

THE STAGES OF CONCERN ABOUT INFORMATION AND COMMUNICATION
TECHNOLOGIES AS EXPRESSED BY TERTIARY EDUCATION INSTRUCTORS IN
NIGERIA

by

DIANE ANOYI IGOCHÉ

(Under the Direction of Robert Maribe Branch)

ABSTRACT

The successful adoption of an innovation depends largely on the adopters of the innovation. When there are low rates of adoption, it is important to understand the concerns and needs of the adopters. This study used one of the dimensions of the Concerns Based Adoption Model- Stages of Concerns to identify the concerns of Nigerian instructors toward the implementation of information and communication technologies such as the Internet and its tools for instructional purposes. The study determined if relationships existed between the Stages of Concerns profiles of instructors and the instructors' years of teaching experience and the Stages of Concerns profiles of instructors and their levels of Internet usage. The study categorized the instructors into different groups according to their Internet use and years of teaching experience. The study found differences between the Stages of Concern profiles of the various groups.

The study used descriptive analysis, ANOVA, correlation analysis and multiple linear regression tests for data analysis. Results showed a High Stage 5 (Collaboration) concern. According to comments provided by instructors, there is a willingness to adopt the innovation once their concerns are addressed. Results also showed a relationship between the level of

Internet use and an instructor's Stage of concern and an interaction between an Instructors level of Internet use and Stage of concern.

The researcher used the results of this study to recommend interventions for the tertiary education institutions used in the study. The interventions focus on providing information, training and ongoing support to the instructors to help increase the rate of the innovation adoption that could lead to successful implementation in the institutions.

INDEX WORDS: Innovation Implementation, Stages of Concerns, Nigeria, Internet and its tools, Interventions, Tertiary Education, ICT

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DEDICATION

I dedicate this dissertation to my Lord and Savior, Jesus Christ, your guidance and favor has carried me through this entire process. Also, to my parents, Major General J.I. Igoche (Late) and Mrs. J.I. Igoche, and my siblings, *A'hunotu ga-ga!!!*

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CHAPTER 1

INTRODUCTION

Sub-Saharan Africa (SSA) has lagged behind in the development and usage of Information and Communications Technologies (ICT) among developing and developed regions of the world. However, Internet usage in Sub-Saharan Africa has increased by 1,360% since 1999 (UNESCO, 2009). The credit for increased SSA Internet usage is commonly accredited to increased ICT infrastructural development. According to the United Nations Educational Scientific and Cultural Organization (UNESCO, 2009), Nigeria has the highest Internet usage in Sub-Saharan Africa and one of the fastest rates of ICT developments. Information and communications technologies have played a key role in the adoption of technology in Nigeria's educational sector. Tertiary education institutions in Nigeria have effectively used the Internet for student registrations, electronic mail communication and the management of learning environments with digital course management systems. Information and communications technologies are positioned to have a positive impact on the quality of teaching and learning in the nation's educational system. However, the ICT gains at tertiary education institutions in Nigeria should be regarded as modest at best. There appear to remain barriers to fully accessing the benefits afforded by the Internet.

The Internet provides various tools such as course management systems, social networking capabilities that encourage global scholarly collaboration, and access to scholarly journals and supplemental learning resources. Tertiary educational institutions in Sub-Saharan African nations such as Nigeria have embraced the affordances of information and

communication technologies by providing instructors with technological innovations such as access to the Internet (Beebe, Akaouskou, Oyeyinka, & Rao, 2003). Internet tools can greatly increase the teaching and learning experiences of instructors and their students. The full potential of ICT affordances has yet to be realized, despite the access to information and communications technologies in tertiary education institutions"; this can be attributed to low rates of innovation adoption and implementation by instructors (Aduwa-Ogiegbaen & Iyamu, 2005; Ford, 2007; Louw, Brown, Muller & Soudien, 2009). Instructors and students are placed at a competitive disadvantage if their educational curriculum does not include the use of the technological affordances that their counterparts in other parts of the world are implementing and institutionalizing (Bloom, Canning, & Chan, 2006; Yusuf & Yusuf, 2009). Each nation in Sub-Saharan Africa is tasked with ensuring that their educational institutions can produce graduates that will become knowledgeable resources in the advancement of their societies in the current global economy.

The preparation of well equipped graduates begins with the instructors who guide the students learning process throughout the students' tertiary education. Instructors need to be properly equipped to implement technological innovations. Information and communications technologies innovations have been provided to instructors but the rate of adoption and implementation is still very low (Agbonlahor, 2008). Ehikhamenor (2003) and Utulu (2008) conducted studies that showed lack of awareness of the benefits of the Internet, and ineffective training and necessary skills as causes of the low rate of technological innovation adoption and implementation. Interventions can be introduced to address the rejection of technological innovations. Training sessions, informational seminars and learning communities are effective interventions that are used in educational settings (Hall & Hord, 2001; Zepeda, 2008). The

intervention is not likely to be successful without understanding and addressing the instructors' perceptions of the innovation and the instructors' personal concerns towards the innovation (Dass, 2001; Hall & Hord, 2001; Sanders and Ngxola, 2009). An appropriate intervention for instructors could be in the form of professional development activities such as training sessions.

The low rate of innovation implementation can be immediately addressed through the introduction of interventions. Training and development activities have been implemented to address the lack of innovation implementation by instructors but these activities have not made a significant difference in the adoption of the technological innovations (Buckley, 2002 & Van der Merwe, 2004). Louw, Brown, Muller & Soudien (2009) highlighted barriers such as (a) a lack of commitment to change by instructors (b) poor perceptions and attitudes toward these innovations, and (c) ineffective training and support (pedagogical) as the main barriers to the adoption, implementation and institutionalization of technological innovations in the tertiary education institutions. The aforementioned barriers can be seen as instructor concerns toward technological innovations.

The presence of these barriers is an indicator that instructor concerns are not considered when the training and professional development activities are designed, which then results in instructors being ineffectively trained. Ineffective training is likely to produce widespread dissatisfaction, resistance to new initiatives and a sense of apathy toward all forms of technology mediated learning (Shepard, Alpert, & Koeller, 2007). According to Hord, Rutherford, Huling-Austin, and Hall (1987), human perceptions and concerns should be considered during the beginning stages leading to the adoption and implementation of any educational innovation. Hall, George and Rutherford (1979) suggest that the concerns of innovation adopters play an important role in the innovation adoption and implementation process. Identifying concerns

related to implementation of an adoption might be the first successful step in addressing the low rates of technological innovation adoption and implementation in SSA tertiary education institutions.

The purpose of this study was to identify stages of concerns cited by Nigerian instructors toward the implementation of information and communication technological innovations such as the Internet and its tools for instructional purposes. The Stages of Concern questionnaire (Hall, George & Rutherford, 1974) was used to quantitatively assess and identify the feelings, perceptions and motivations that an instructor might have toward a technological innovation such as the Internet for instructional purposes. This study identified the concerns of tertiary education instructors in Nigeria in relation to their use of the Internet for instructional purposes.

Rationale

Instructors in Nigerian tertiary education institutions are the main population for this study. Nigeria is the most populous nation in Africa with approximately 140 million residents, and the highest number of tertiary education institutions in Sub-Saharan Africa. Most of the Sub-Saharan African (SSA) countries have similar economic and ICT infrastructural development backgrounds. A study contextualized using one country such as Nigeria can be used as a foundation for progress for other SSA nations experiencing progressing through the educational innovation adoption process.

Nigeria is a country in great need of educational reform despite the nation's claim as the giant of the African continent (Ololube, 2006). The Nigerian educational system has been criticized for not preparing students to meet the challenges of globalization (Yusuf & Yusuf, 2009). Students with educational qualifications from Nigerian tertiary education institutions are not intimated with modern technology skills and instructors in Nigerian tertiary education

institutions are not exposed to the different teaching methods that are available with modern technology adoption (Yusuf & Yusuf, 2009). The Nigerian Educational Reform Act (NERA) of 2007, which deals with the improvement of educational practices in the primary, secondary, and tertiary levels of education, was instituted to begin the reformation of the nation's educational sector. The NERA combined with recent economic developments in Nigeria has resulted in increased access to information and communications technologies in tertiary education institutions; however rates of adoption and implementation of the ICTs are still low.

Past hindrances such as inadequate infrastructure are slowly diminishing. The United Nations Economic Commission for Africa (UNECA) reported that ICT development and implementation was on the rise (United Nations, 2008). The banking and telecommunications sectors of Sub-Saharan African nations have embraced ICT and have introduced innovations such as electronic banking and a boost in telecommunications. The telecommunications industry has enjoyed rapid growth and it has played a role in bridging the global digital divide between Sub-Saharan Africa and the rest of the world (Hahn & Kibora, 2008). Economic sectors are reaping the benefits of ICT developments while the education sector is lagging behind. The banking industry has taken advantage of the Internet and its tools to enhance the quality of customers' financial needs. The financial industry took advantage of the Internet and its tools to introduce mobile banking and e-trading to its customers. The tertiary education institutions have also introduced student online registration, fee disbursements and electronic communication via the Internet (Olatokun, 2006), but instructors have not fully exploited the Internet for the resources that have been shown to enhance teaching and learning.

The Internet provides teaching and learning tools that are useful to educators, such as the World Wide Web which in turn gives an instructor access to supplemental learning resources

such as scholarly journals, course management systems and open courseware systems such as Moodle. The absence of Internet in teaching and learning is becoming one of the most important and widely discussed issues in contemporary education policy (Palak, Walls & Wells, 2006; Thierer, 2000) among developing nations. There are many educational benefits of integrating the Internet into the tertiary education curriculum, one of the biggest benefits is providing access to resources that instructors and students in a nation such as Nigeria would not easily obtain.

Internet and Education

The Internet has introduced convenience, collaboration and global learning into a student's learning experience. A majority of today's students regardless of location also called the Net Generation are digital, experiential and social (Oblinger & Oblinger, 2005), due to their exposure to the Internet. Meeting the needs of the Net Generation student requires the adoption and integration of information and communications technologies such as the Internet. Use of the Internet can enhance traditional teaching and learning methods that involved the use of textbooks and lectures as sole means of knowledge acquisition in a classroom. The Internet is a dynamic tool that can provide a rich classroom experience for both the teacher and the student (Henry, 2002). The Internet allows an instructor access to supplemental teaching materials such as journal articles, educational video and audio, and other resources that can be beneficial to the student's learning. The Internet reduces the cost of transmitting information to individuals especially in developing countries. Information that might have been expensive to obtain is now easily accessible.

Early Internet use primarily offered an array of features that were deemed practical for only personal and business activities. The Internet aided in the utilization of database

applications, file transfers, electronic mail (e-mail) and the World Wide Web (Cady & McGregor, 1995; Krol & Ferguson, 1995). The advancement of Internet technologies has now introduced other applications such as chatting, sharing of academic documents, and the improved World Wide Web. Internet tools have now become integral parts of computer mediated instruction (Al-Fulih, 2002). The Internet has tools that can allow instructors to create a dynamic learning environment for their students. Instructors can design discussion boards using interactive tools on course management systems to encourage discourse between students during and after classroom time. The World Wide Web affords instant access to scholarly supplemental teaching tools. Instructors can effectively conduct scholarly research with the information made accessible via the Internet and boost the weak presence of Nigerian (and Africa in general) scholarly works in the international scholarly community (Aina, 2005). The Internet provides instructors with opportunities for collaboration with academics in different educational institutions around the world. Instructor adoption and implementation of the Internet has benefits for them and their students.

Barriers to Internet Adoption

The process of technology adoption is not complete until the adopter implements and institutionalizes the technological innovation provided. Most instructors in Nigerian universities have not used the technological innovations that they are asked to integrate into their classrooms (Jegade, 2009). School administration and government agencies have neglected faculty development and support in technology adoption, in the rush to implement new technologies and the attempts to bridge the digital divide. The adoption and integration of technological innovations by educators lags behind technology integration in other sectors even in the developed nations (Cuban, 2001). One explanation for the lack of technology adoption and

integration by educators is that the effectiveness of technology in the classroom has not been clearly demonstrated (Maguth, 2008; Reeves, 2003). There is a growing realization of the importance of the Internet in teaching and learning among Nigerian tertiary education instructors, some view Internet use in instruction as an integral part of the preparation of graduates who can function in a technology driven society like the one we see today.

Some instructors in a society where the Internet is a recent innovation might view the Internet as a supplementary instructional tool. This can be attributed to a lack of modeling of the effectiveness of Internet technologies in instruction. Most educators are not well trained in using technologies for teaching as a means of educational sustainability (Ololube, 2006). Instructors are skilled in their content area and the traditional teaching methods with which they received their training (Wiesenmayer, Kupczynski, & Ice, 2008). The instructor, who through years of practice, has developed a teaching style that allows him or her to teach in a seamless, fluid manner, may rebel against teaching with new technologies, believing that the new method is inferior to the traditional mode in which they are well versed (Bennett & Lockyer, 2004; Hazzan, 2000). Efforts need to be taken to address resistance against the technological innovations.

Theoretical Framework

Concerns Based Adoption Model. This study will apply the Concerns Based Adoption (CBAM) model to address the concerns of instructors. The Concerns Based Adoption Model provides an understanding of the affective and behavioral dimensions of change that determines an individual's decision to accept or reject an innovation (Anderson, 1997). The Concerns Based Adoption Model has been widely used in innovation diffusion research and has shown its relevance even two decades after its conception (Julius, 2007; Sahin & Thompson, 2007; Slough & Chamblee, 2007; Tunks & Weller, 2009). The Concerns Based Adoption Model was

developed at the Research and Development Center for Teacher Education at the University of Texas at Austin. The Concerns Based Adoption Model is a framework that provides tools for assessing progress during the innovation diffusion and adoption process (Zepeda, 2008).

Concerns Based Adoption Model highlights the concerns of the adopter and believes that their concerns can shape the way they respond to an innovation and the innovation adoption process. The implementation of any new educational policy, such as changes in school culture, technological changes or personnel changes will be met with resistance. Successful change agents and policy makers such as Administrators who have introduced the technologies to the instructors acknowledge human resistance as a major barrier to change. Acknowledgment is only the first step to overcoming the barriers of implementation, understanding and addressing the different causes of resistance can make the necessary difference between a potential adopter adopting or rejecting an innovation.

Stages of Concern. The Stages of Concern (SoC) is a one part of the Concerns Based Adoption (CBAM) Model. The Stages of Concern acknowledges the personal nature of change that is often overlooked in the literature about diffusion of innovations. The Stages of Concern framework is a developmental progression in which teachers implementing an innovation have concerns of varying intensity that can make the change process different for each individual (Anderson, 1997). Hord, Rutherford, Huling-Austin, and Hall (1987) constructed the Stages of Concern framework; SoC aids planners of professional development measure and address the personal concerns of individuals and their belief systems towards new innovations. The Stages of Concern framework addresses the “most crucial tenet of educational evaluation: participants in change, progress through innovations at an individual pace” (Zepeda, 2008, p. 42), this individual pace is mostly influenced by personal circumstances and characteristics. The Stages

of Concern highlights the perceptions that an adopter has towards an innovation and the adopter's motivation to implement the innovation based on those perceptions. An instructor's concerns and feelings of uncertainty can influence their decision to implement the desired innovation (Christou, Eliophotou-Menon & Philippou, 2004). Different backgrounds and past experiences influence an individual's personal concerns towards an innovation which can result in the resistance of the innovation. Therefore, it is important to identify and understand the individual's concerns to possibly reduce the resistance towards the implementation of an innovation.

