4), and refocusing (6) concerns were the same regardless of their tenure status, teaching experience, or highest degree level. The significant results are presented in Table 13. This finding suggests that tenure, teaching experience, and degree level has an impact on collaboration (5) stage of concern.

Table 13

*Significant Univariate Effects of Academic Demographics on the Seven Stage of Concerns*

|   | DV            | SS      | df | MS      | F     | P     | $\eta p^2$ |
|---|---------------|---------|----|---------|-------|-------|------------|
| Tenure Status<br>x Teaching<br>Experience                   | Unconcerned   | 464.672 | 3  | 154.891 | 4.078 | 0.010 | 0.137      |
|   | Information   | 305.770 | 3  | 101.923 | 1.875 | 0.141 | 0.068      |
|   | Personal      | 298.593 | 3  | 99.531  | 1.348 | 0.265 | 0.050      |
|   | Management    | 75.756  | 3  | 25.252  | 0.449 | 0.719 | 0.017      |
|   | Consequences  | 482.396 | 3  | 160.799 | 2.448 | 0.070 | 0.087      |
|   | Collaboration | 528.757 | 3  | 176.252 | 2.690 | 0.052 | 0.095      |
|   | Refocusing    | 341.727 | 3  | 113.909 | 1.411 | 0.246 | 0.052      |
| Tenure Status<br>x Teaching<br>Level x<br>Highest<br>Degree | Unconcerned   | 187.254 | 1  | 187.254 | 4.931 | 0.029 | 0.060      |
|   | Information   | 165.001 | 1  | 165.001 | 3.036 | 0.085 | 0.038      |
|   | Personal      | 643.569 | 1  | 643.569 | 8.717 | 0.004 | 0.102      |
|   | Management    | 250.583 | 1  | 250.583 | 4.451 | 0.038 | 0.055      |
|   | Consequences  | 499.740 | 1  | 499.740 | 7.607 | 0.007 | 0.090      |
|   | Collaboration | 319.624 | 1  | 319.624 | 4.878 | 0.030 | 0.060      |
|   | Refocusing    | 171.836 | 1  | 171.836 | 2.128 | 0.149 | 0.027      |

**Summary**

The Concerns Based Adoption Model (CBAM) in the form of a Stages of Concern Questionnaire (SoCQ) diagnostic tool was used to determine teacher concerns during the digital one-to-one initiative in a southeastern school system setting. The independent variables were personal demographics and academic demographics. The dependent variables were acquired from each respondent's digital one-to-one SoC as calculated by the SoCQ. Descriptive statistics and MANOVAs were conducted using SSPS. Descriptive statistics examine the personal and

academic demographics. A multivariate analysis of variance (MANOVA) was conducted to assess, separately, the effects of personal demographics and academic demographics (independent variables) on the SoC of teachers (dependent variable). Box's *M* tests and Levene's tests of equality of error variance were employed to test the assumptions of the homogeneity of covariance matrices. The effect size was calculated using partial eta squared ( $\eta p^2$ ).

For research question one and two, descriptive analyses of first and second highest concerns provided some insight into the nature of concern among elementary and secondary school teachers. The results for research question one revealed that the highest peak SoC for teachers with the innovation of digital one-to-one was the unconcerned (0) stage of concern. The findings for research question one suggest that the teachers are concerned about the innovations effect on them or some other activity going on. The results for research question two found that the second highest peak SoC for teachers with the innovation of digital one-to-one was the personal (2) stage of concern followed by the refocusing (6) stage of concern. The findings for research question two suggest that teachers are uncertain about the demands of the innovation, how they can meet those demands, and/or their role with the innovation (personal stage); however, they appear to be open in exploring ways to benefit from the innovation or finding other alternatives (refocusing stage).

The multivariate results of research question three for personal demographics, using *Pillai's Trace*, revealed no significant effects for gender, age group, nor for the interaction effect between these two independent variables on the seven stages of concerns. Although the effects of the independent variables and the interaction effects between the two were not significant by the most used multivariate tests (i.e., *Pillai's*, *Wilks' Lambda*), a multivariate effect with *Roy's*

*Largest Root* was found to be significant for age group. Univariate tests yielded no significant results for gender, age group, nor for the interaction effect between these two independent variables on the seven stages of concerns.

For academic demographics, using *Pillai's Trace*, there were statistically significant multivariate interaction effects between tenure and teacher experience and between highest degree and teaching experience on the seven stages of concerns. Univariate tests found a significant two-way interaction effects for tenure status and teaching experience on the unconcerned (0) stage. Simple main effects analysis showed that for non-tenured teachers with zero to five years of teaching experiences unconcerned (0) stage of concern were significantly higher than non-tenured teachers with six to ten years of teaching experiences but were the same as other non-tenured teachers with 11 to 20, 21 to 30 years, and 31 plus years of teaching experiences. The simple main effects also found that tenured teachers were the same across years of teaching experiences at the unconcerned (0) stage of concern.

Univariate tests also found a significant three-way interaction effects for tenure status, teaching level, and highest degree on the unconcerned (0) stage on the personal (2), the management (3), the consequences (4) stage, and the collaboration (5) stages of concerns. Simple interaction effects analysis showed the collaboration (5) stages of concern for non-tenured secondary teachers with a master's degree were significantly higher than non-tenured secondary teachers with an Ed.S. degree but were the same as other non-tenured secondary teachers with a bachelor's degree and a doctorate degree. The simple interaction effects also found that the collaboration (5) stages of concern for tenured elementary teachers who held a bachelor's degree were significantly lower than tenured elementary teachers who held an Ed.S. degree and a doctorate degree but were different from other tenured elementary teachers with a

master's degree. Collaboration (5) stages of concern for elementary teachers who held an Ed.S. degree and a doctorate degree were also the same as other tenured elementary teachers with a master's degree. Moreover, the simple interaction effects found that tenured secondary teachers were the same across highest degree level at the collaboration (5) stages of concern. finally, a simple interaction effects analysis showed that unconcerned (0), personal (2), consequences (4), and refocusing (6) stages of concerns for teachers were the same regardless of their tenure status, teaching or highest degree level.

## CHAPTER V: DISCUSSION OF FINDINGS

A summary of the study is presented in this chapter. This chapter also discusses the findings presented in Chapter IV. Moreover, this chapter presents the conclusions and recommendations for best practices and future research resulting from this study.

### **Introduction**

Nationwide, educators are amid a paradigm shift that is affecting the teacher's teaching environment and the student's learning environment. As teachers struggle with disparities in student achievement and the failure/inability of traditional instructional practices to erase those disparities, they endure increasing criticism and pressure to promote technology-rich classrooms aligned with 21st Century skills. In addition, teachers must demonstrate a readiness for emerging technology that continues to accelerate at a rapid rate. Furthermore, the last decade has seen a dramatic increase in the number and scope of digital one-to-one projects. The teachers' attitudes and beliefs are critical to effective use of technology for teaching and learning, especially within these digital one-to-one initiatives.

This study employed the Concerns Based Adoption Model (CBAM) as a theoretical framework to offer research-based constructs and tools to understand, facilitate, and evaluate teacher concerns and perceptions of the implementation of digital one-to-one educational initiative. The study focused on the seven different stages of concern (SoC), which include the following: 1) self-concerns (Stages 0-2 with stage 0 as the awareness level, or low involvement or interest; stage 1 as the informational level, or general interest about capabilities of proposed

instructional technology and requirements; and stage 2 as the personal level, or anxiety over his or her capabilities, personal cost and suitability of adopting instructional technology; 2) task concerns (Stage 3 as the management level, or focus on best practices/resources involved in using technology; and 3) impact concerns (Stages 4-6 with stage 4 as the consequences level, or teacher concern with impact on students and student outcomes; stage 5 as the collaboration level, or teaming up and collaborating with others; and stage 6 as the refocusing level, or teacher focus on universal benefits of the instructional technology and modification/rejections are made (Hall & Hord, 1987; 2011).

The CBAM framework allowed the researcher to examine individual teacher concerns during the process of adopting an innovation. The research questions addressed were:

1. What is the highest peak SoC for teachers with the innovation of digital one-to-one;
2. What is the second highest SoC of teachers with the innovation of digital one-to-one; and
3. Is there a difference in the SoC of teachers with the innovation digital one-to-one based on their (a) personal demographics and (b) academic demographics?

### **Personal and Academic Demographics**

An analysis of the demographic and academic data indicated that the sample population (N=116) consisted of teachers at the elementary (64%) and secondary (36%) school level in a southeastern state school district with the innovation of digital one-to-one. Female (89%) teachers made up the preponderance of the respondents of this study. Most of the respondents were between the ages of 30 and 39 (28%) and between the ages of 40 and 49 (28%). The highest degree obtained by most of the respondents was a bachelor's degree (44%). Moreover,

many of the respondents had tenured status (32%) and had between 0 to 5 years (28%) and 11 to 20 years (28%) of teaching experience.

### **Research Question 1 and 2**

*What is the highest and second highest peak SoC for teachers with the innovation of digital one-to-one?* Research questions one and two sought to determine the highest and second highest peak SoC for teachers with the innovation of digital one-to-one. The results for research question one revealed that the highest peak SoC for teachers with the innovation of digital one-to-one was the unconcerned stage of concern (0) (45%,  $n=52$ ). This study results placed the teacher concerns primarily at the self level. High level of self concerns are prominent with teachers involved in educational change (Hall & Hord, 2001; Newhouse, 2001). According to George, Hall and Stiegelbauer (2006), the higher the stage 0 score, the higher the indication that other things, innovations, or activities are of greater concern than the innovation under consideration with the SoCQ.

Although this school district has been a one-to-one system for five years, unconcerned stage of concern (0) was the highest peak SoC for teachers; therefore, most of the group participant (45%,  $n=52$ ) were more focused on “self-based” needs concerning digital one-to-one. The timing of the survey could have impacted the results. During the period of the survey, the teachers were preparing for a district benchmark test, which measured standards that should have been taught and mastered for the previous nine-weeks and semester.

The results for research question two found that the second highest peak SoC for teachers with the innovation of digital one-to-one was the personal stage of concern (2) (52%,  $n=27$ ), which is also at the self concern level. This finding suggests that teachers are uncertain about the demands of the innovation, how they can meet those demands, and/or their role with the

innovation (George, Hall, & Stiegelbauer, 2006). Donovan, Hartley, and Strudler (2007) further suggested that teachers at stage 2 in their study were not comfortable as they attempted to blend their traditional pedagogies with the requirements for teaching in the one-to-one environment. This can be interpreted as an indication they are uncomfortable modifying. As previously stated in the literature, three to five years of an innovation is the period for the intensity of a given concern to change enough for a shift to occur between stages.

It is worth noting that close in percent and numbers to personal stage of concern (2) is refocusing stage of concern (6) (48%, n=25). At this stage, the focus is on exploring universal benefits from the innovation, including the possible change or replacement with a more powerful alternative (Newhouse, 2001). While personal stage of concern (2) suggest that teachers are uncertain about the demands of the innovation, how they can meet those demands, and/or their role with the innovation, the refocusing stage of concern (6) shows that they appear to be open in exploring ways to benefit from the innovation or finding other alternatives. Perhaps this is an indication that the innovator adopters are becoming more knowledgeable of what is occurring in the innovation (Donovan & Green, 2010).

The classification of SoC profiles is based on peaks and valleys within the profiles. This study does not see a high-level increase across the stages of concern to produce the peaks and valleys to show progression of the adoption of the innovation digital one-to-one. As individual's feelings and perceptions make progress about the innovation, the curve will move forward like a wave. Innovation acceptance will result in decrease in the self-stage while increasing in the impact stages. The intensity in movement results in the wave motion on the individual SoC profile (Hall & Hord, 2006; George, Hall, & Stiegelbauer, 2006). As stated, this research has a high intensity in the self-concerned stage. Similarly, Radke (2011) conducted studies which

aligned individuals in high intensities on stages 0, 1, and 2 as self-concerned individuals. The study had 55% or more participants peaking in the stage 0, 1, and 2. Most of the group participants were classified in the early implementer category and more focused on “self-based needs” concerning the innovation of one-to-one, wireless, and laptop initiative (OWLI). Other related research is Newhouse (2001) and Shoepf (2004).