Importance

Statement of the Problem

Nigerian instructors anticipate using technology to enhance their method of teaching. Instructors recognize that the Nigerian educational system will reap the full benefits of technology adoption and integration in teaching and learning (Ololube, 2006) once pre-service and in-service educators are able to effectively use these tools for learning. However, the implementation of technological innovations for instructional purposes has been very slow. Instructors are not motivated to integrate technological innovations because of little or no knowledge about integrating the innovation into their classrooms, despite the provision of professional development activities such as training workshops (Ololube, Amaele & Kpolovie, 2009). Introducing more training and development to attend to the low rates of implementation may not increase implementation rates because ineffective training and development can increase barriers to technology adoption and integration (Ely, 1999). The problem is professional development designers focused on increasing the implementation of a technological innovation such as the Internet are not addressing the underlying concerns that the Nigerian

instructors have towards the innovation and its implications for their instructional curriculum. Conducting this study has begun the process of uncovering and addressing the concerns faced by these instructors.

Research Questions

As Internet access continues to grow, it is important to seek empirical evidence regarding the delayed adoption of the Internet and its tools into the Nigerian tertiary education instructor's instructional curriculum. Agbonlahor (2008), Obajemu and Ibegwam (2006), and Keengwe (2007) have examined the characteristics of instructional technology users, librarian attitudes towards technology, and student perception towards integration of instructional technology into their courses.

The results of this study can be used to plan and design adequate instruction for professional development activities. The results of this study should specify successful diffusion strategies and institutionalization of the Internet for instructional purposes and other technological innovations (Hall & Hord, 2001; Kozma, 1979). This study will help future researchers understand possible factors that contribute to acceptance or rejection of new innovations in a Nigeria and Sub-Saharan Africa tertiary education institution.

The study will examine the relationship between the instructors' concern profiles and their prior experiences with the Internet. The following research questions will guide the study:

1. What are Nigerian tertiary education instructors' concerns toward the use of the Internet and its tools for instructional purposes as measured by the Stages of Concern Questionnaire?
2. a. Is there a relationship between the Stages of Concern profiles and the levels of Internet use?

- b. Do instructors with varied levels of Internet use vary in their Stages of Concern?
- 3. a. Is there a relationship between the Stages of Concerns profiles and the years of teaching experience?
 - b. Do instructors with varied years of teaching experience vary in their Stages of Concern?
- 4. Is there an interaction effect between the levels of Internet use and years of teaching experience, and the Stages of Concerns of an instructor?

CHAPTER 2

REVIEW OF RELATED LITERATURE

The purpose of this chapter is to review the literature associated with adopter concerns and its influence on the adoption and integration of an innovation, specifically Internet Technologies in Nigerian tertiary education institutions. The review begins with a section discussing the Internet, the Internet in Sub-Saharan Africa and Nigeria, use of the Internet in Nigerian tertiary education institutions, and the perceptions of instructors in Nigerian tertiary education institutions towards the Internet. The last section of this review presents relevant change theories such as Diffusion of innovation theory and the Concerns-Based Adoption Model and uses these theories to further explain the influence of adopter concerns on the innovation diffusion process.

The importance of improved Internet connections has been acknowledged in developing countries, especially in Sub-Saharan Africa (SSA). Internet access as part of Information and Communications Technologies (ICT) development is an essential part of the United Nations' Millennium Development Goals implemented to address economic woes of developing countries by 2015 (United Nations, 2008). Development is important to help bridge the digital divide between developed nations and developing regions such as SSA (Thierer, 2000). Integrating ICT into education is a step towards bridging the digital divide and producing competent individuals who can compete in our global economy.

The Internet is one of the most useful ICT affordances that have been beneficial in education. The role of Internet use in teaching and learning has been one of the most important

and widely discussed issues in contemporary education policy since the inception of the Internet (Rosen & Well, 1995; Sentini, 2006; Thierer, 2000). Okojie, Olinzock & Okojie-Boulder (2006) suggest that instructional technologies such as the Internet are narrowly perceived. Such a perception might hinder instructors' willingness to adopt such technologies for instruction.

The Internet

The Internet is the largest network of computers in the world. The Internet is able to provide and support high level communications using a Transmission Control Protocol/Internet Protocol (TCP/IP) (Federal Networking Council, 1995). The Internet is the default digital library to today's educators and their students (Oblinger & Oblinger, 2005). One of the major strengths of the Internet is its communication power that enables the fast delivery and request of information. There is a disparity of Internet usage around the world due to barriers such as late development of information and communications technologies (ICT). The developed nations in Asia and industrialized regions such as North America and Western Europe are currently leading the world in Internet access and usage as seen in figure 1 below.

The Internet offers an array of features that have become useful for daily activities. The Internet offers database applications, file transfers, electronic mail (e-mail) and the World Wide Web (Cady & McGregor, 1995; Krol & Ferguson, 1995). The various Internet applications were previously used for personal and business purposes (Krol & Ferguson, 1995); the advent of the new millennium and advancement of social networking technology introduced other applications such as the ability to send instant messages to individuals around the world, sharing of academic and "causal" documents, and the improved World Wide Web.

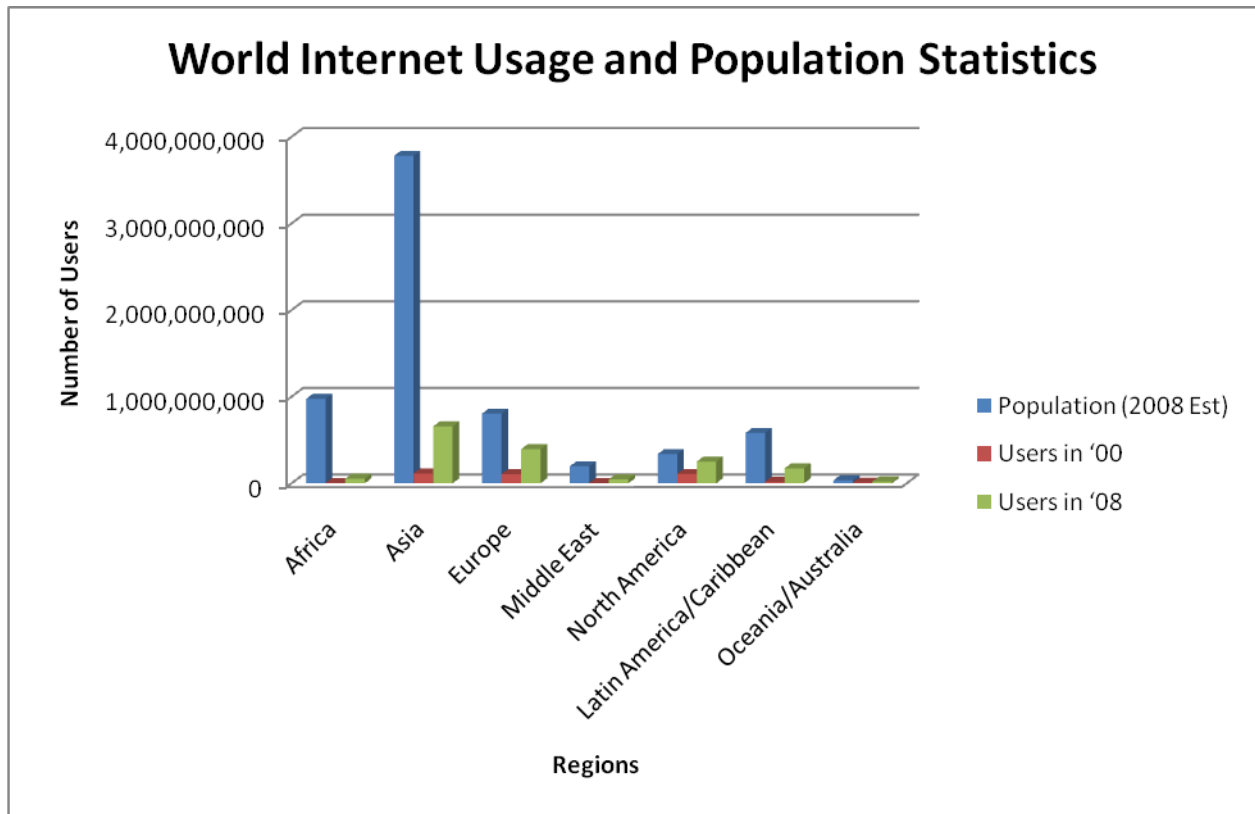


Figure 1. World Internet Usage and Population Statistics.

The Internet as an Instructional Tool

The use of the Internet as an instructional tool has the potential to transform the way instructors teach and conduct research (Supon & Ruffini, 2009). The Internet has various characteristics that are important to the success of teaching and learning:

1. The Internet is an excellent means for collaboration; it has successfully reduced the distance barriers for instructors and learners in different parts of the world. Academic collaboration is an important part of growth as an instructor and a learner, and the Internet has helped promote collaboration (Gerber, Grund & Grote, 2008; Sooryamoorthy & Shrum, 2007). Instructors can use tools available on the Internet such as blogs, wikis and podcasts to share information with their classes and other instructors and students at other education institutions. These tools provide an

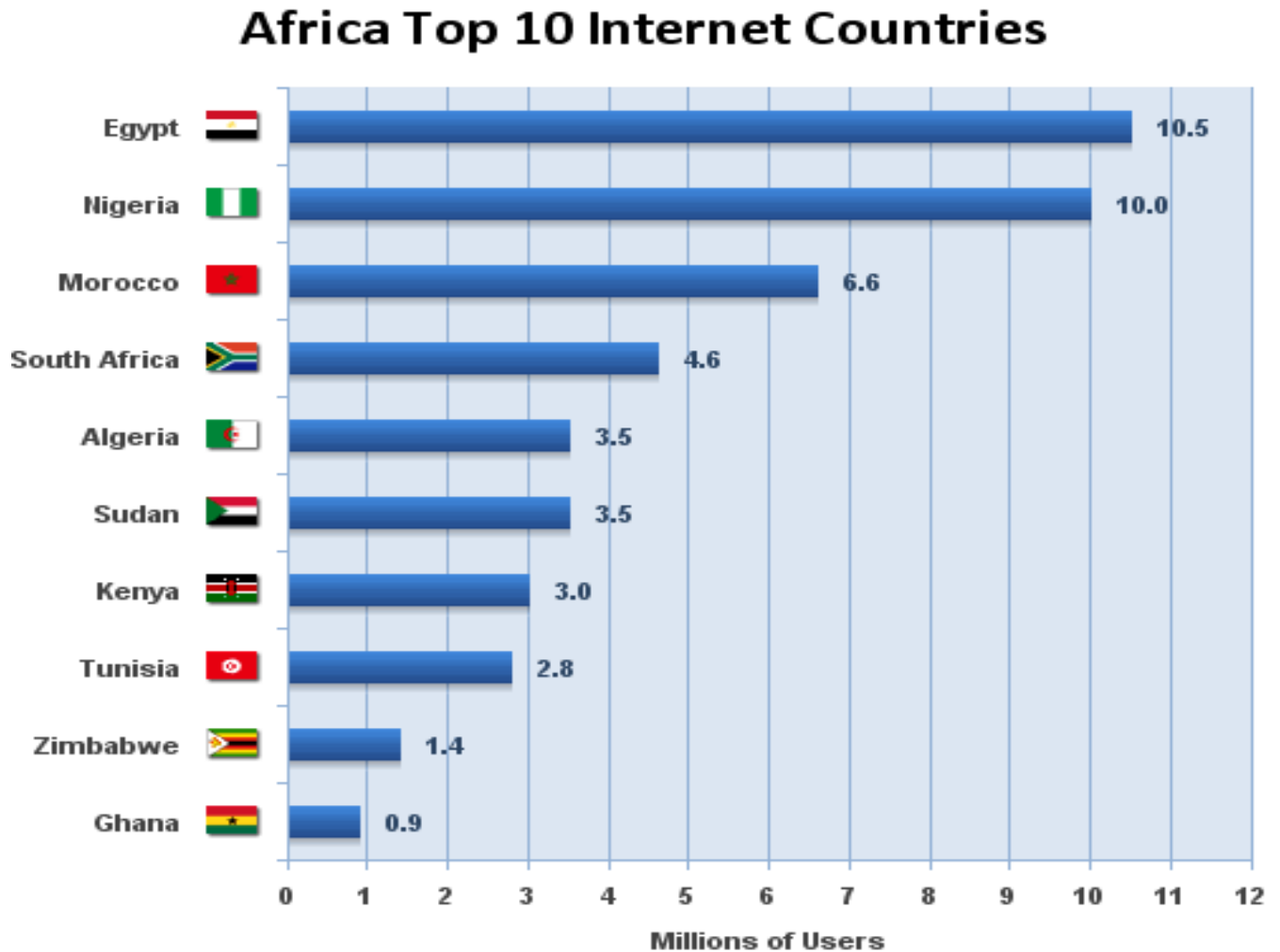
- opportunity for improving and adding new collaborative ideas to the classrooms (Boulos, Maramba & Wheeler, 2006). Availability of free and open source applications on the Internet make collaboration cost effective and an option for scholars in educational institutions in developing countries that would not have access to these resources otherwise.
2. Internet technologies provide a needed shift in the way students are taught. Incorporating the use of Internet technologies into the classroom aids the student in becoming an effective problem solver, and the learning process can be participatory instead of bureaucratic (Zemsky & Massy, 2004).
 3. The Internet is an excellent source to obtain research resources and enable educators in regions such as Sub-Saharan Africa to participate in scholarly publication activities. The gap in literature on educational development in developing countries needs to be thoroughly researched and reported (Manir, 2008). Educators can take advantage of electronic publishing opportunities to address this gap in the body of knowledge.

Internet in Sub-Saharan Africa

The diffusion of the Internet in Africa was relatively slow at the end of the 20th century and the first few years of the 21st century. A United Nations Development Programme (UNDP) Development Report showed that by 2003, all 54 countries on the African continent were connected to the Internet and usage data was beginning to grow. The adoption of mobile technology is responsible in part for the boost in connectivity as individuals use their cellular phone devices to access the Internet without the infrastructural issues of power supply and lack of equipment (Oyelaran-Oyeyinka & Lal, 2005). Internet access via mobile phones is used for casual purposes such as emailing and most recently, social networking (Andonova, 2006).

Figure 2 shows Nigeria as leading in the number of users in the Sub-Saharan Africa region.

Although there are more users in Nigeria, the Internet has not been fully adopted as an academic tool (Manir, 2008; Zhen, Garthwait & Pratt, 2008).



Source: Internet World Stats - www.internetworldstats.com - Dec. 2008

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Figure 2. Internet Penetration in African countries.

The Internet in Nigeria

Nigeria has gained notoriety with respect to the increase in the number of Internet crimes. The Federal Bureau of Investigation (FBI) (2007) Internet Crime Report lists Nigeria as one of the top ten countries in which cybercrime originates; the Internet is used by criminals as a means

to collect personal and financial information from unsuspecting individuals in western countries. Unfortunately, the Internet has not been fully adopted for non-fraudulent activities in Nigeria, especially in the education sector.

Technology adoption and integration in developing countries such as Nigeria has been studied but only to a limited extent. A World Bank Report shows that Internet use may be understated in developing countries where many commercial subscribers rent computers connected to the Internet (as cited in Chinn & Fairlie, 2004). Although a computer penetration rate of 1 computer to every 100 persons has been surmised by some researchers (Chinn & Fairlie, 2004), these numbers do not account for the Internet café businesses that are widespread in developing countries nor do these figures include university provided computers that are meant for student use.

An example of technology adoption is Nigeria's newly adopted Mobile Internet Units (MIU), a mobile cyber center comprising of workstations that are connected to the internet via a Very Small Aperture Terminal (VSAT) with a number of multimedia facilities. These units are deployed to various rural areas in the country to increase the penetration of technology. The affordances of these units for education remain unclear.