### **Research Question 3**

*Is there a difference in the SoC of teachers with the innovation digital one-to-one based on their personal demographics and academic demographics?* Research question three sought to determine if differences existed in the SoC of teachers with the innovation digital one-to-one based on their personal demographics and academic demographics.

#### **Personal Demographics and SoC**

The multivariate results of research question three for personal demographics, using *Pillai's Trace*, revealed no significant effects for gender, age group, nor for the interaction effect between these two independent variables on the seven stages of concerns. Although the effects of the independent variables and the interaction effects between the two were not significant by the most used multivariate tests (i.e., *Pillai's*, *Wilks' Lambda*), a multivariate effect with *Roy's Largest Root* was found to be significant for age group. Univariate tests yielded no significant results for gender, age group, nor for the interaction effect between these two independent variables on the seven stages of concerns. In this study, it was found that teachers' personal demographics (gender and age) did not impact their SoCs. Rogers (2003) and Searson (2012) both concluded that personal demographics did not impact SOC's.

## Academic Demographics and SoC

The multivariate results for academic demographics, using *Pillai's Trace*, found there were statistically significant multivariate interaction effects between tenure and teacher experience and between highest degree and teaching experience on the seven stages of concerns. univariate tests found a significant two-way interaction effects for tenure status and teaching experience on the unconcerned stage of concern (0). simple main effects analysis showed that for non-tenured teachers with 0 to 5 years of teaching experiences unconcerned stage of concern (0) were significantly higher than non-tenured teachers with 6 to 10 years of teaching experiences but were the same as other non-tenured teachers with 11 to 20, 21 to 30 years, and 31 plus years of teaching experiences. The simple main effects also found that tenured teachers were the same across years of teaching experiences at the unconcerned stage of concern (0). This study found that non-tenured teachers with five years or less of teaching had higher intensity in the unconcerned stage of concern (0) than non-tenured teachers with 6 to 10 years of experience but similar to other non-tenure teachers with 11+ years of experience. Simply stated, tenure status and years of experience influenced stages of concern which was found to be high intensity in self-concern.

Similar results were seen in academic demographics (tenure, highest degree, experience level) displayed when SoCs were compared in Li and Linder's study in 2007. Contrary to this, Radke (2011) showed a positive correlation to impact to some of the teacher concern peaks with OWLI. The highest peaks were teachers with 1-2 years of experience in unconcerned stage of concern (0). The lower peaks of unconcerned stage of concern (0) were with teachers with 3 or more years of teaching experience. This study showed higher peaks unconcerned stage of concern (0) with teachers with less than five years teaching experience than those with more than

five. The results for teachers in this study was related to teacher experience, teacher contract (tenure/nontenure), teacher school assignment, and teacher subject assignment. The correlation with teacher experience inferred a conceivably valuable point of comparison for the OWLI. More conclusive data could be obtained pertaining to OWLI involving the Levels of Use Survey, as the SoCQ does not measure level of use.

Simple interaction effects analysis showed the collaboration stage of concern (5) for non-tenured secondary teachers with a master's degree were significantly higher than non-tenured secondary teachers with an Ed.S. degree but were the same as other non-tenured secondary teachers with a bachelor's degree and a doctorate degree. The simple interaction effects also found that the collaboration stage of concern (5) for tenured elementary teachers who held a bachelor's degree were significantly lower than tenured elementary teachers who held an Ed.S. degree and a doctorate degree but were different from other tenured elementary teachers with a master's degree. Collaboration stage of concern (5) for Elementary teachers who held an Ed.S. degree and a doctorate degree were also the same as other tenured elementary teachers with a master's degree. Moreover, the simple interaction effects found that tenured secondary teachers were the same across highest degree level at the collaboration stage of concern (5). Finally, a simple interaction effects analysis showed that unconcerned (1), personal (2), consequence (4), and refocusing (6) stages of concerns for teachers were the same regardless of their tenure status, teaching or highest degree level.

The varying waves of intensity with stage of collaboration (5) is interesting. Donovan and Green (2010) conducted a study which examined one-to-one implementation in teacher education programs. The second peak of concern for the instructional faculty in their study was stage of collaboration (5). It was noted that often it was said "we are collaborating;" however,

instructional participants are perhaps unsure about how the collaboration for the innovation adoption will work and how to incorporate more technology into their course work. Radke (2011) further elaborates that stage of collaboration (5) is not typically a high stage component of early adopters. The anomaly of stage of collaboration (5) spike leads one to believe that there is more going on than an emergent behavior. Interpretations can be there is more of a buy-in from the high frequency group or more emphasis on collegiality acknowledgement that growing pains and cooperation are critical to the success of any sustained innovation (Hall & Hord, 2011). The high-level frequency of the stage of collaboration (5) with this study could signify growing pains of the innovation within the district due to the turnover rate of teachers within the district.

### **Conclusions**

Based on the findings of this study, three conclusions have been identified. First, change is a process. This study results placed the teacher concerns primarily at the *Self-Level*. The results are consistent with concerns that are found in other innovations that are in early stages with significant levels of self-concerns. Change also requires clarity about purposes and processes. Rogers (1995) recognized that people who are sincerely trying to implement innovations may become frustrated because of unspecified changes. Fullan (2001) warned about false clarity in which change is oversimplified and teachers later discover the implementation involves more than what was described. Teachers must be clear about the important feature of an innovation or what should be done differently. Hall and Hord (2001) stated that it is crucial to have teacher buy-in and an increased understanding that change is a process.