Nigeria's National Information Technology Development Agency (NITDA) is one of the agencies involved in the adoption and penetration of technology in the country. A study conducted by NITDA in 2003 reported that a positive shift in government readiness to embrace technology is taking hold in the country. Avenues like the MIUs and VSAT now provide at least some degree of Internet access to the rural areas of the country. The boom in mobile phone usage has also increased the wireless connections around Nigeria and the African continent. General Packet Radio Service coupled with wireless application protocol (WAP) enabled phones

allow people to gain wireless Internet access to their computers. Technology adoption and integration enhances various sectors of the economy including the educational, health and military sectors amongst others. Emphasizing technology adoption and integration in the educational sector has the potential to equip graduates with the necessary skills to become technology proficient professionals that can improve the technology operations of the other sectors. As with most aspects of an evolving economy, education is the key.

Internet Technologies in Nigerian Tertiary Education Institutions

The evolution of Internet resources has created richer avenues for acquisition of knowledge and is in turn encouraging teachers to become more creative in their approach to guiding their students' acquisition of knowledge (Ololube, 2008). Technology in education provides educators with the opportunities to create authentic learning situations in and out of the classroom, exposing the learner to diverse experiences via collaborative learning and various communities of learning (Adika, 2003). Instructional technologies have evolved from the chalkboard and textbooks where learning is primarily teacher centered, to learning experiences that allow technology to be used for information retrieval and as problem solving tools by students themselves (Morrison & Lowther, 2005). The development of ICT infrastructure is integral to the technology adoption process. The success of ICT adoption and integration in classrooms depends on the support of the government, local authorities and the private sector (Bryderup & Kowalski, 2002). In recent times, the adoption of information and communication technologies in tertiary institution teaching has been the topic of much debate (Larose et al., 1999). Some view ICT in Nigerian tertiary education as integral to the preparation of graduates who can function in a technology driven society like the one we see today.

Technology adoption and integration into education lags behind technology innovations in even the most developed countries (Cuban, 2001). One explanation for the lack of technology adoption by educators in Nigeria is that most educators are not well trained in using technologies in teaching as a means for educational sustainability (Ololube, 2006). In addition, the effectiveness of technology in the classroom has not been clearly demonstrated (Reeves, 2003). Yusuf (2005) conducted a study on Nigerian educators self-efficacy of computer education and found that most educators do not have the appropriate experience or exposure required for computer use in educational purposes; the support provided (if any) does not address such needs; and the support provided is geared towards infrastructural (hardware) support rather than pedagogy.

Studies Related to Internet Usage in Nigerian Tertiary Education Institutions

There was an increase in the research on instructor use of the Internet in the mid to late 1990's especially in developed countries. However, research focused on Internet use among faculty members in various developing countries did not gain attention until 2001; the first studies were conducted by scholars focusing on the Middle East (Al-Fulih, 2002; Al-Muhaisin, 2000). These studies influenced a wave of studies that focused on how instructors were taking advantage of this technological innovation and what (if any) were the hindrances to their adoption of this innovation for academic purposes.

The time lag between the initial studies in developed countries and developing countries is due to the fact that developing countries are only beginning to bridge the technological divide (Aduwa-Ogiegbaen & Isah, 2005) that existed between them and the developed nations. Adika (2003) conducted one of the first comprehensive studies of Internet use among instructors in a Sub-Saharan African tertiary education institution. Similar to other studies in the same context,

the study highlighted the barriers of Internet usage mentioning inefficient training and support as one of the barriers. Ehikhamenor (2003) conducted a study about the use and non-use of the Internet among Nigerian tertiary education instructors and found accessibility, and ease of use to be the biggest barriers to adoption and implementation. Aduwa-Ogiegbaen and Isah (2005) addressed the extent to which a Nigerian tertiary education instructor uses the Internet and the role of gender in the usage decisions. The study showed that instructors used the Internet for personal purposes and gender did not play a role in the low rate of adoption of the innovation for instructional purposes. Agbonlahor,s (2008) study aimed at correlating individual characteristics to instructor attitudes toward information technology such as the Internet. She found that the attitudes of instructors can hinder their decision to adopt the innovation. The aforementioned studies highlighted ineffective support as a barrier to adoption and implementation of the technological innovation. Recommendations from Agbonlahor (2008) and Ehikhamenor (2003) included increased accessibility and implementation of effective interventions such as training and development that would address the perceptions and attitudes of instructors towards the technological innovation.

Technology Adoption and Integration in Tertiary Education

There are several rationales for technology adoption and integration in tertiary education. Technology adoption is the process of embracing the technologies introduced in the school system. Earle (2002) describes technology integration as the use of tools that deliver content and implement practices in an efficient and effective way. Duderstadt, Atkins, and Van Houweling (2002) argue that technology is primarily needed to improve access to higher education for under-served populations of students, Oblinger and Oblinger (2005) maintain that technology adoption and integration in tertiary education is needed to educate the new generation of “Net”

learners. Bates and Poole (2003) promote the idea that technology integration will enhance the effectiveness of teaching and learning in higher education. Herrington, Reeves, Oliver and Woo (2004) promote the idea that technology in tertiary education gives instructors better opportunities to provide authentic learning experiences, exposing learners to diverse experiences via collaborative learning and various communities of learning. Technology adoption and integration in Nigerian tertiary institutions is promoted for many of the same reasons stated above, and it is justified because of the perceived need for the nation and African continent to bridge the digital divide and produce globally competitive citizens (Czerniewicz, 2004). One novel perspective is that technology integration will allow developing countries to „leapfrog“ traditional methods of increasing productivity (Steinmueller, 2001); productivity in students learning experiences and an instructors“ teaching and scholarly career.

Effective technology adoption and integration process is important for technology to be adopted and institutionalized. Emphasizing technology adoption and integration in the tertiary educational sector will equip graduates with the necessary skills to become technology proficient professionals, who can improve the technology operations of the other sectors (Ololube, 2006). However, relatively little is known about why the instructors in Sub-Saharan African tertiary education institutions have not institutionalized the technologies provided to them, especially based on results of recent studies (Jegede, 2009; Manir 2008; Ololube, 2008) that show a low rate of adoption of technological innovations in tertiary education institutions.

Instructors Perception of Technology

The innovation adoption process cannot be successful without the consideration of the adopters“ perceptions, attitudes and needs in regards to the innovation that is introduced. Instructors“ perceptions of technological innovations differ based on their past experiences, self

efficacy and other factors (Georgina & Hosford, 2009; Hord, Rutherford, Huling-Austin, & Hall, 1987). Wedman and Heller (1984) were among the first researchers to address the concerns of teachers during the initial introduction of computers to the classrooms in the United States of America. The study helped change agents, change facilitators and policy makers understand the concerns of teachers during that time and they were able to make adoption decisions based on the concerns found in studies such as Wedman and Hellers' study. The study mentioned above has not been conducted for the Nigerian tertiary education instructor. The developmental needs of an adopter change with the advancement of innovations and the potential adopters experience with the innovation (some might be inexperienced or experienced users) (Hall et al., 1979). Aneke and Finch (1997) and Lee (2001) suggest that timely examination of instructor needs upon introduction of an innovation is necessary for the innovation to be adopted, implemented and institutionalized.

Potential adopters who perceive an innovation's relative advantage tend to embrace it even when they have concerns about the innovation. Studies of Nigerian Instructors' perceptions of Internet technologies (although limited), show that Instructors see a relative advantage to using the Internet in the classroom (Jegede, 2008; Manir, 2008; Ololube, 2008). However, the Instructors stated Internet technologies improve communication (Manir, 2008); there is little discussion about the pedagogical benefits of Internet technologies. Instructors have not discovered the relevance of implementing the technologies in their classrooms. Rogers' (1995) suggests that the absence of the feeling of relevance will have a negative impact on the adoption of an innovation. Jegede, 2008; Ololube, 2008 and Yidana, 2007 suggest that Nigerian tertiary education instructors' perception of technology shows the inadequate feelings of relevance, lack of understanding related to adoption and integration of technology and its effect on the individual

teaching style and lack of effective support to institutionalize technology in the classroom.

Idowu, Adagundo and Popoola (2003) reported that technological innovations are not utilized for instructional purposes because of ineffective training provided. Their study highlighted the negative attitudes of instructors toward the innovation for instructional purposes but showed positive attitudes when using the innovation for personal purposes. Cuban (1999) study showed that instructors were comfortable with the Internet and its tools for personal use but only 10% of them used the innovation for instructional purposes; this is a similar story in the case of Nigerian tertiary education instructors today (Jegede, 2009). Their needs and concerns for personal use of the innovation include communication and these concerns are met. Idowu, et al., (2003) study results showed that interventions geared toward adoption of the innovation should consider the differences in adopter needs.

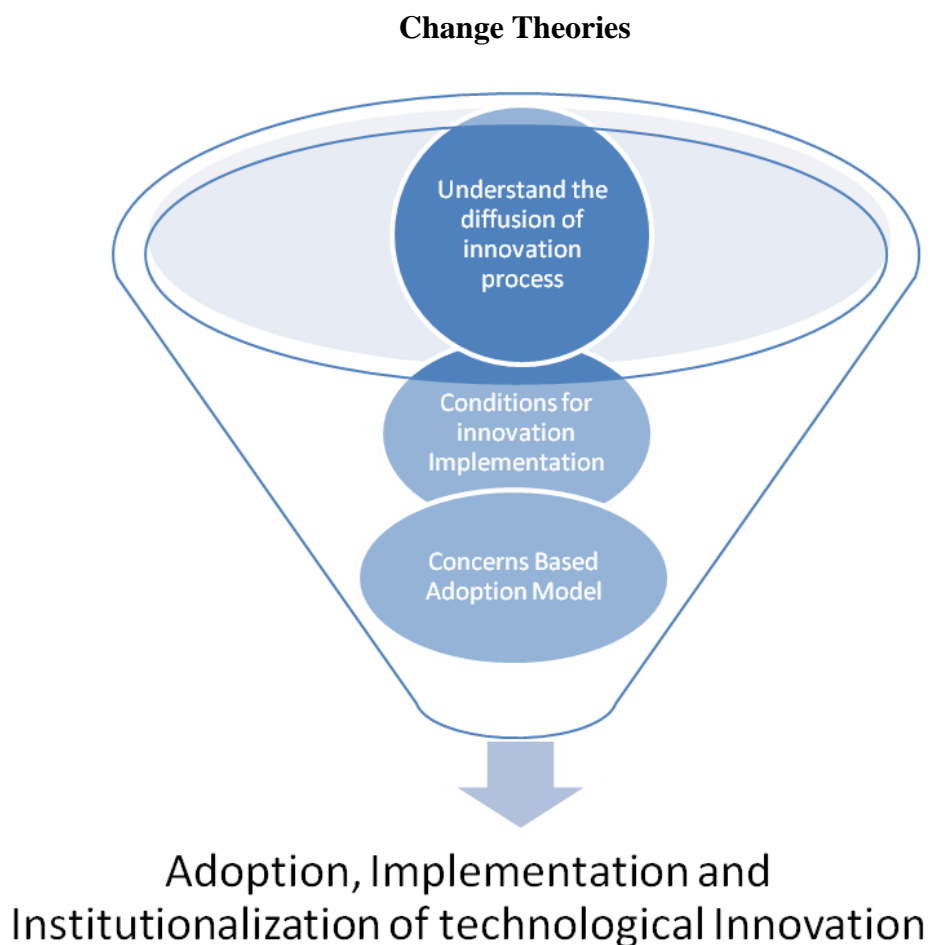


Figure 3. Adoption and Institutionalization of Technology Innovation

Diffusion of Innovation Theory

Change theories that exist today have been modeled after or against Rogers (1995) Theory of Diffusion of Innovation. Change theories are multi-disciplinary, and they are important in helping researchers understand the complex nature of human perceptions of change and acceptance or rejection of new innovations.

This study regards an innovation as the introduction of a new idea, method or device. An innovation is not useful unless it has been communicated to potential adopters and eventually adopted or revised for future adoption. “Diffusion is a special type of communication that transmits a new idea” (Rogers & Shoemaker, 1971, p. 12); the implementation of a new idea

usually requires change in existing structures and practices. This change causes uncertainty to the adopters of the new idea. The introduction of the Internet into Nigerian tertiary education institutions might at first seem to be an unambiguously good thing, but it will inevitably have major implications for instructors and students alike, some of which are positive such as greater access to information, and some of which are negative, such as greater distractions from academic study.

There are four main elements involved in the diffusion of an innovation; the innovation, communication channels, time and the social system (Rogers, 1995, p.10).

Innovation - Rogers (2003) defined an innovation as an idea, practice or object that is new to an adopter (an individual who might use the innovation). Most studies on innovation diffusion are focused on technology, and as a result, innovation and technology are sometimes used as synonyms (Rogers, 2003, p.13). Introducing technological innovations or innovations of any kind causes a feeling of uncertainty among most stakeholders in the context into which the innovation is introduced. Potential adopters of the innovation are puzzled by the usefulness of the innovation; this usually creates a resistance during the introduction of the innovation. The uncertainties can be alleviated by understanding the potential adopters' perceptions and concerns toward the innovation (Rogers, 2003) prior to communicating the ideas that define the innovation more clearly to the adopters.

Communication Channels - A communication channel transmits information about the innovation to the adopters after their initial awareness of the idea or technology. Communication channels can be used in reducing barriers to acceptance of the innovation. Communication through the right channels via the right medium can persuade an individual to accept a new idea (Rogers 2003, p. 18). Rogers referred to homophily as a principle that applies to adopter

preference to communication. Homophily is the degree to which two individuals share the same attributes, e. g. work or live near each other, belong to the same group or share similar interests.

However, many participants in innovation diffusion are usually heterophilious (opposite of homophily) and this becomes a problem (Rogers, 1993). Markus (1987) suggested that the more people on a network, the more diffusion and adoption occur; his theory applied to diffusion of interactive media. Technology adoption change agents are mostly subject matter experts who are probably not employed in the same social system as the potential adopters. The adopters and change agents usually have communication barriers because they have different perspectives of the innovation (Rogers, 2003, p. 19). This challenge can be overcome with persistence and time applied to the innovation-decision process.

Time - The introduction of change to any social system requires time for adoption and integration. Rogers (2003) suggests that the consideration of time in the diffusion of innovation theory is a major strength of the theory in comparison to other behavioral science research that ignores timing. The relative earliness or lateness of an adopter's decision to adopt an innovation and the innovation acceptance rate in a system (the number of members of the organization that adopt the innovation) is influenced by the communication channels as well as by other factors (Rogers, 2003).

Social System - Rogers (2003) defines a social system as "a set of interrelated units that are engaged in joint problem solving to accomplish a common goal" (p. 23). The social system is important to the diffusion process because of the characteristics of the structure and individuals in that system. The role of leaders, cultural norms, the types of innovation-decision process, change agents and the consequences of the innovation (these are the changes that take place in a social system due to the adoption or rejection of an innovation) affect diffusion within

the social system (Roger, 2003). The potential adopters of an innovation are units within a social system. Leaders in a social system that is structured formally or informally play a role as Policy Makers and sometimes, change agents. Most times they support external change agents to accomplish the diffusion of the innovation into their social system.

Cultural norms should be understood prior to the introduction of any innovation. The cultural norms of a social system can become barriers to innovation diffusion (Rogers, 2003). An example of a cultural norm is the use of textbooks by instructor as an instruction preparation tool. Integrating the Internet into the classroom for the purposes of supplemental instructional material might be resisted because of its potential to introduce a diversion from that social system's norm (Ureigbo, Oroke & Eruyota, 2007). *Change agents* are tasked with the role of providing information about the innovation, including the benefits and the consequences. The change agent is usually heterophilious from the units of the social system and should employ the aid of an opinion leader (such as a Policy Maker) who is homophilious to the social system (Rogers, 2003). The opinion leader will bridge the gap between the change agent and the units of the social system and increase the credibility of the change agent.

Rogers' (1995) recognizes the components of an environment (social system) that experience change but focuses on heavily the innovation and how the innovation's perceived characteristics can affect the rate of adoption. Practical studies were conducted as the years passed and with each study came the question of innovation's failure to be institutionalized especially in educational settings (Creamer & Creamer, 1988; Fullan, 1994; Levine, 1980 & Linquist, 1978). Fullan (1994) posited that the implementation process needed to be examined thoroughly to understand why educational technology innovations were not institutionalized. Ely theorized eight conditions of implementation in 1976, making the conditions of

implementation the first change theory to recognize the environmental factors such as factors that are related to how the potential adopter interacted with the idea prior to the introduction of the innovation (Ellsworth, 2000). Ely (1972, 1990) applied Rogers' Diffusion of Innovation theory to the adoption and institutionalization of instructional technologies and found eight conditions that are necessary for the successful implementation of an instructional technology innovation.

The conditions for implementation recognize that "Change is a process and not an event" (Hall, 1979, p. 1) and since it involves human interaction, it requires the presence of various conditions for the successful transition of change from diffusion to institutionalization. Ely (1990, 1999) validated the eight conditions of implementation by applying them to practical situations. Ely (1999) suggests that once an educational innovation satisfies the eight conditions for diffusion and implementation of an innovation listed below, it will be successfully adopted.

1. Dissatisfaction with the status quo – The use of current processes that are ineffective and inefficient is what stems the feeling of dissatisfaction with the status quo. This feeling is important to the adoption of an innovation. Change agents that do not perceive potential adopters need for change is tasked with informing them about the relative advantage of the intended innovation. Measuring the levels of dissatisfaction is helpful in communicating the innovation's compatibility to the potential adopter (Ellsworth, 2000).
2. Sufficient Knowledge and Skills – Adopters who will implement an innovation must possess the knowledge and skills to do the job (Ely, 1990). The adopters' perception of the innovation and its complexity are evident in this condition. Self efficacy and competency issues should be addressed (Ensminger, Surry, Porter & Wright, 2004).

Training and support are essential to gaining knowledge and skill needed to use an innovation.

3. Adequate Time – The potential adopter's willingness to devote time to an innovation is important in the successful integration and institutionalization of the innovation. Reward and support offered by change agents or policy makers can influence the potential adopter's attitude towards devoting time to an innovation. Ely (1990) suggests that the confirmation of an innovation is not the end of the innovation decision phase (similar to Rogers' suggestion); additional time should be factored into adapting the abilities to use an innovation.
4. Adequate Resources – Ely (1990a, 1999) refers to resources as equipment, finances, personnel and technological support. Missing these components will result in a failed implementation of an innovation. The relative advantage attribute highlighted by Rogers is evident in this condition. An innovation that is worse than the preceding idea, process, or technology will be rejected by adopters (Ensminger et al., 2004). Adequate resources is one of the most important (in some studies, the most important) condition that needs to be present for successful implementation and institutionalization of an innovation (Ensminger et al., 2004; Hall & Hord, 1987; Hall & Loucks, 1975; Surry & Ely, 2002; Surry & Ensminger, 2002).
5. Rewards and Incentives – Rewards differ from one adopter to another (Ely, 1999; Rogers, 2003). Intrinsic and extrinsic motivation is essential to an implementation process. They add value to the adopter's perception of the implementation process and might influence how the adopter sees the innovation in terms of its relative advantage.

6. Participation – This process involves the inclusion of adopters as decision makers in the implementation process. This can ensure better communication about the innovation, and the adopters can develop a sense of ownership to the innovation decision process (Ensminger et al., 2004).
7. Commitment – The support and encouragement of the change agents and decision makers are essential for the commitment of adopters to an innovation. Literature supports Ely's claim; a study conducted by Dhanarajan (2001) showed that university administrators' lack of commitment to implementation has resulted in failed institutionalization of the innovation.
8. Leadership – Change agents and policy makers' endorsement of the innovation is important to adopters. The affective support provided by leaders by means of encouragement and endorsement of the innovation influences the motivation (Ensminger et al., 2004) of potential adopters of the innovation and the institutionalization of the innovation.

The eight conditions of implementation address the professional and personal concerns that arise during the introduction of an innovation (Surry & Ely, 2002). Surry and Ensminger (2002) suggest that the conditions are interrelated and the absence of one can undermine the others. However, it is important to note that adopter's needs differ from person to person. Ensminger, Surry, Porter, & Wright (2004) and Hajad Mohammed-Nor (2004) indicate adequate resources such as training and support as one of the most important factors to successful implementation of an innovation. Varden (2002) showed that dissatisfaction with the status quo was one of the most prevalent conditions mentioned by the participants of his study. Assessing

the personal and professional concerns of potential adopters can reduce uncertainties that arise during the innovation adoption process.

Concerns Based Adoption Model

The Concerns Based Adoption Model (CBAM) has been widely used in innovation diffusion research. Concerns Based Adoption Model was developed at the Research and Development Center for Teacher Education at the University of Texas at Austin. The Concerns Based Adoption Model is a framework that provides tools for assessing progress during the innovation diffusion and adoption process (Zepeda, 2008, p. 42). The CBAM considers the innovation adoption process from the perspective of the adopters that are responsible for implementing the innovation (Heck, Stiegelbauer, Hall & Loucks, 1981). The model also highlights the concerns of the adopter and believes that their concerns can shape the way they respond to an innovation. The implementation of any new educational policy such as changes in school culture, technological changes or personnel changes will be met with resistance.

Change agents and policy makers acknowledge human resistance as a major barrier to change; however, acknowledgment is only the first step to overcoming the barriers, understanding and addressing the different causes of resistance is also important. Personal and perceptual factors are some of the causes of resistance that have been noted by change theories (Rogers, 2003). The personal side of change includes understanding the feelings and perceptions that individuals hold toward the innovation. Examples of personal and perceptual factors include cultural, political, interpersonal and intrapersonal affairs.

The Concerns Based Adoption Model identifies three areas that professional development designers and facilitators can use to assess the concerns of potential adopters. Stages of Concern, Levels of Use, and Innovation Configuration; these three areas are diagnostic

dimensions for conceptualizing and measuring change in innovation adopters (Anderson, 1997). However, the CBAM highlights the Stages of Concern framework as a good way to quantitatively identify and examine the concerns that a potential adopter has towards an innovation.

Stages of Concern. There have been various models and frameworks designed to measure and assess the personal concerns of an individual during the initial introduction of an innovation. Hord, Rutherford, Huling-Austin, and Hall (1987) constructed the Stages of Concern framework that helps change agents, policy makers and change facilitators measure and address the personal concerns of individuals and their belief systems towards the introduction of new innovations. This framework acknowledges the personal nature of change that is often overlooked in the literature about innovation diffusion process and the institutionalization of innovations. This framework can help policy makers and change agents that need to tackle low adoption and implementation of innovations understand the perspectives of their potential adopters.

Understanding the concerns of a potential adopter can reduce the uncertainties that arise during the innovation adoption process (Donovan, Hartley, Strudler, 2007). The Stages of Concern (SoC) is a smaller framework under CBAM that measures the personal aspect of change. SoC highlights the perceptions that an adopter has towards an innovation and the adopter's motivation to implement the innovation based on their perceptions. Hall et al., (1979) suggest three ways of measuring the Stages of Concern, One legged interviews, open ended statements and the Stages of Concern questionnaire. The SoC questionnaire is widely used in educational settings because it is easier to administer and it has been rigorously tested for reliability and consistency (Hall & Hord, 2001). Hall and Hord (2001) suggests that "using the

SoC assessment techniques can result in highly effective coaching sessions, relevant workshops that consider the personal side of change” (p. 57). More studies need to focus on the application of the Stages of Concern framework and its usefulness in the design and delivery of professional development activities during the innovation diffusion process to address low rates of adoption and implementation of innovations.

The Stages of Concern framework was built on research previously conducted by Frances Fuller. Fuller (1969) linked concerns to the change process during her research about student teachers concerns and its relationship to the content of their courses and their field experiences. Fuller (1969) found four levels of concerns: unrelated concerns, self concerns, task concerns and impact concerns; she found that the student teachers concerns were not matched to the content of their courses or their experiences. The concerns were most likely the concerns of the professor, thereby leaving the students unprepared for their teaching tasks. Fuller’s research was found to be related to individuals experiencing change in an educational setting (Hall & Hord, 2001). The change facilitator normally introduces change based on their (the change facilitator) concerns and because the experiences of the change facilitator differ from the potential adopter, a gap is created that often results in the rejection of an innovation (Rogers” 2003). Hall and Hord (2001) suggest that professional development facilitators need to align the professional development activities with the concerns of those directly engaged in change.

George & Rutherford (1979) constructed seven categories that are used to measure a potential adopter’s concerns towards an innovation:

1. Self Concerns:

0. Awareness-At this stage, the potential adopter has little to no interest in the innovation.

1. Informational-Information about the innovation is available and individuals begin to understand the organizational implications of the innovation and its implementation.
2. Personal-The potential adopter starts to consider the personal implications of the innovation, questions about the ways they can implement the innovation to the personal costs of this change need to be addressed.
2. Task Concerns
 3. Management-The adopter begins to experiment with the innovation via training, or a trial process. Questions about available support and resources need to be addressed.
3. Impact Concerns
 4. Consequence-Concerns are centered around the impact of the innovation on the adopter's sphere of influence, for example their students.
 5. Collaboration-Adopters interest in working with others adopters in the social system.
 6. Refocusing-This is an important stage; change facilitators can introduce additional professional development to foster continuous use of the adoption. Rogers" (2003) suggests that additional support is needed for institutionalization of an innovation. This makes the introduction of an upgrade to the innovation or an alternative easier.

The Stages of Concern can be assessed prior to, during and after the introduction of an innovation. Professional development designers and facilitators can administer the SoC assessment prior to the professional development activity; they can use the results to effectively

design the professional development activity. The change facilitators can also use the SoC after introducing an intervention to examine the success of the intervention.

Transitioning from Traditional Mode of Teaching

The idea of change elicits multiple responses from human beings. Feelings of uncertainty and various stages of concern have to be addressed for change to be accepted or even considered (Hall & Hord, 2006). A change agent is faced with the task of convincing their potential adopters that the intended innovation has a relative advantage to their cultural norms. Once a perception has been formed about an innovation, it is difficult to change that perception. The best way to address these perceptions, concerns and uncertainties is by providing information to the potential adopter (Hall & Hord, 2001; Jacobsen, 1998; Rogers, 1995). The information should include advantages of the new innovation, ways to use the innovation and support for operational problems that may arise with use of innovation. These three areas can be addressed with initial and ongoing development activities, such as workshops, training sessions, and seminars.

Instituting technology into the classroom requires a shift in style of teaching. Most instructors are unprepared to integrate technology into their classrooms (Guenther, 2002). The willingness of instructors to adopt a new pedagogical approach especially relating to technology as a teaching resource is essential for successful implementation (Kosak et al., 2004). Thach (1995) suggests an intervention such as training to help prepare the apprehensive and willing instructor to make the pedagogical adjustment. The training and development sessions should not be restricted to the acquisition of technical knowledge. This is regularly neglected during training sessions and studies have found it to be one of the leading causes of technology de-

institutionalization in an instructor's classroom (Lee, 2001). Training should incorporate the essential instructional skills needed to teach with technology.

Faculty development is important to ensure that instructors have acquired the skills to transition into teaching with technology and have a better perception of the technology that is implemented. Formal training should be the initial step taken when an innovation such as technology is introduced to an instructor (Rakes & Casey, 2002). The formal training influences their perception about the technology, especially if they have had no prior experience with it. The informal training is one that continues as instructors seek out information for themselves, through continuous attendance of workshops and seminars. Lorenzetti's (2002) study on instructors need for pedagogical support while teaching with technology, suggests that informal training and assistance provided by support centers are important for continuous use of technologies in their classrooms.

Implementing the right intervention for innovation adoption is important especially in the case of late adopters such as instructors in Nigerian and Sub-Saharan Africa tertiary education institutions. Focus needs to be redirected to human resources during technology adoption. The rush to bridge the technological divide has caused decision makers in universities to neglect adopters' concerns and needs (Ololube, 2006). The Concerns Based Adoption Model (CBAM) provides excellent implications for interventions during and after the diffusion of innovation(s). Concerns Based Adoption Model plays an active role in evaluating the impact of an intervention such as professional development, as Zepeda (2008) suggests "With the end in mind, evaluating the impact of professional development must be at the forefront of planning efforts" (p. 31). The Concerns Based Adoption Model helps a change facilitator understand change and administer effective support during the change process. The Stages of Concerns framework addresses the

concerns that a potential adopter might have before, during and after the change process, understanding these concerns are essential in reducing the barriers experienced during the introduction of an innovation.

Summary of the Related Literature

The adopters of the innovation are Nigerian tertiary education instructors. The low rate of adoption and implementation of the innovation has been attributed to poor perceptions and concerns towards the technological innovation. Hall and Hord (2001) suggest introducing an intervention to address the issue of low adoption and implementation. An intervention such as training will successfully address the rate of low adoption and implementation when the perceptions and concerns of the adopter are addressed during the intervention. A change agent and change facilitator has to understand the innovation and how it fits into a social system (Ely, 1990; Rogers, 1995), and the potential adopters' concerns (Hord, Rutherford, Huling-Austin, and Hall, 1987) to create an intervention that will address the low rates of innovation adoption and implementation. However, this assumption has not been empirically tested and reported due to the novelty of the availability of the Internet to Nigerian tertiary education institutions.

Thus, this study is aimed at identifying the concerns that Nigerian tertiary education instructors have towards the technological innovations that have been made available for instructional purposes. The Stages of Concerns questionnaire will be used to quantitatively identify the concerns of instructors.

CHAPTER 3

METHODS

The purpose of this section is to describe the research methods used to complete this study. This section includes a statement of purpose, brief description of the study participants, sample selection, data collection tools, data collection procedures and the data analysis plan.

Statement of Purpose

The purpose of this study was to identify the Stages of Concerns cited by Nigerian tertiary education instructors toward the implementation of information and communication technological innovations such as the Internet and its tools for instructional purposes. The participants of this study provided pertinent information about their levels of use of the Internet for instructional purposes and years of teaching experience. The researcher examined these variables to understand their effect (if any) on, and relationship to a participant's Stage of concern. The Stages of Concerns profiles were measured using the Stages of Concern Questionnaire. These profiles can be used for the planning and design of adequate instruction for professional development activities, which can aid in the successful diffusion and institutionalization of the innovation (Hall & Hord, 2001; Kozma, 1979). The following research questions will guide the study:

1. What are Nigerian tertiary education instructors' concerns toward the use of the Internet and its tools for instructional purposes as measured by the Stages of Concern Questionnaire?

2. a. Is there a relationship between the Stages of Concern profiles and the levels of Internet use?
- b. Do instructors with varied levels of Internet use vary in their Stages of Concern?
3. a. Is there a relationship between the Stages of Concerns profiles and the years of teaching experience?
- b. Do instructors with varied years of teaching experience vary in their Stages of Concern?
4. Is there an interaction effect between the levels of Internet use and years of teaching experience, and the Stages of Concerns of an instructor?

Research Design

Descriptive statistics was used to analyze the Stages of Concern profiles and determine the predominant or high intensity stages, as well as the low intensity stages. Correlation analysis was conducted to determine a relationship between the instructors Stages of Concern and their levels of Internet use. Correlation analysis assesses the degree to which variables are linearly related in a sample. Correlation analysis does not predict cause and effect; this analysis is used to seek out a linear relationship (if any) between variables. Analysis of Variance (ANOVA) was used to determine SoC differences between the groups of within the independent variables.