Second, teachers must have a voice in the change process. The second highest peak concern personal (stage 2) leads this study to show the teachers are still determining their role in

the decision-making process of this innovation. Too often, teacher who are going through the change process are not consulted on the usefulness of the innovation yet are expected to adopt it with open arms (Tyack & Cuban, 2000). Teachers are a relevant fixture in sustaining and the implementation process of an innovation. Change facilitators must be diligent in acknowledging and addressing teacher feelings of discomfort and concerns. Another problem becomes too many innovations at one time. The top-down approach does not always lend itself to successful implementation of an innovation. It is significant to teachers that when asked to adopt an innovation they feel important and involved.

Teacher professional development should be differentiated. As shown in this study teachers have genuine concerns at all stages of self-concerns. Many of the concerns stem from the teachers' comfort level with the technology and its role in their teaching. Schools should continue to mentor and train new teachers as well as to continue to hire, train, and retain experienced teachers. As the one-to-one initiative continues, it is recommended that teacher concerns be re-evaluated to not only track teacher concerns but to provide quality professional development that aligns with concerns. Teacher professional development on new innovations should be differentiated to meet the different concerns of the teachers.

### **Limitations of the Study**

Several limitations were identified in the study. They included the following:

1. The study is restricted to one school district in a southeastern state;
2. Conclusions are drawn from the teacher self-reports of their personal experiences and perceptions;

3. The cross-sectional designs of the study limit the views of the respondents to a specific time and does not accurately represent views of participants over a continuum; and
4. This study is limited to the concerns of teachers as measured by the SoCQ. The SoCQ is not designed to provide respondents the opportunity to provide additional information.

### **Recommendations**

The results presented in this study have contributed new information to the educational literature about teacher concerns in the adoption and implementation of digital one-to-one. The recommendations will have relevance for those considering digital one-to-one or any other innovation. Based upon the findings of this study, recommendations are being made for best practices and future research.

#### **Recommendations for Best Practices**

Schools should develop interventions to monitor and address the teachers' concerns as they progress through the change process. Hall and Hord (2006) suggested there should be continuing communication, ongoing training, on-site coaching, and time for implementation. Due to the ever-evolving nature of technology, targeted interventions should bridge the gap between the expectations of technology used outside the classroom and those used in the classroom.

School leaders should be aware that some individuals may not ever progress beyond their current concerns regardless of interventions. This can be simply due to the teacher's discomfort level with technology. In addition, environmental factors such as limited funding, other

initiatives, hard to reach students, student absenteeism, etc. all play a part in the success of an innovation.

School leaders should integrate teachers in the change process by actively engaging them with their personal SoC profiles. This information can provide teachers with a better understanding of their concerns with digital one-to-one and where they are in the adoption process. Empowering teachers with their SoC profiles might create an environment of awareness which help them to become more open-minded during interventions and less self-concerned about the innovation.

### **Recommendations for Future Research**

This study should be replicated in neighboring school districts beginning to implement digital one-to-one initiative. Doing this will provide additional research that is not a self-report by a school district and will help other districts not to encounter similar resistance in the change process with the innovation of digital one-to-one.

Research should be continued in this southeastern school district using Concerns-Based Adoption Model as the theoretical framework but Level of Use (LoU) as the diagnostic tool and One Legged Interviews as supplemental data. Level of use (LoU) is similar to SoC with seven levels but explores the extent to which teachers are using the innovation in terms of frequency and proficiency. Observations and self-reports surveys provide this information. The One-Legged Interview would provide an opportunity for respondents to expound on their answers and the researcher to seek clarity.

## Summary

The purpose of this study was to determine the concerns of teachers during the implementation of digital one-to-one in a southeastern school district. Based upon the findings of this research, the teachers were self-aware of the initiative digital one-to-one but other innovations or activities were of greater concern at the time of the SoCQ. The teachers are also uncertain about the demands of the digital one-to-one initiative and how to meet them but are open to suggestions and alternatives. After a five-year period, the data did not reflect the wave motion that is expected of individuals engaged with the adoption of an innovation to progress from self-concerns (Stages 0, 1, and 2) towards impact concerns (Stage 4, 5, and 6) and ultimately adoption. This is referred to as “tailing up” (Hall & Hord, 2006). In this study, the teachers were at a high intensity level of unconcerned (0) meaning that unconcerned was the highest profile peak for most teachers. The results of this study can be used to guide future research into concerns of teachers with digital one-to-one, and help change facilitators understand the importance of teachers in the change process of adopting an innovation like digital one-to-one initiative.

## REFERENCES

- Anderson, S. (1997). Understanding teacher change: revisiting the concerns based adoption model. *Curriculum Inquiry*, 27(3), 331-367.
- Anderson, S. E. (1997). Change:revisiting the concerns based adoption model. *Curriculum Inquiry*, 27(3), 331-367.
- Angelo, J. (2001, December). Georgia's wireless school project. *District Administration*, 37(12), 10-11.
- Bai, H., & Ertner, P. A. (2008). Teacher educators' beliefs and technology uses as predictors of preservice teachers' beliefs and technology attitudes. *Journal of Technology and Teacher Education*, 16, 93-112.
- Barak, M. L. (2006). Wireless laptops as means for promoting active learning in large lecture halls. *Journal of Research on Technology in Education*, 38, 246-263.
- Bebell, D., & Kay, R. (2010). One to one computing:a summary of the quantiative results from berkshire wireless learning initiative. 9(2).
- Becker, H. J. (2000). Who's wired and who's not: Childrens's access to and use of computer technology. *The Future of Children*, 10(2), 44-75.
- Becker, H., & Rantz, J. (n.d.). The influence of computer and internet use on teachers' pedagogical practices and perceptions. *Journal of Research on Computing in Education*, 31, 356-385.
- Becker, H., & Riel, M. M. (2000). *Teacher professional engagement and constructivist-compatible computeer use (on-line)*. Retrieved March 21, 2014, from [www.crito.uci.edu/tic/findngs.html](http://www.crito.uci.edu/tic/findngs.html)
- Berger, M. J., & Morag, S. G. (2016, March). Towards a model supporting educational change. *International Journal of Informational Educational Technology*, 6(3), 23-236.
- Bitner, N., & Bitner, J. (2002). Integrating technolgy in the classroom: eight keys to success. *Journal of Technology and Teacher Education*, 10(1), 95-100.
- Brandt, R. (2003). Is this school a learning organization? 10 ways to tell. *Jorunal of Staff Development*, 24(1), 10-16.
- Broussard, J., Hebert, D., Welch, B., & VanMetre, S. (2014). Teaching today for tomorrow: a case study of one high schools 1:1 computer adoption. *Delat Kappa Gamma Bulletin*, 80(4), pp. 37-45.

- Cardenas, K. (1998). American Association of University Professors. 84(3), 27-29.
- Cheung, D., J.Hattie, & Ng, D. (2001, March/April). Rexamining the stages of concern questionnaire:a test of alternative models. *Journal of Educational Research*, 94(4), 226-236.
- Cuban, L. (1993). *How teachers taught: Constancy and change in American classrooms 1880-1990* (2nd ed.). New York: Teachers College.
- Cuban, L. (2001). *Over sold under used: Computer in the classroom*. Cambridge, MA: Harvard University Press.
- Culp, K. M., Honey, M., & Mandinach, E. (2005). A retrospective on twenty years of education technology policies. *Journal of Computing Research*, 32(3), 279-303.
- Dawson, K., Cavanaugh, C., & Ritzhaupt, A. (2006). Florida's eett leveraging laptops initiative and its impact on teaching practices. *Journal of Research on Technology in Education*, 41(2), 143-159.
- DenBeste, M. (2003). PowerPoint, technology, and the web: more than just an overhead projector for the new century. *The History Teacher*, 36(4), 491-504.
- Dexter, S., Anderson, R., & Becker, H. (Spring 1999). Teacher's views of computers as catalysts for changes in their teaching practice. *Journal of Research on Computing in Education*, 31(3), 221-239.
- Donovan, L. . (2010). One to one computing in teacher education: faculty concerns and implications for teacher educators. *Journal of Digital Learning in Teacher Education*, 26(4), 140-48.
- Donovan, L., Hartley, K., & Strudler, N. (Spring 2007). Teacher concerns during initial implementation of a one-to-one laptopl initiative middle school level. *Journal of Research on Technology in Education*, 39(3), 263-286.
- Dwyer, D. R. (1991). Changes in teacher's beliefs and practices in technology-rich classrooms. *Education Leadership*, 45-52.
- Edwards, M. (2014). *Every child, every day: A digital conversion model for student achievement*. Pearson Education, Inc.
- Ellsworth, J. B. (2000). *Surviving change: a survey of educational change models*. Syracuse, NY: Clearinghouse on Infomation and Technology.
- Ertmer, P. A. (2005). Teacher pedalogical beliefs: the final frontier in our quest for technology integration. *Educational Technology Research and Development*, 53(4), 25-39.
- Falvo, D. (2003). Developing professionalism in teaching through technology skill development among rural teachers. 47(3), 21-25.

- Fletcher, G. (2006, March). A laptop for every ... teacher! Florida's governor unveils a different kind of 1-to-1 computing program. *Technological Horizons in Education*, 33(8), 16-17.
- Fowler, F. J. (2009). *Survey Research Methods* (4th ed.). Thousand Oaks, CA: Sage Publications, Inc.
- Fullan, M. (2001). *The new meaning of educational change* (3rd ed.). New York: Teachers College.
- Garthwait, A., & G., W. H. (2005). A year in the life: two seventh grade teachers implement one-to-one. *Journal of Research on Technology in Education*, 37, 361-377.
- George, A., Hall, G. E., & Stiegelbauer, A. M. (2006). *Measuring implementation in schools: the stages of concerns questionnaire*. Austin, TX: SEDL.
- Greaves, T., Hayes, J., Wilson, L., Gielniak, M., & Peterson, R. (MDR 2010). *The Technology Factor: Nine keys to student achievement and cost effectiveness*.
- Gulek, J. C., & Demirtas, H. (2005). Learning with technology: The impact of laptop use on student achievement. *Journal of Technology, Learning, and Assessment*, 3(2), 5-38.
- Hall, G. E. (2010). Technology's achilles heel: Achieving high-quality implementation. *Journal of Research on Technology in Education*, 42(3), 231-253.
- Hall, G. E., & Hord, S. (1987). *Change in schools: Facilitating the process*. Albany, NY: State University of New York.
- Hall, G. E., & Hord, S. M. (2006). *Implementing Change: Patterns, Principles, and Pitfalls* (2nd ed.). Boston, MA: Pearson.
- Hall, G. E., & Hord, S. M. (2011, August). Implementation: Learning builds the bridge between research and practice. *Journal of Staff Development*, 32(4), 52-57.
- Hall, G., & Hord, S. (August 2011). Implementation: Learning builds the bridge between research and practice. *Journal of Staff Development*, 32(4), 52-57.
- Hedberg, J. (March 2011). Towards a disruptive pedagogy: Changing classroom practice with technologies and digital content. *Educational Media International*, 48(1), 1-16.
- Holcomb, L. (2009, Nov/Dec). Results and lesson learned from 1:1 laptop initiatives: a collective review. *Tech Trends*, 53(6), 49-55.
- Howland, J., & Wedman, J. (2004). A process for faculty development: individualizing technology learning. *Journal of Technology and Teacher Education*, 12(2), 239-263.
- Jaber, W. E., & Moore, D. (1999). A survey of factors which influence teachers' use of computer-base technology. *International Journal of Instructional Media*, 23(6), 253-266.