The study used multiple linear regression analysis to determine an interaction effect between an instructor's level of Internet use and years of teaching experience, and an instructor's Stage of concern. Multiple linear regression analysis possesses better statistical predictive power over correlation analysis. Multiple linear regression analysis indicates the degree to which a predictor is correlated with a criterion. The multiple linear regression analysis examines the

validity of each predictor variable, the interaction effect of one variable over the other and the significant interaction effect of both independent variables combined.

Research Questions	Data Type	Collection Tool	Procedure
1. What are Nigerian tertiary education instructors' concerns towards the use of the Internet and its tools for instructional purposes, as measured by the Stages of Concerns Questionnaire (SoCQ)?	Quantitative	SoCQ	SoCQ Manual
2. a. Is there a relationship between the instructors Stages of Concern and the levels of Internet use? b. Do instructors with varied levels of Internet use vary in their Stages of Concern?	Quantitative	SoCQ	Correlation Analysis ANOVA
3. a. Is there a relationship between the instructors Stages of Concerns and the years of teaching experience? b. Do instructors with varied years of teaching experience vary in their Stages of Concern?	Quantitative	Demographics Data SoCQ	Correlation Analysis ANOVA
4. Is there an interaction effect between the levels of Internet use and years of teaching experience, and the Stages of Concerns of an instructor?	Quantitative	Demographics Data SoCQ	Multiple Linear Regression

Figure 4. Primary Research Method

Definitions of the Variables

The following variables were identified based on the research objectives:

Independent/Predictor Variable: Level of Internet use and years of teaching experience

Dependent/Criterion Variable: The instructors' Stages of Concern profiles.

Participants. The population for this study was full time instructors at Nigerian tertiary education institutions. Instructors occupy the ranks of Assistant Lecturers, Lecturers I and II, Senior Lecturers, Associate Professors, and Professors. The institutions are accredited by the Nigerian Universities Commission (NUC).

Sampling. A sample is a group selected from a population to participate in a study. The samples selected for this study were Instructors that held the ranks of Lecturers I and II, Senior Lecturers, Associate Professors and Professors. The Assistant lecturers were not solicited for response because the researcher wanted to seek input from individuals with terminal degrees (obtained or in view) in their fields. Participation in the study was voluntary; the study involved the completion of an online questionnaire by participants, thus convenience sampling based on the availability of potential respondents email addresses was the method of sampling for this study.

The questionnaire was administered to 201 Nigerian tertiary education instructors. The minimum sample size for a Correlational study is considered to be 30 (Fraenkel & Wallen, 2003). In order to gain a more accurate representation, the researcher determined an adequate sample size using G*Power (Faul, Erdfelder, Buchner & Lang, 2009). The G*Power computes appropriate sample sizes for a research study to maximize a researcher's success in analyzing the data collected. The G*Power computation using error rate value of $\alpha=.05$, an anticipated effect

size of medium (.30) and the power, .95. Based on these criteria, it was determined that the appropriate sample size should be 110 participants.

Context

The study was conducted using participants from tertiary education institutions in Nigeria. The tertiary education institutions were picked based on an informal assessment of the institutions instructional technology infrastructure, and through personal communication with school administration who expressed urgent need for increased technology adoption and integration by instructors. Diffusion and implementation of innovation usually occur over a long period of time (Rogers, 2003) and the tertiary education institutions wish to address the issue of low technology adoption and implementation in order to introduce other instructional technological innovations that can aid the institutions and the nation in bridging the technology divide that exists.

The researcher's study proposal has been reviewed by each institution's Director of Research or an assigned representative who oversees the implementation and adoption of this innovation. The researcher hopes the results of this study will be influential in increasing the rate of adoption and implementation of the innovation and the design of instruction used in intervention and professional development activities geared towards the diffusion of this innovation.

Data Collection

The Concerns Based Adoption Model (CBAM) was developed in 1974 and has been applied to research concerning educational innovations. The Concerns Based Adoption Model highlights the concerns of an adopter and suggests that the adopter's concerns can shape the way they respond to an innovation. The Concerns Based Adoption Model identifies three dimensions

that professional development designers and facilitators can use to assess the concerns of their students; Stages of Concern, Levels of Use, and Innovation Configuration. These three areas are diagnostic dimensions for conceptualizing and measuring change in innovation adopters (Anderson, 1997). This study will use the Stages of Concern as a dimension to guide data collection.

The Stages of Concern dimension is useful in qualitatively and quantitatively measuring perceptions and attitudes towards an innovation. Hall and Hord (2001) suggest the use of the Stages of Concerns Questionnaire (SoCQ) for the quantitative measurement of concerns. The Stages of Concerns Questionnaire is a thirty-five (35) item questionnaire that was created to apply to all educational innovations. The SoCQ consists of seven subscales of five items that correspond to the 7 stages of concerns as researched by Hall et al. (1974). Each item on the questionnaire is accompanied by an 8-item Likert-type scale from 0 to 7, 0=concern is irrelevant, 1= not true of me now, 3-5=somewhat true of me now, and 6-7=very true of me now.

The Stages of Concerns Questionnaire has a strong reliability and validity; and it is useful for implementation assessment efforts (Hall, 2001). Cronbach's alpha was used to establish reliability with alpha coefficients ranging from .64 to .83 and test-retest sub sample ranging from .65 to .84, this indicated the consistency of each of the seven stages (Hall et al., 1979). The Stages of Concerns Questionnaire has been widely used and tested and it is a rigorous instrument for assessment of implementation efforts (Hall & Hord, 2001). The Stages of Concerns can be assessed prior to, during and after a professional development activity. This study is advocating the use of SoCQ to measure concerns prior to the introduction of a professional development activity; designers and facilitators can use the results to effectively design instruction used in this activity.

Reliability and Validity

The reliability of an instrument is the consistency of the scores that are obtained from that instrument and the extent to which the scores are free of any element of error (Fraenkel & Wallen, 2003). Validity is an important concept to consider when designing or selecting an instrument for a study, it is the extent to which the items on an instrument serve the purposes of the study. Hall et al. (1974) carefully tested the Stages of Concern Questionnaire (SoCQ) reliability; the SoCQ was administered to professors to understand their concerns about instructional modules used in team teaching. The results of the two-week test-retest study with retest correlations ranging from .65 to .86 for the seven stages and the internal validity ranging from .64 to .83 (Hall & George, 1979) showed a strong reliability. Although Hall et al. (1974) were not able to comprehensively test the validity of the SoCQ; Pedron and Evans (1990) have successfully shown its strong validity.

Data Collection Procedures

The instrument was distributed using an online data collection tool called Survey Monkey. Online data collection has become popular due to increased internet access, its speed, ease of use and cost; this makes it more favorable than the paper and telephone surveys (Couper, 2005). Dissertation data collection is governed by the University of Georgia's Institutional Research Board (IRB); "The University of Georgia requires that all research involving human subjects receive review and approval before the research begins" (UGA, 2009, p. 3). For this study:

1. The researcher obtained permission to use the SoCQ from Dr Gene Hall and the Southwest Education Educational Development Laboratory in Austin, Texas.

2. The SoCQ was reproduced using an online survey website in preparation for data collection.
3. A Human Subjects Research Application was submitted and approved by the University of Georgia's IRB. An amendment was filed to accommodate changes to the study based on results from the pilot study.
4. Participants were invited to participate in the study via email. The participants email addresses were furnished by each institution's Office of Institutional Research and Center for Teaching and Learning. A cover letter, directions for completing the questionnaire and the questionnaire were included on the data collection website.
5. A follow up letter was emailed three weeks after initial invitation to encourage participation in the study.

Data Analysis

The study used the Manual for the Use of the SoC Questionnaire (Hall, et al., 1986), and the SPSS program to analyze the data. Quantitative and qualitative analyses to the responses of the Stages of Concern Questionnaire were conducted. The analysis procedure for each research question is presented below.

Research Question 1: What are Nigerian tertiary education instructors' concerns toward the use of the Internet and its tools for instructional purposes as measured by the Stages of Concern Questionnaire?

The Quick Scoring Device (Hall et al., 1986) aided in the compilation of raw data and intensity profiles of the seven Stages of Concern for each participant. The mean raw scores for the entire population determined the composite Stages of Concern Profiles. The Stage Score method of analyses (Hall, et al., 1986, pp. 29-34) was used in data interpretation. High Stage

score is the terminology used to identify an individual or a group's predominant Stage of concern. Second High Stage score is used to identify the Stage following the High Stage. Higher Stages of Concern indicated higher intensity of concerns at each stage, while lower scores indicated less intense concerns.

Research Question 2a: Is there a relationship between the instructors Stages of Concern and the levels of Internet use?

Correlation analysis was conducted to determine a relationship between the instructors Stage of Concern and level of Internet use. Scatter plots were used to provide a visual representation of the correlation (or lack) between the variables.

Research Question 2b: Do instructors with varied levels of Internet use vary in their Stages of Concern?

The instructors were categorized into three levels of Internet use according to their identification of use. Analysis of Variance was used to determine if there is a difference between the Stages of Concern profiles of instructors in different levels of Internet use. Bar Charts were used as a graphical representation of the Stages of Concerns of the three categories of Internet use.

Research Question 3a: Is there a relationship between the instructors Stages of Concern and years of teaching experience?

Similar to research question two, a correlation analysis was conducted to determine a relationship between the instructors Stage of Concern and level of Internet use. Scatter plots were used to provide a visual representation of the correlation (or lack) between the variables.

Research Question 3b: Do instructors with varied years of teaching experience vary in their Stages of Concern?

The instructors were categorized into three groups of teaching experience according to their input in the questionnaire. Analysis of Variance (ANOVA) was used to determine if there is a difference between the Stages of Concern profiles of instructors in different categories of teaching experience. Bar Charts were used as a graphical representation of the Stages of Concerns of the three categories of years of teaching experience.

Research Question 4: Is there an interaction effect between the levels of Internet use and years of teaching experience, and the Stages of Concerns of an instructor??

Multiple linear regression analysis is a technique that can be used to determine a interaction effect between a criterion variable and two or more predictor variables (Fraenkel & Wallen, 2003); multiple linear regression technique was used to determine an interaction effect between both predictors (level of Internet use and years of teaching experience) and the criterion variable (instructor's Stage of Concern).

Level of Use Questions and Optional Comments. The SoCQ also includes supplemental questions that allow a respondent to enter information about their level of innovation use and years of experience using the innovation. The researcher provided a comments section to allow participants include comments about the adoption of the innovation. The comments supported the respondents Stages of Concern profiles, by adding reasoning behind the profiles; the comments provided richer data than those collected from the questionnaire alone. The comments were analyzed and categorized into recurring themes.

The Pilot Study

A pilot study was conducted to formatively evaluate the data collection tools and research design strategies for this study. The Pilot Study data shown in Table 1 informed the research questions listed below.

1. What are the Stages of Concerns of faculty members involved in the implementation of a new classroom technology?
2. Is the Stages of Concerns Questionnaire appropriate for the collection of data?

A descriptive data analysis is provided below to fully inform research question 1. Hall et al. (1979) approve of findings based on raw scores and relative mean scores (descriptive statistics). Table 1 contains the raw scores collected from the pilot study data collection process.

Table 1

Pre and Post Questionnaire Analysis

Descriptive Statistics for Pre-Test			Descriptive Statistics for Post-Test		
Stages of Concern	Raw Score	Mean	Stages of Concern	Raw Score	Mean
0-Awareness	26	5.2	0-Awareness	39	7.8
1-Informational	28	5.6	1-Informational	43	8.6
2-Personal	33	6.6	2-Personal	43	8.6
3-Management	35	7	3-Management	46	9.2
4-Consequence	50	10	4-Consequence	60	12
5-Collaboration	50	10	5-Collaboration	59	11.8
6-Refocusing	37	7.4	6-Refocusing	52	10.4

Research Question #1- What are the Stages of Concerns of faculty members involved in the implementation of a new classroom technology?

The concerns were identified using the Stages of Concerns Questionnaire (SoCQ). The responses on the SoCQ were analyzed to identify the concerns held by faculty participants of the

intervention. The responses of each individual was separated by stages and summed to represent a raw score for each stage.

Analysis- The analysis of the respondents' profiles revealed the concerns that were held pre intervention and post intervention. Hall and colleagues (1979) suggest interpreting the scores based on the higher and lower levels shown by the raw scores or percentiles. The high intensity stages suggest respondents' strongest concerns while the lower intensity stages show lowest concerns.

The respondents showed a higher concern with Management (Stage 3), Refocusing (Stage 6), Collaboration (Stage 5) and Consequence (Stage 4). The highest stage of concern is Stage 4. These are the stages that reflect an adopters concerns about the impact of the innovation on the end users of the innovation, therefore, the respondents are concerned about the innovation's impact on their students and others in their sphere of influence (Hall & Hord, 2001). The pre and post test mean show similar concerns meaning the intervention might not have attended to those concerns. This is an indication of the importance of measuring the pre intervention concerns of adopters prior to designing an intervention.

Feedback from Center for Teaching and Learning Administrators

The facilitator of the workshop and other members of the university's Center for Teaching and Learning (CTL) assessed the instrument for appropriateness and provided the following feedback:

1. Questionnaire is at appropriate length for faculty members.
2. Pre and post questionnaire requests are difficult to administer because faculty members are approached with various completion and satisfaction surveys during interventions of this nature (Hall & Hord, 2001).

3. Faculty view workshops as a waste of time because they feel the workshops are meant to “fulfill all righteousness”. Their concerns are not taken into consideration, some workshops might contain redundant material and others are extremely complicated.

Implications for this study

The pilot study was essential in highlighting issues with the research design and potential issues that would hinder the success of the final dissertation study. The pilot study showed a concern expressed by Hall and Hord (2001) about faculty apprehension towards questionnaires especially when they are administered at multiple times in a short period. The data analysis revealed re-occurring faculty concerns that surfaced pre and post intervention. The pilot study shows highlighted the importance of identifying faculty members concerns prior to designing an intervention during the innovation adoption process. Identifying the concerns prior to an intervention will be helpful to administrators when selecting the kinds of professional development activity that will address the concerns related to the implementation of an innovation. This might result in a change in concerns from the pre test to post test.

Study Timeline

Date	Activity	Persons Responsible
October-November, 2009	Complete Pilot Study Analysis	Co-PI
January 14 th 2010	Prospectus Meeting	Co-PI
April 2010-June 2010	Data Collection- Distribute Questionnaire	Co-PI
June 2010-August 2010	Data Analysis and Write up	Co-PI
August-September 2010	Revisions	PI and Co-PI
October 2010	Present Final Study	Co-PI

CHAPTER 4

RESULTS

Overview

This research study identified the Stages of Concerns cited by Nigerian tertiary education instructors toward the implementation of information and communication technologies (ICT) such as the Internet and its tools, for instructional purposes. The participants of this study provided pertinent information about their levels of use of the Internet for instructional purposes and years of teaching experience. The researcher examined a possible relationship and interaction effect of both variables to an instructor's Stages of Concern.

Questionnaires were administered to a sample of Nigerian tertiary education instructors to identify their concerns about the implementation of ICT innovations in their respective tertiary education institutions; the results of the questionnaires are analyzed in this chapter. Data entry for questionnaire results was supported by Microsoft Excel. The Statistics Package for the Social Sciences (SPSS) program (V.18) was used for quantitative data analysis. Quantitative and qualitative analyses of the questionnaire responses are presented to aid in the interpretation of results. The research questions for this study are:

1. What are Nigerian tertiary education instructors' concerns toward the use of the Internet and its tools for instructional purposes as measured by the Stages of Concern Questionnaire?
2. a. Is there a relationship between the Stages of Concern profiles and the levels of Internet use?

- b. Do instructors with varied levels of Internet use vary in their Stages of Concern?
- 3.
 - a. Is there a relationship between the Stages of Concerns profiles and the years of teaching experience?
 - b. Do instructors with varied years of teaching experience vary in their Stages of Concern?
- 4. Is there an interaction effect between the levels of Internet use and years of teaching experience, and the Stages of Concerns of an instructor?