- Johstone, B. (2003). *Nevermind the Laptop Kids: Computers and the Transformation of Learning*. New York: iUniverse.
- Karaya, T., Light, D., & Culp, K. M. (2005). Factors influencing outcomes from a technology-focused professional development program. *Journal on Technology Research in Education*, 37, 313-329.
- Kelly, L., & Ringstaff, C. (2013). The learning return on our educational technology investments: a review of findings from research. Retrieved March 7, 2013, from <http://wested.org/on-linepubs/learning-return.pdf>
- Lei, J., & Zhao, Y. (2008). One-to-one computing: what does it bring to schools? *Journal of Educational Computing Research*, 39(2), 97-122.
- Levin, H. (2004, April). Laptops unleashed: A high school experience. *Learning and Leading with Technology*, 31, 6-11.
- Levin, L. E., & Wasmuth, V. (2004). Laptops, technology, and algebra I: A case study of an experiment. *Mathematics Teacher*, 97, 136-142.
- Li, Q. (Summer 2007). Student and teacher views about technology: A tale of two cities. *Journal of Research on Technology in Education*, 39(4), 377-397.
- Li, Y., & Linder, J. (n.d.). Faculty adoption behavior about web-based distance education: a case study from china agricultural university. *British Journal of Educational Technology*, 38(1), 83-94.
- Lowther, D., Ross, S. M., & Morrison, G. (2003, September). When each one has one: the influence on teaching strategies and student achievement of using laptops in the classroom. *Educational Technology Research and Development*, 51(3), 23-44.
- Lunt, J. S. (2004). Maine: Main Learning Technology Initiative Transforms Teaching and Learning at Freeport Middle School. *T.H.E. Journal*, 31(12), 18-19.
- Maninger, R., & Holden, M. (2009). Put the textbooks away: preparation and support for a middle school one-to-one laptop initiative. *American Secondary Education*, 38(1).
- Marzano, R. J., Robbins, S., Yoon, L., Zraik, L., & Zaffron, S. (n.d.). A New Paradigm to Educational Change. *Education*, 116(2).
- McGrail, E. (2005). Teachers, technology, and change: English teacher's perspectives. *Journal of Technology and Teacher Education*, 13, 5-24.
- McLaughlin, M. W., & Talber, J. E. (2006). *Building school-based teacher learning communities*. New York: Teachers College.

- Mills, S., & Tincher, R. (Spring 2003). Be the technology: A developmental model for evaluating technology integration. *Journal of Research on Technology in Education*, 35(3), 382-401.
- Muir, M., Knezek, G., & Christensen, R. (2004, November). The power of one to one: Earling findings from the Maine Learning Technology Initiative. *Learning and Leading with Technology*, 32(3), 6-11.
- Muir, M., Manchester, B., & Moulton, J. (2005). Learning with laptops. *Educational Leadership*, 62.
- Newhouse, C. P. (Summer 2001). Applying the concerns-based adoption model to research on computers in classrooms. *Journal of Research on Computing in Education*, 33(5).
- Pea, R. D. (2002). A Walk on the Wild Side: How Wireless Handhelds May Change Computer-Supported Collaborative Learning. *International Journal of Cognition and Technology*, 145-68.
- Penuel, W. R. (Spring 2006). Implementation and effects of one-to-one computing initiatives: A research synthesis. *Journal of Research on Technology in Education*, 38(3), 329-348.
- Prensky, M. (2001). Digital Natives: digital immigrants. *On The Horizon*, 9(5).
- Raulston, C. G., & Wright, V. H. (2010). Teachers' perceptions and attitudes of one to one laptop initiative: connections toward 21st century learning. *Meridian Middle School Computer Technologies Trend*, 13(1).
- Richardson, J. (2011). Eta squared and partial eta squared as measurements of effect size in educational research. *Educational Research Review*, 6, 135-147.
- Rogers, E. (1995). *Diffusion of Innovation* (4th ed.). New York, NY: Free Press.
- Rosen, Y., & Beck-Hill, D. (2012). Intertwining digital content and a one-to-one laptop environment in teaching and learning: Lessons from the time to know program. *Journal of Research on Technology in Education*, 44(3), 225-241.
- Russell, M., Bebell, D., & Higgins, J. (2004). Laptop Learning: A comparison of teaching and learning in upper elementary classrooms equipped with shared carts of laptops and permanent 1:1 laptops. *Journal of Educational Computing Research*, 30, 313-330.
- Sahin, I., & Thompson, A. (2007). Analysis of predictive factors that influence faculty members' technology adoption level. *Journal of Technology and Teacher Education*, 15(2), 167-90.
- Sandholtz, J. H. (2001). Learning to teach with technology: a comparison of teacher development programs. *Journal of Technology and Teacher Education*, 9(3), 349-74.
- Sandholtz, J., Ringstaff, C., & Dwyer, D. (n.d.). *Teaching with Technology: Creating Student-Centered Classrooms*. New York: Teachers College.

- Saunders, R. (2012). Assessment of professional development for teachers in vocational education and training sector: An examination of the concerns based adoption model. *Australian Journal of Education*, 56(2), 182-204.
- Sheninger, E. (2014). *Digital Leadership: Changing paradigms for changing times*. Thousand Oaks, CA: SAGE.
- Silvernail, D. L., & Lane, D. M. (2004). *The impact of Maine's one-to-one laptop program on middle school teachers and students*. University of Southern Maine, Center for Education, Policy, Applied Research and Evaluation. Retrieved March 21, 2014, from [www.usm.maine.edu/cepare/mlti.htm](http://www.usm.maine.edu/cepare/mlti.htm)
- Steel, J., & Hudson, A. (2001). Educational technology in learning and teaching: the perceptions and experiences of teaching staff. *Innovation in Education and Teaching International*, 38(2), 625-649.
- Straub, E. T. (2009). Understanding technology adoption theory and future directions for informal learning. *Review of Educational Research*, 79(2), 625-649.
- Toyama, K. (2015, May 19). Why technology will never fix education. *The Chronicles of Higher Education*, LXI(37), pp. A26-A27. Retrieved from <http://bitly/1AFXd4U>
- Walczuch, R., Lemmicnk, J., & Streukens, S. (2007). The effect of service employees' technology readiness on technology acceptance. *Information and Management*, 44, 206-215.
- Wang, Y. (2002). When technology meets beliefs: Pre-service teachers' perception of the teacher's role in the classroom with computers. *Journal of Research on Technology in Education*, 35(1), 150-162.
- Warschauer, M. (2005). Going one to one. *Educational Leadership*, 63(4), 34-38.
- Warschauer, M. (2006). *Laptops and literacy: Learning in the wireless classroom*. New York: Teachers College.
- Whitley, B. E. (1997). Gender differences in computer-related attitudes and behavior: a meta-analysis. *Computers in Human Behavior*, 35(5), 840-850.
- Willis, E., Tucker, G., & Gunn, C. (2003). Developing an online master of education in educational technology in a learning paradigm: the process and product. *Journal of Technology and Teacher Education*, 11(1), 5-21.
- Windschitl, M. (n.d.). Tracing teachers' use of technology in a laptop computer school: The interplay of teacher beliefs, social dynamics, and institutional culture. *American Educational Research Journal*, 39, 165-205.