Questionnaire Respondents

Data was retrieved from questionnaires administered to instructors in five Nigerian tertiary education institutions. The Stages of Concern Questionnaire (SoCQ) and demographic questions were administered to potential participants via an online data collection medium and distributed to participants via electronic mail (email). A total of 157 questionnaires were returned for a response rate of 79 %. Out of 157 returned questionnaires, 121 were usable. Missing information such as respondent rank and years of experience rendered multiple questionnaires unusable. Table 2 below shows the number of questionnaires returned by groups.

Table 2

Questionnaire Response Count

Respondents	Number
Potential Respondents	201
Actual Respondents	157
Usable Questionnaires	121
Groups	
Professors	41
Senior Lecturers	24
Lecturers I and II	56
Questionnaires (Not Usable)	36

Data Analysis (Research Questions 1-4)

The instructors' Stages of Concern profiles are used in the data analysis of the study.

Stages of Concerns are the concerns that a potential adopter possesses about the implementation and institutionalization of an innovation. Hall, George, and Rutherford (1986) categorized the seven Stages of Concerns into four levels of concerns for easier interpretation:

1. Self-Concerns

- 0. Awareness-At this stage, the potential adopter has little to no interest in the innovation.
- 1. Informational-Information about the innovation is available and individuals begin to understand the organizational implications of the innovation and its implementation.
- 2. Personal-The potential adopter starts to consider the personal implications of the innovation, questions about the ways they can implement the innovation to the personal costs of this change need to be addressed.

2. Task Concerns

- 3. Management-The adopter begins to experiment with the innovation via training, or a trial process. Questions about available support and resources need to be addressed.

3. Impact Concerns

- 4. Consequence-Concerns are centered around the impact of the innovation on the adopter's sphere of influence, for example their students.
- 5. Collaboration-Adopters interest in working with others adopters in the social system.

6. Refocusing-This is an important stage; change facilitators can introduce additional professional development to foster continuous use of the adoption. Rogers" (2003) suggests that additional support is needed for institutionalization of an innovation. This makes the introduction of an upgrade to the innovation or an alternative easier.

The Stages of Concern Questionnaire consisted of 35 statements expressing a concern toward the innovation. The statements were accompanied by a likert-type scale of responses from 0 to 7. A response of 0 indicated little or no concern toward the statement and a response of 7 indicated a very high concern. The aggregate scores showed Stages with peak intensity and Stages with low intensity. The highest peak stages are called High Stages or high intensity stages and the second highest peak stages are called Second High Stages.

Research Question 1. What are Nigerian tertiary education instructors" concerns toward the use of the Internet and its tools for instructional purposes, as measured by the Stages of Concern Questionnaire (SoCQ)?

A total of 121 responses were analyzed to address this question. The Stages of Concern profiles of all respondents were determined based on their responses to the Stages of Concern Questionnaire. A raw score of each individual"s responses for each stage was calculated, amounting to the sum of responses of the five statements of that stage. The mean scores were calculated for each Stage of Concern for all respondents. Hall et al. (1979) provided a guideline for the interpretation of Stages of Concern profiles; this guideline is used in the interpretation of results for this study.

The instructors" composite responses showed that Impact concerns (Stage 5 and Stage 4) are the High and Second High Stages of concern as shown in Figure 5 below. The Stage 1 (Self-

concern) was also a relatively high intensity concern for respondents. High and Second High Stages of concern indicate more intense concerns at that stage and lower scores indicate less intense concerns. The instructors are concerned with the impact of the innovation on their current delivery of instruction and the impact on their students' learning experience. High concerns in Stage 4 and Stage 5 also show that adopters are interested in collaborating with their colleagues to implement the innovation. High concerns in Stage 1 reveal an adopter's need to receive more information about the innovation. Adopters with high intensity concerns in Stage 1 should also be informed about the personal implications of the innovation (Atkins & Vasu, 2000).

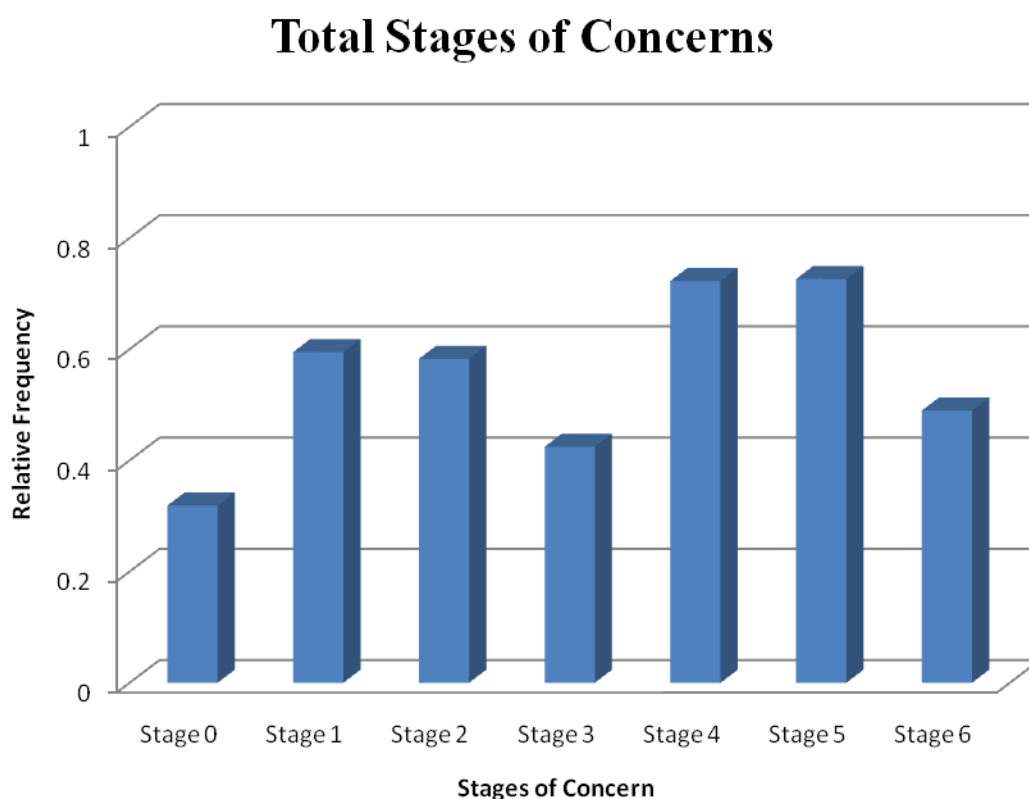


Figure 5. Stages of Concern Profile for Total Instructors (N=121)

Stage 2 (Personal) closely follows Stage 1 (Informational) as a notable concern validating the need to inform potential adopters about the implications of the innovation. Stage 6 (Refocusing) might be lower because of the novelty of this innovation to the adopters; the Internet and its tools are still been diffused in Nigerian tertiary education institutions. Stage 6 (Refocusing) could become a higher concern once the instructors have lower Self concerns and a better understanding and experience using the innovation. The participants showed lower Stage 3 (Management) concerns; this stage focuses on an adopter's ability to experiment with the innovation during training. Stage 3 concerns also indicate a concern about the logistics and management of the innovation. This is supported by comments from respondents about the lack of training efforts in their various institutions. Lastly, Stage 0 (Awareness) is the lowest stage of concern among the instructors. This is a positive indicator of willingness to accept the innovation during the adoption and implementation process. Stage 0 usually indicates that adopters have little to no interest in the innovation; it should be noted that the respondents who had these concerns were individuals with limited exposure to the innovation.

Research Question 2a. Is there a relationship between the instructors' Stages of Concern and the levels of Internet use?

Correlation analysis was conducted to determine if there is a relationship between the instructors Stages of Concern and their levels of Internet use. The data shows a correlation of +1, this indicates that an instructor's Stage of concern is related to the instructor's level of Internet usage. The correlation coefficient shows a medium correlation at .36. We can conclude from the correlation that 13% of variance (0.359^2) of the Stage of Concern variable is accounted for by its linear relationship with the level of Internet usage as shown in figure 6 below. The

correlation coefficient is significant, $r(119) = .36, p < .001$, meaning that there is a strong positive correlation between an instructor's Stage of Concern and the levels of Internet use.

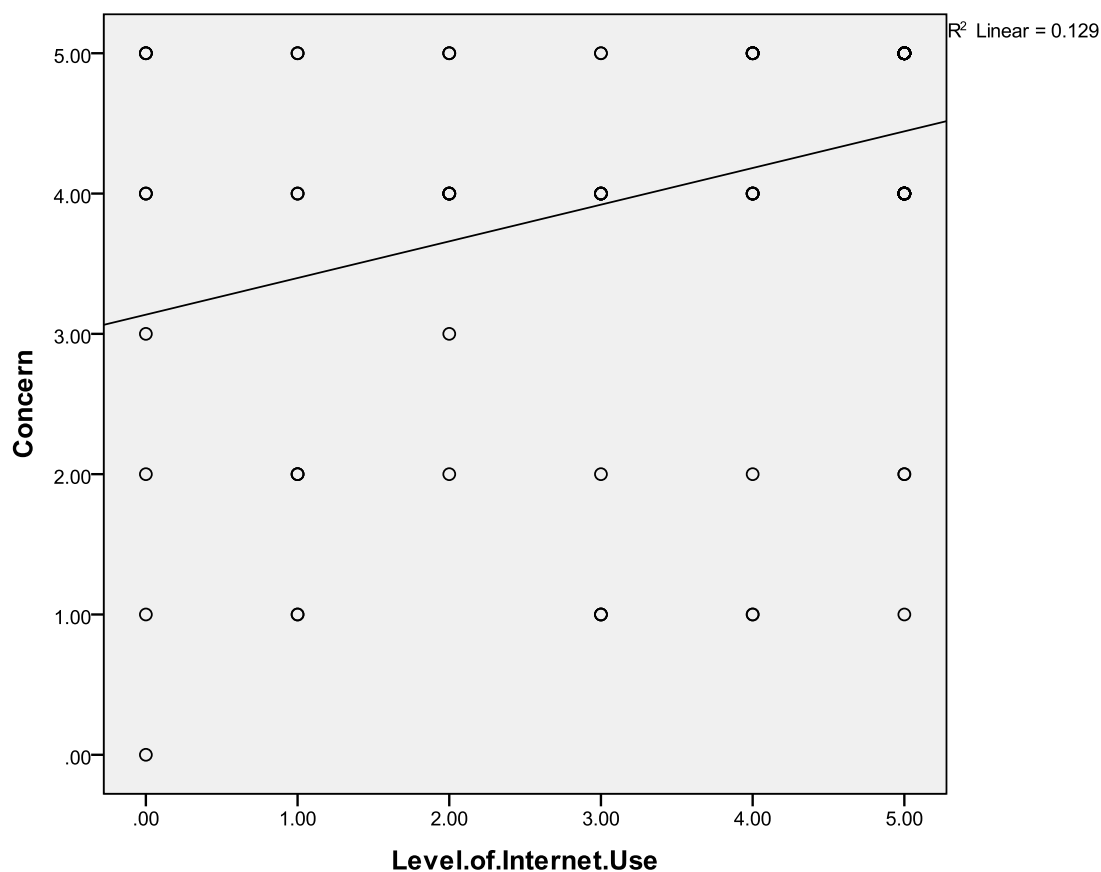


Figure 6. Scatter plot showing relationship between Stage of concern and Level of Internet use

Research Question 2b: Do instructors with varied levels of Internet use vary in their Stages of Concern?

The Stages of Concern Questionnaire requires respondents to identify as non-users (never), new users (one to four years), or seasoned users (five years or more) of the innovation. A total of 13 instructors identified as non-users, 50 instructors were new users and 58 users were seasoned users as shown in table 3 below.

Table 3

Instructor level of Internet use

Sub Group (by Year of usage)	Number
Never (Non-User)	13
1-4 (New User)	50
5 and more (Seasoned User)	58
Total	121

First, an analysis of variance (ANOVA) was conducted to examine the possibility of a statistically significant difference between the Stages of Concerns profiles of the three groups of Internet use. The results showed that there is a difference between the Stages of Concern profiles between the three groups, ($M=4.25$, $SD=2.36$), $F(2, 607)=10.581$, $p<.05$.

A closer examination of the different groups provided further explanation of the differences in concerns between the groups of Internet use as highlighted by the ANOVA test. Figure 7, Figure 8 and Figure 9 show a visual representation of the Stages of Concern profiles of each group of Internet users.

SoC Internet Experience (Non user)

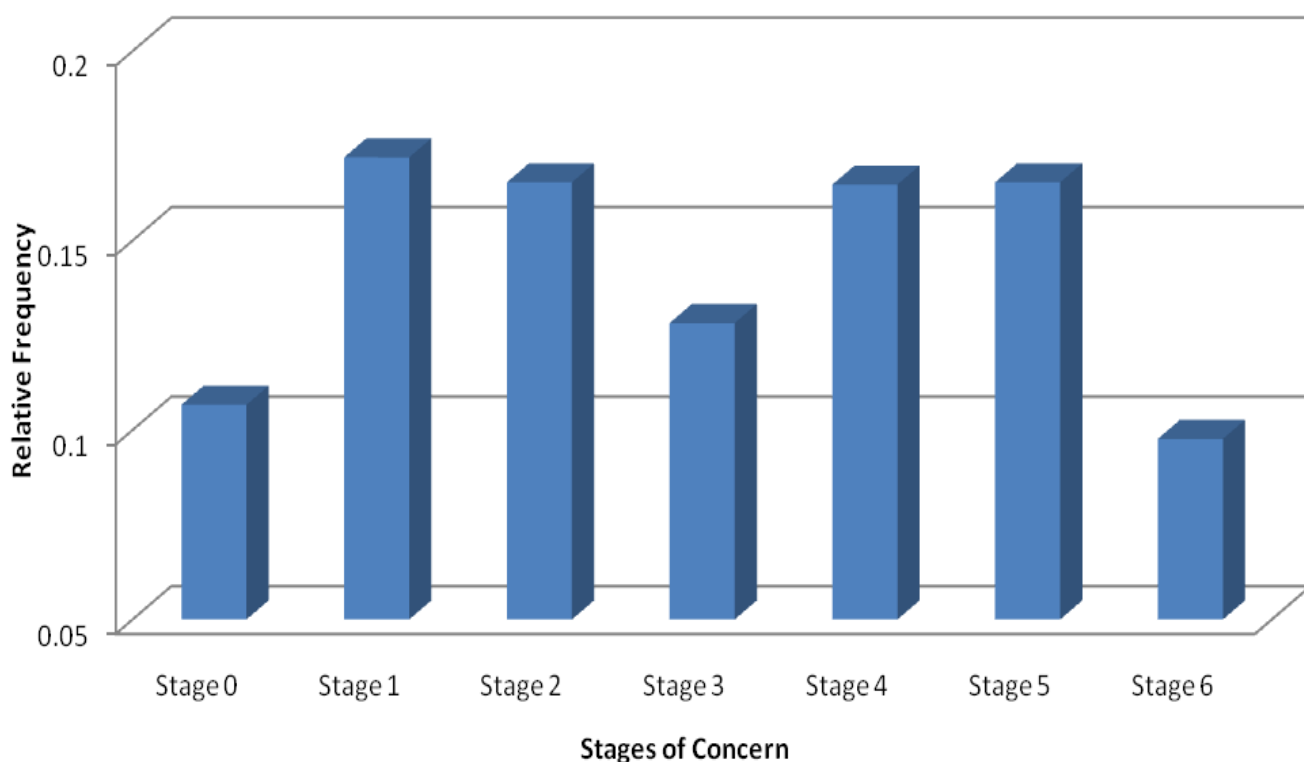


Figure 7. Stages of Concern (SoC) profiles of Users with No Experience using the Internet.

The High Stage score for users who indicated that they have never used the Internet for instructional purposes is Stage 1 (Informational). A High Stage 1 concern shows the potential adopter's need to receive more information about the innovation. Stage 2 (Personal), Stage 4 (Consequence) and Stage 5 (Collaboration) are of equal concerns to this group. An adopter with relatively high Self and Impact concerns question the innovation and implementation process on a personal level. A non-user is likely to question an innovation's role in their daily routine and the implications of implementing the innovation. This group also has higher Stage 0 concerns and lower Stage 6 concerns meaning a lack of interest in the innovation and a need to investigate the use of other instructional tools; this is expected for a group of non-users. Although, a low

Stage 6 and a higher Stage 0 indicate the possibility of resistance to the innovation (Hall et. al., 1986), this can be remedied once Stage 1 concerns are addressed.

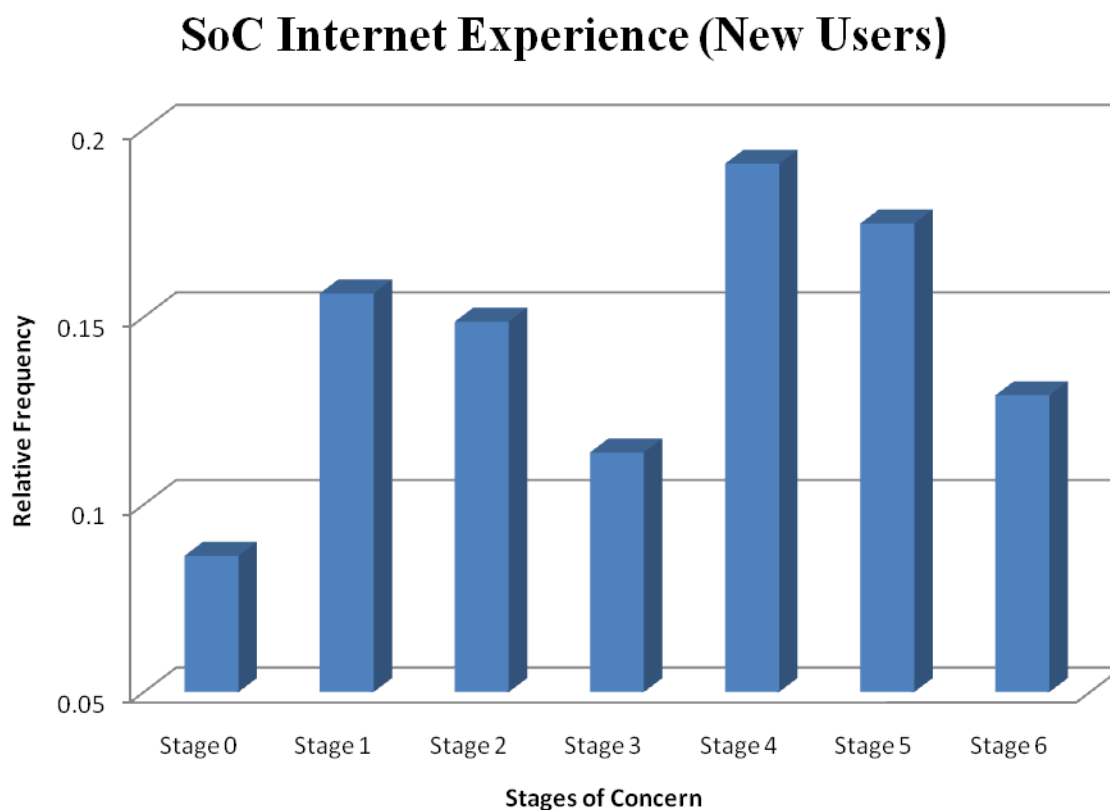


Figure 8. Stages of Concern (SoC) profiles of Users with 1-4 years experience using the Internet.

New users in the study indicated that they have used the innovation for a period of 1 to 4 years. Their concerns differ from those of a non-user. The new users have Stage 4 (Consequences) concerns toward the innovation and Stage 5 (Collaboration) concerns. New users are adapting to the innovation and they have a tendency to want to learn from seasoned users. It is not uncommon to see new users who seek information (Stage 1) about the innovation, as they might still be experimenting with the innovation. The Stage 6 concerns are relatively lower than Stage 1 and accompanied with a low Stage 0; this group is interested in understanding the consequences of the innovation and the collaboration efforts available during innovation use.

Change administrators in these institutions should note the relatively high Stage 1 concern as a sign that the one to four year group needs more information about the innovation.

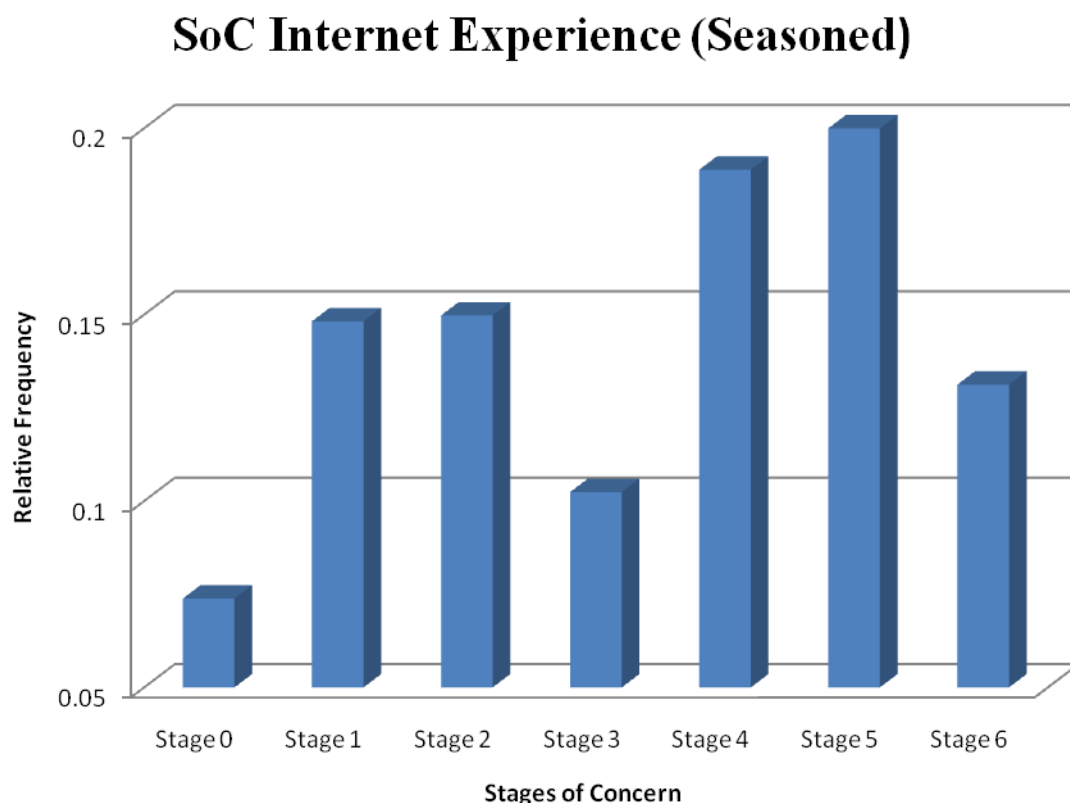


Figure 9. Stages of Concern (SoC) profiles of Users with ≥ 5 years experience using the Internet.

Instructors that indicated that they have used the Internet and its tools for five years and more are considered as seasoned users in this study. The seasoned users showed high concerns in Stage 5 (Collaboration) and a Second High Stage of concern in Stage 4 (Consequence). The Self concerns (Stage 1 and Stage 2) also surfaced as major concerns for the instructors. This suggests an immediate need for effective training and information sessions to these adopters. Seasoned users who have high Self concerns especially Stage 2 concerns might be lacking pertinent information about the innovation. The seasoned user should not be seeking information about the innovation on a personal level as they have been exposed to the innovation for a longer

period of time. Change administrators should view this as a need to administer effective informational workshops to address these concerns. Seasoned users especially in educational settings act as mentors to non-users and new users; it is important for the seasoned users to thoroughly understand the personal implications of the innovation. The Stage 6 concerns might indicate instructors have ideas about improving use of innovation, the group would be more effective in their institutions if their Stage 1 and Stage 2 concerns are lowered. The relatively low Stage 0 concerns coupled with higher Stage 6 concerns are positive indication that this group has little resistance to the innovation unlike the non-user and one to four year group.

The difference between the Stage of Concerns of the instructors based on their level of Internet use can also explain why there is a positive relationship between an instructor's Stage of concern and level of Internet use.

Research Question 3a. Is there a relationship between the Stages of Concerns profiles and the years of teaching experience?

Correlation analysis was conducted to determine if there is a relationship between the instructors Stages of Concern and the years of teaching experience. The correlation coefficient shows a medium correlation at .026. We can conclude from the correlation that 0.07% of variance (0.026^2) of the Stage of Concern variable is accounted for by its linear relationship with years of teaching experience as shown in figure 10. However, the correlation coefficient is not significant, $r(119) = .03, p > .001$; this means an instructor's Stage of Concern is not related to years of teaching experience. Therefore, there is no relationship between an instructor's years of teaching experience and the instructor's Stages of Concern.

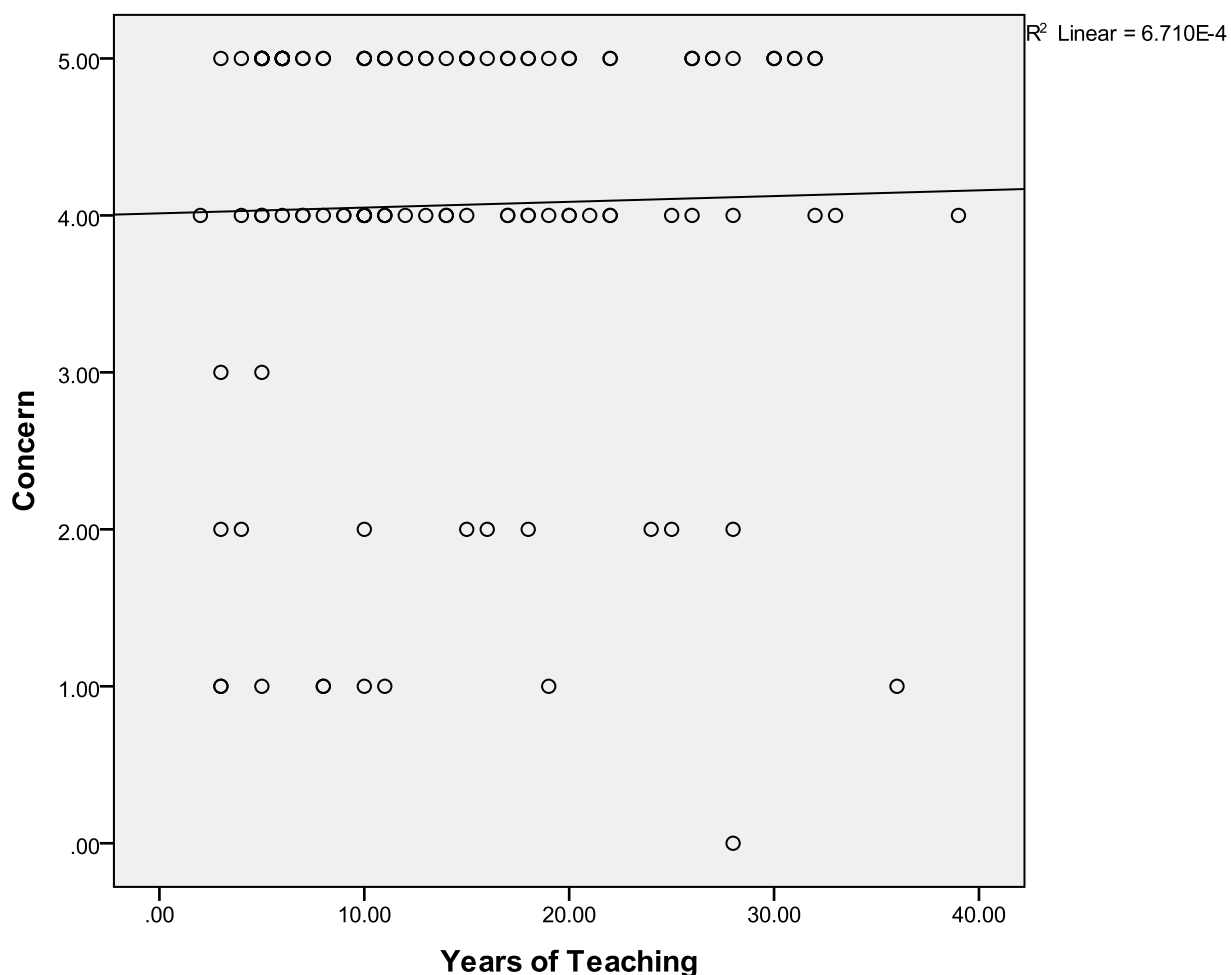


Figure 10. Scatter plot showing relationship between years of teaching and Stage of concern

Research Question 3b. Do instructors with varied years of teaching experience vary in their Stages of Concern?

The correlation analysis has shown that there is no relationship between instructor's Stages of Concern and years of teaching experience, however, the presence of a positive r further supports the need to examine the instructors' Stages of Concerns based on the different years of teaching experience. The positive relationship indicates that as an instructor's years of teaching experience increases, the concerns might transition from one stage to the next.

The respondents were asked to provide their years of teaching experience in a tertiary education institution. The respondents were categorized into three groups. Instructors with 1 to 10 years teaching experience (N=53), instructors with 11 to 20 years of teaching experience (N=38) and instructors with 21 years and above of teaching experience (N=30) as shown in table 4 below.

Table 4

Instructor Teaching Experience

Sub Group (by Year of Experience)	Number
1-10	53
11-20	38
21 and more	30

First, an analysis of variance (ANOVA) was conducted to examine the possibility of a statistically significant difference between the Stages of Concerns profiles of the three groups of teaching experience. The results showed that there is no difference between the Stages of Concern profiles between the three groups; ($M=5.04$, $SD=2.03$), $F(2, 607)=2.178$, $p=.11$. The researcher decided to closely examine the different teaching experience groups by creating charts that showed the Stages of Concern of each group. This explained the lack of statistically significant difference between the Stages of Concerns of the different groups, as highlighted by the ANOVA test. Figure 11, figure 12 and figure 13 show a visual representation of the Stages of Concern profiles of each group of instructors.

Instructors with 1 to 10 years of teaching experience show High and Second High Stages of Concern in Stage 4 (Consequences) and Stage 5 (Collaboration). The instructors seek to understand the impact of the innovation on student learning and the collaboration efforts available to them as users. Change facilitators can use this as an opportunity to introduce

Communities of Learning and mentoring to encourage collaboration and shadowing efforts. The instructors also show relatively high Stage 2 (personal) concerns. Personal concerns are not always indicators of resistance, especially when coupled with Stage 1 (informational) as shown above; this shows that there might be unease with the innovation. Providing better information about the innovation could aid in reducing this unease.