- Zayim, N., Yildirim, S., & Saka, O. (2006). Technology adoption of medical faculty in teaching: differentiating factors in adopter categories. *Educational Technology and Society*, 9(2), 213-222.
- Zhao, Y., & Cziko, G. A. (2001). Teacher adoption of technology: A perceptual control theory perspective. *Journal of Technology and TEacher Educaiton*, 9(1), 5-30.
- Zucker, A. (2004). Developing a research agenda for ubiquitous computing in schools. *Journal of Educational Computing Research*, 30, 371-386.

APPENDIX A:  
SOCQ QUESTIONNAIRE

Personal demographic questions

1. What is your Gender?

Male  Female

2. What range best represents your age?

20-29  30-39  40-49  50-59  60-69

Academic demographic questions

3. What is your current tenure status?

Non-Tenure  Tenure

4. What is your current teaching level?

Elementary  Secondary

5. What is the highest degree you have earned?

Bachelors'  Masters'  Ed. S  Doctorate

6. How much teaching experience do you have at your current elementary or secondary level?

0-5 years  6-10 years  11-20 years

21-30 years  31- higher years

The purpose of this questionnaire is to determine what people who are using or thinking about using various programs are concerned about at various times during the adoption process.

The items were developed from typical responses of school and college teachers who ranged from no knowledge at all about various programs to many years' experience using them. Therefore, **many of the items on this questionnaire may appear to be of little relevance or irrelevant to you at this time.** For the completely irrelevant items, please mark "0" on the scale. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale.

For example:

This statement is very true of me at this time.

0 1 2 3 4 5 6 (7)



This statement is somewhat true of me now. 0 1 2 3 4 5 6 7

This statement is not at all true of me at this time. (0) 1 2 3 4 5 6 7

This statement seems irrelevant to me. 0 1 2 (3) 4 5 6 7

Please respond to the items in terms of **your present concerns**, or how you feel about your involvement with **this innovation digital one-to-one**.

Thank you for taking time to complete this task.

|                      |                    |          |                         |          |          |              |          |
|----------------------|--------------------|----------|-------------------------|----------|----------|--------------|----------|
| <b>0</b>             | <b>1</b>           | <b>2</b> | <b>3</b>                | <b>4</b> | <b>5</b> | <b>6</b>     | <b>7</b> |
| Irrelevant<br>me now | Not true of me now |          | Somewhat true of me now |          |          | Very true of |          |

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 7. I am concerned about students' attitudes toward the digital one-to-one.  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. I now know of some other approaches that might work better.  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. I am more concerned about Schoolnet assessments.   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. I am concerned about not having enough time to organize myself each day.  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. I would like to help other faculty in their use of the digital one-to-one.  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. I have a very limited knowledge of the digital one-to-one.  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 13. I would like to know the effect of the digital one-to-one on my professional status.                              | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 14. I am concerned about conflict between my interests and my responsibilities.                                       | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 15. I am concerned about revising my use of the digital one-to-one.   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 16. I would like to develop working relationships with both our faculty and outside faculty using digital one-to-one. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

|  |                 |
|--|-----------------|
| 17. I am concerned about how the digital one-to-one affects students.                                | 0 1 2 3 4 5 6 7 |
| 18. I am not concerned about the digital one-to-one at this time.                                    | 0 1 2 3 4 5 6 7 |
| 19. I would like to know who will make the decisions in the new system.                              | 0 1 2 3 4 5 6 7 |
| 20. I would like to discuss the possibility of using the digital one-to-one.                         | 0 1 2 3 4 5 6 7 |
| 21. I would like to know what resources are available if we decide to keep digital one-to-one.       | 0 1 2 3 4 5 6 7 |
| 22. I am concerned about my inability to manage all that the digital one-to-one requires.            | 0 1 2 3 4 5 6 7 |
| 23. I would like to know how my teaching or administration is supposed to change.                    | 0 1 2 3 4 5 6 7 |
| 24. I would like to familiarize other departments or persons with the progress of this new approach. | 0 1 2 3 4 5 6 7 |

|                   |                    |          |                         |          |          |              |          |
|-------------------|--------------------|----------|-------------------------|----------|----------|--------------|----------|
| <b>0</b>          | <b>1</b>           | <b>2</b> | <b>3</b>                | <b>4</b> | <b>5</b> | <b>6</b>     | <b>7</b> |
| Irrelevant me now | Not true of me now |          | Somewhat true of me now |          |          | Very true of |          |

Circle one number for each item.

|   |                    |
|---|--------------------|
| 25. I am concerned about evaluating my impact on students.            | 0 1 2 3 4 5 6<br>7 |
| 26. I would like to revise the digital one-to-one's approach.         | 0 1 2 3 4 5 6<br>7 |
| 27. I am preoccupied with things other than the digital one-to-one.   | 0 1 2 3 4 5 6<br>7 |
| 28. I would like to modify our use of digital one-to-one based on the | 0 1 2 3 4 5 6<br>7 |

|  |                    |
|--|--------------------|
| experiences of our students.   |                    |
| 29. I spend little time thinking about the digital one-to-one.   | 0 1 2 3 4 5 6<br>7 |
| 30. I would like to excite my students about their part in this approach.                                    | 0 1 2 3 4 5 6<br>7 |
| 31. I am concerned about time spent working with nonacademic problems related to the digital one-to-one.     | 0 1 2 3 4 5 6<br>7 |
| 32. I would like to know what the use of the digital one-to-one will require in the immediate future.        | 0 1 2 3 4 5 6<br>7 |
| 33. I would like to coordinate my efforts with others to maximize the digital one-to-one's effects.          | 0 1 2 3 4 5 6<br>7 |
| 34. I would like to have more information on time and energy commitments required by the digital one-to-one. | 0 1 2 3 4 5 6<br>7 |
| 35. I would like to know what other faculty are doing in this area.  | 0 1 2 3 4 5 6<br>7 |
| 36. Currently, other priorities prevent me from focusing my attention on the digital one-to-one.             | 0 1 2 3 4 5 6<br>7 |
| 37. I would like to determine how to supplement, enhance, or replace the digital one-to-one.                 | 0 1 2 3 4 5 6<br>7 |
| 38. I would like to use feedback from students to change the program.  | 0 1 2 3 4 5 6<br>7 |
| 39. I would like to understand how my role will change when I am using the digital one-to-one.               | 0 1 2 3 4 5 6<br>7 |
| 40. Coordination of tasks and people is taking too much of my time.  | 0 1 2 3 4 5 6<br>7 |
| 41. I would like to know how the digital one-to-one is better than what we had.                              | 0 1 2 3 4 5 6<br>7 |

Thank you for your help!

APPENDIX B:  
IRB APPROVAL

THE UNIVERSITY OF ALABAMA | Office of the Vice President for  
Research & Economic Development  
Office for Research Compliance

January 31, 2017

Andrain Yeldell  
ELPTS  
College of Education  
Box 870302

Re: IRB # 17-OR-041, "Digital One to One: The Teachers' Concerns in the Change Process"

Dear Ms. Yeldell:

The University of Alabama Institutional Review Board has granted approval for your proposed research.

Your application has been given expedited approval according to 45 CFR part 46. You have also been granted the requested waiver of written documentation of informed consent. Approval has been given under expedited review category 7 as outlined below:

*(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.*

Your application will expire on January 29, 2018. If your research will continue beyond this date, please complete the relevant portions of the IRB Renewal Application. If you wish to modify the application, please complete the Modification of an Approved Protocol form. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants. When the study closes, please complete the Request for Study Closure form.

Should you need to submit any further correspondence regarding this proposal, please include the above application number.

Good luck with your research.

Sincerely,



Director & Research Compliance Officer  
Office for Research Compliance

358 Rose Administration Building | Box 870127 | Tuscaloosa, AL 35487-0127  
205-348-8461 | Fax 205-348-7189 | Toll Free 1-877-820-3066

**CONSENT TO PARTICIPATE IN RESEARCH**

**DIGITAL ONE TO ONE: TEACHERS' CONCERNS IN THE CHANGE PROCESS**

**Andrain Yeldell, Ed. S**

Assistant Principal – Challenger Elementary School

Doctoral Student- University of Alabama

**Dr. Angela Benson, Associate Professor**

Program Coordinator, Instructional Technology Department of Educational Leadership, Policy, and

Technology Studies – University of Alabama

**You are being asked to participate in a study.**

**Description of Study**

Andrain Yeldell, Principal Investigator and a doctoral degree candidate at the University of Alabama and is conducting a study under the direction of Dr. Angela Benson.

Taking part in this study involves completing a web survey that will take about 15 minutes. This survey contains questions about your utilization of digital one to one within your school district.

**Purpose**

The study will identify teacher peak and secondary stages of concerns during digital one to one. In addition, the study will identify the peak and secondary concerns as they relate to academic and personal demographics of teachers.

**Procedures**

If you volunteer to participate in this study, you will be asked to utilize a password **7gc5t5** to access and complete an online survey which will take approximately 15 minutes.

**Benefits of Participation**

There will be no direct benefits to you for completing this survey. The findings will be useful for understanding the concerns of teachers during the implementation of digital one to one.

**Risks of Participation**

There are no foreseen risks for participating in this study.

**Confidentiality**

Your confidentiality will be protected throughout this study. We will not ask for any identifying information. At any point, we will not collect your IP address. Only summarized data will be presented at meetings or in publications. All information

**UA IRB Approved Document**

Approval date: 1-30-17

Expiration date: 1-29-18

gathered in this study will be kept completely confidential and secure. No references will be made to link you to this study. At the end of the study everything will be destroyed.

**Cost/Compensation**

No compensation will be provided for this study. The study will take 15 minutes of your time.

**Contact Information**

If you have questions about this study, please contact Andrain Yeldell at 256-348-0573 or by email at [ayeldell@crimson.ua.edu](mailto:ayeldell@crimson.ua.edu). This research is being conducted under the direction of Dr. Angela Benson. She may be contacted via email [abenson@ua.edu](mailto:abenson@ua.edu) or 205-348-7824.

If you have any questions about your rights as a research participant, you may contact the University of Alabama Research Compliance Officer, Ms. Tanta Myles, at 205-348-8461 or toll free at 1-877-820-3066.

If you have complaints or concerns about this study, file them through the UA IRB outreach website at [http://osp.ua.edu/site/PRCO\\_Welcome.html](http://osp.ua.edu/site/PRCO_Welcome.html). Also, if you participate, you are encouraged to complete the short Survey for Research Participants online at this website. This helps UA improve its protections of human research participants.

**Voluntary Participation**

Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relationship to the university.

**If you understand the statements above, are at least 18 years old, and freely consent to participate in this study, click on the confirmation checkbox below.**

|                          |  |
|--------------------------|--|
| <input type="checkbox"/> | I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. |
|--------------------------|--|

APPENDIX C:

AGREEMENT FOR PERMISSION TO REPUBLISH



AGREEMENT FOR PERMISSION TO REPUBLISH — PRINT & ELECTRONIC

Please fill out, sign, and return copy to American Institutes for Research, Attn: Helen Sacco; 1120 E. Diehl Road, Suite 200; Naperville, Illinois 60563-1486; [hsacco@air.org](mailto:hsacco@air.org).

American Institutes for Research in the Behavioral Sciences (hereinafter called the “grantor”) grants the undersigned, Andrain Yeldell, Ed.D. Student, University of Alabama (hereinafter called the “applicant”), nonexclusive license to reprint the following (hereinafter called “the selection”):

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