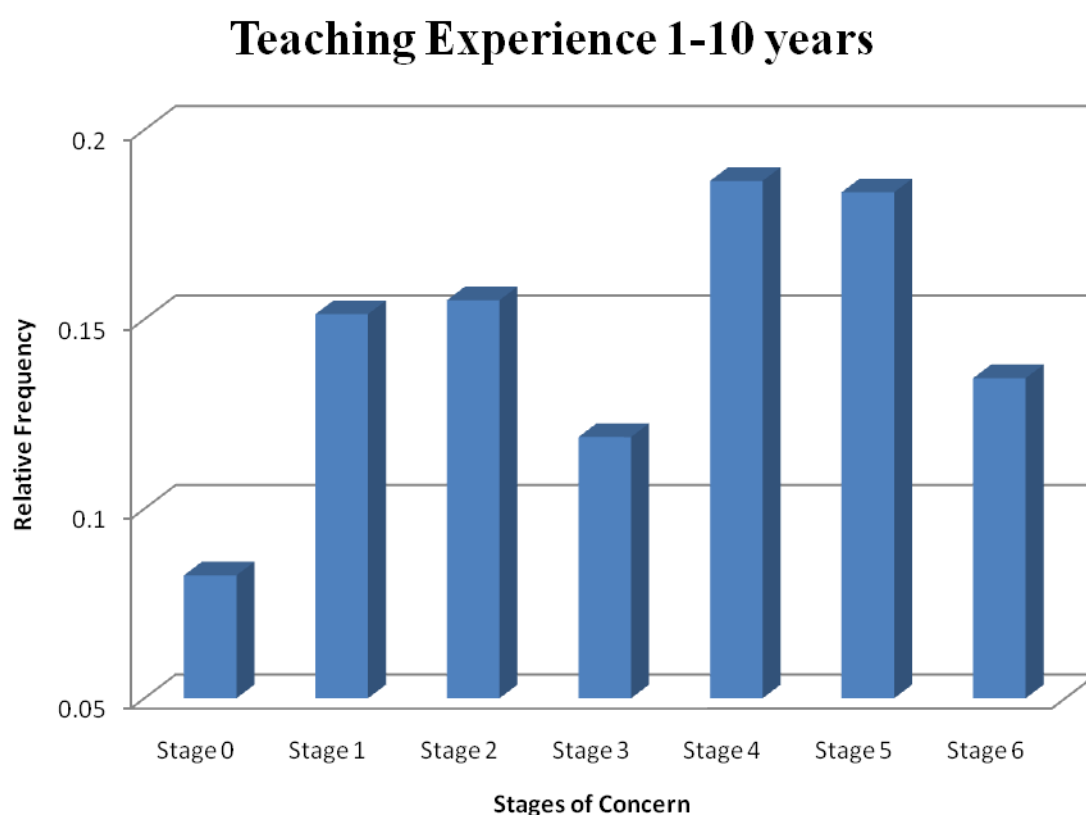


Figure 10. Stages of Concern (SoC) profiles of Users with 1-10 years of teaching experience.

The 11-20 years of experience group comprised of Lecturer II and Senior Lecturers; a group that began their teaching careers prior to the introduction of the Internet and information and communication technologies (ICT) in Nigeria, unlike the one to ten year group who likely received their career training and started their career during the introduction of ICT in Nigeria. However, the 11-20 years of experience group also had high intensity concerns in Stage 4 and

Stage 5. The instructors also showed high Self-Concerns. A High concern in Stage 5 and a high concern in Stage 1 indicate a need to learn more about the innovation from others, mostly seasoned users that have been successful using the innovation. However, a lower intensity of concern in Stage 6 and a higher intensity of concern in Stage 1 show change facilitators that adopters are interested in pursuing knowledge about the innovation.

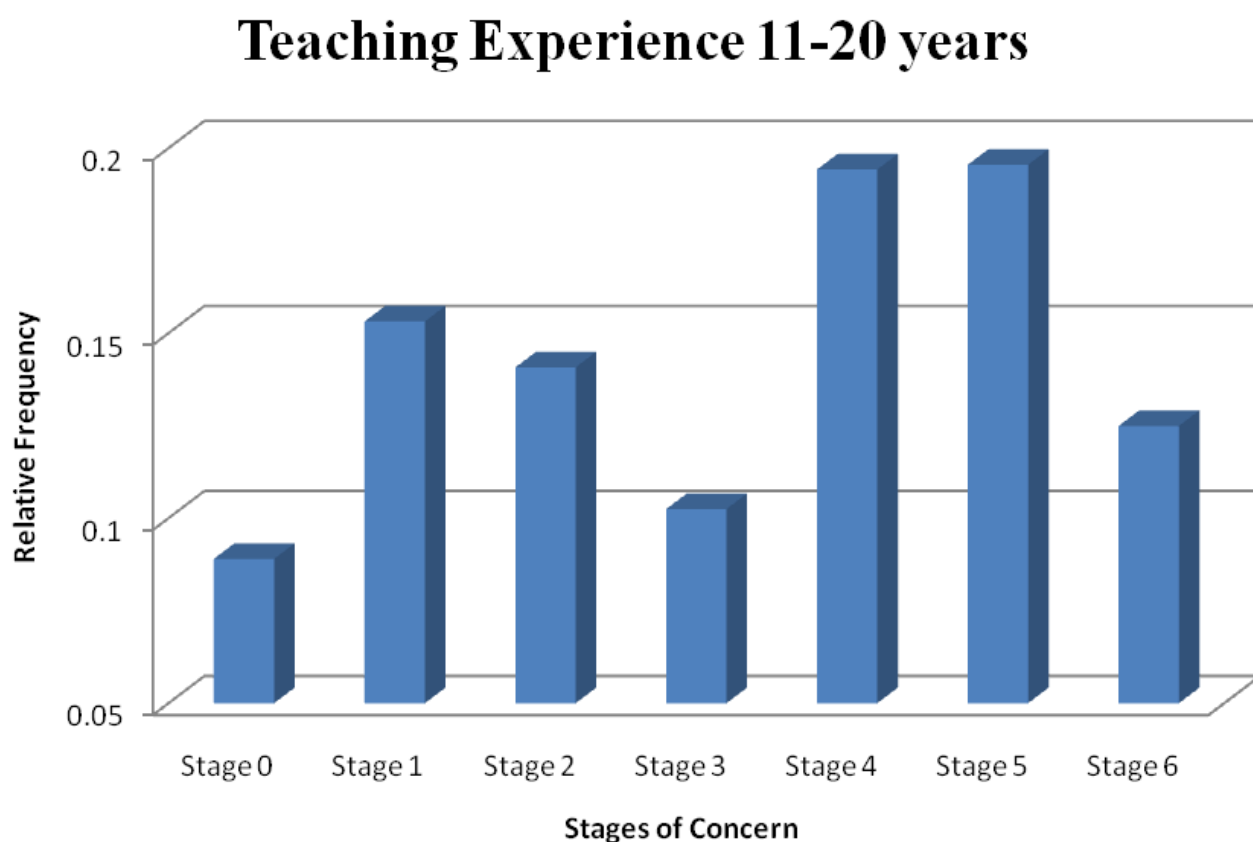


Figure 12. Stages of Concern (SoC) profiles of Users with 11-20 years of teaching experience.

Instructors with over 21 years of experience have a similar background profile to the instructors with 11 to 20 years of experience. Their teaching experiences and training involve years without use of the Internet and its tools for instructional purposes. Similar to the one to ten and 11-20 years of teaching experience groups, the over 21 years of teaching experience group has high intensity of concern in Stage 5 and a Second High concern in Stage 4. This Stage of

concern profile indicates a need for collaboration, understanding the consequences of use of the innovation for students and a concern about learning more about the innovation from others. The background profile of the group would easily lead one to believe a high resistance due to their lack of exposure to the innovation during a majority of their training and teaching career, but it is a positive indicator that Stage 0 concerns are very low and Stage 1 concerns are high. The instructors are now interested in gathering information about the innovation prior to making a decision to adopt or reject the innovation.

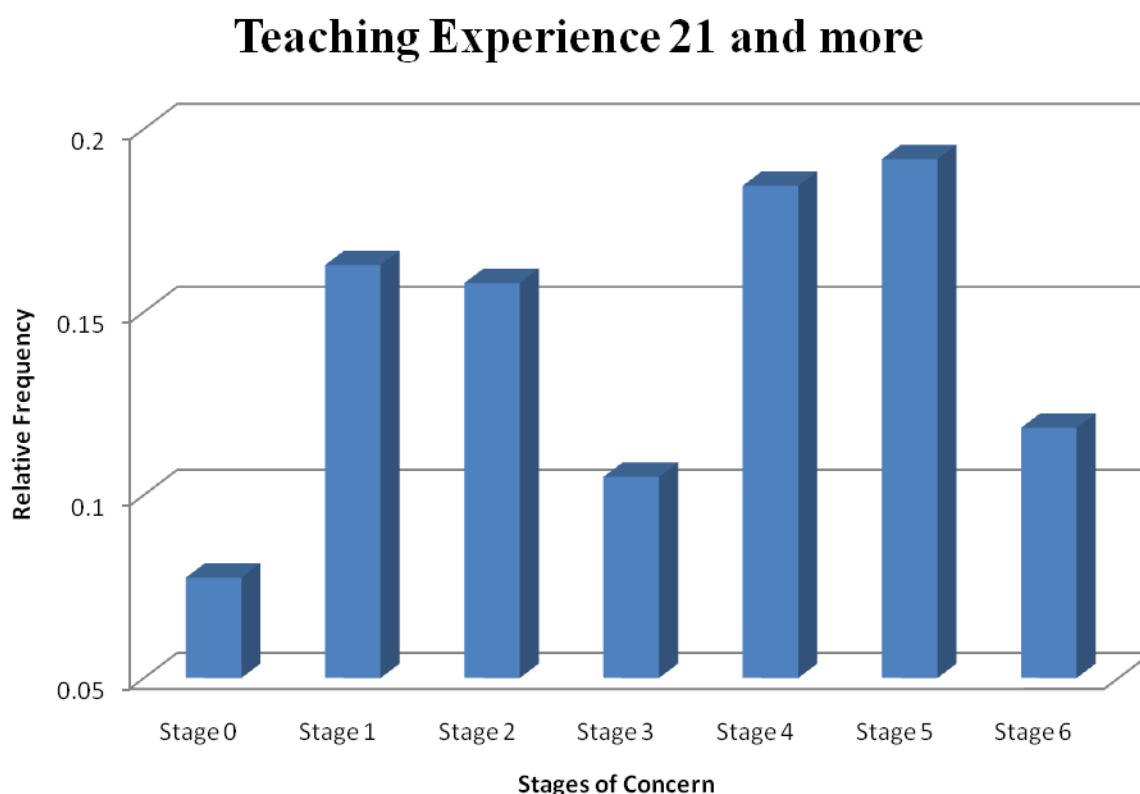


Figure 13. Stages of Concern (SoC) profiles of Users with ≥ 21 years of teaching experience.

The charts have supported the ANOVA test that showed that the different groups of teaching experience have similar Stages of Concern profiles. The groups showed High and Second High Stage concerns in Stage 4 and Stage 5. The groups also showed profile similarities

for the other Stages of Concerns. Instructors with different years of teaching experience might not have differing concerns.

Research Question 4. Is there an interaction effect between the levels of Internet use and years of teaching experience, and the Stages of Concerns of an instructor?

Multiple regression analysis was conducted to show if there is interaction between the levels of Internet use and teaching experience, and the Stage of Concern for instructors. First, the researcher determined how the Stage of concern is interacts with each predictor variable (as shown in table 5). The regression equation based on the instructors level of Internet use was significant at $R^2 = .13$, adjusted $R^2 = .12$, $F(1,119) = 17.48$, $p < 0.01$. However, the regression equation for years of teaching experience was not significant, $R^2 = .001$, adjusted $R^2 = -.008$, $F(1,119) = .079$, $p = 0.779$. Then, a multiple regression analysis was conducted to determine if knowledge of both predictor variables show an interaction to an instructor's Stage of concern. The linear combination of both predictors was significantly related to instructors' Stage of concern, $R^2 = .136$, adjusted $R^2 = .121$, $F(2, 118) = 9.20$, $p < 0.01$, as shown in table 6. The multiple regression results show that level of Internet use has a stronger interaction effect with an instructor's Stage of concern. Years of teaching experience offers little interactive power beyond that contributed by an instructor's level of Internet use.

Table 5

Multiple Linear Regression Table (Model Summary N = 121)

Model	R	R-Square	F	Sig.
Teaching	.026	.001	.079	.779
Internet	.359	.129	17.482	.001*
* $p < 0.05$				

Table 6

Multiple Linear Regression Table (Model Summary of both variables N = 121)

Model	R	R-Square	F	Sig.
1	.369	.136	9.200	0.001*
* $p < 0.05$				

Responses to Level of Use Questions and Optional Comments

The Stages of Concern Questionnaire (SoCQ) elicited responses to a number of questions that can be used to understand the training needs and Stages of Concerns of respondents. The responses obtained from the level of use questions could aid in the design of effective interventions prior to and during innovation adoption. The comments also provide qualitative support to the SoCQ responses.

The level of use questions and responses are seen below:

- 1) In your use of the innovation, do you consider yourself a Non-User, Novice, Intermediate, Old Hand and Past User?
- 2) Have you received formal training regarding the innovation?
- 3) Are you currently in the 1st or 2nd year of use of some other major innovation other than this one?
 - a. If you answered yes, please feel free to describe

The researcher also provided a section for optional comments, questions or follow up information from interested respondents.

Answers

- 1) 4% of respondents indicated they are Non-Users of the innovation and have not received formal training on the use of the innovation (N=5). Only one Non-User listed their use of another innovation (the smart board).
- 2) 16% indicated that they are Novices with the use of the innovation (N=19). 80% of the Novices have never received training on the use of the innovation and only 1 Novice uses another innovation (the smart board).
- 3) 47% of respondents listed themselves as Intermediate users of the Internet (N=57). Majority of the Intermediate users also stated that they have received formal training on the use of the Internet and 12% indicated that they are using another innovation (the smart board was the common innovation mentioned).
- 4) 31% of respondents listed themselves as Old Hands using the Internet (N=38). 73% of Old Hands have received formal training in their use of the innovation and only 5% of Old Hands are currently using another innovation (smart board).
- 5) 2% of respondents listed themselves as Past Users of the innovation (N=2). None of the Past Users have received training on using the innovation and they are currently not using any other technological innovation in place of the Internet and its tools.

Respondents were generous in leaving comments for the researcher. The researcher found the comments to be recurring and categorized the comments into three themes. The comments are also summarized and shown in table 7 below.

Themes

Theme One: Instructors are seeking assistance with implementing appropriate technology.

Theme Two: Instructors have interest (and actively seek out opportunities) in attending workshops geared toward the implementation of the innovation.

Theme Three: Instructors show frustration with inability to properly implement the innovation by seeking out alternatives.

Table 7

Condensed comments from Respondents

Comments
1. Seeking assistance with implementing “appropriate” technology in classroom.
2. Interest in attending workshops geared towards implementing the innovation pedagogically.
3. Seeking more information about the innovation.
4. Seeking information about alternative innovations that are useful to students.
5. Interest in collaborating with the principal investigator and co-principal investigator of this study to coordinate workshops on implementing the innovation
6. Dissatisfaction with the innovation and its effect on tertiary education.
7. Interest in the results of the study

Summary

This chapter showed data analysis of the research questions presented in the beginning of this study. The analysis conducted determined that Nigerian tertiary education instructors Stages of Concerns toward the implementation of the Internet and its tools for instructional purposes are Stage 5 (Collaboration). The Second High Stage of concern for these instructors is Stage 4(Consequence). Instructors are concerned with acquiring information about the information

and understanding the impact the innovation will have on their students. The instructors are also interested in collaboration efforts that can make the innovation implementation effective. Instructors were divided into groups based on their Internet usage experience and teaching experiences. Although, all groups showed a similarity in having high Stage 4 and Stage 5 concerns, correlation analyses were conducted to determine if there was a statistically significant relationship between the independent variables (Internet use and years of teaching experience) and the Stages of Concern profiles. The tests showed a statistical significance between the levels of Internet use and Stage of concern. There was no statistical significance between an instructor's years of teaching and Stage of concern. The researcher categorized the respondents into groups based on the independent variables. The groups were closely examined using ANOVA tests to determine if there were differences in the Stage of Concerns of instructors in the various groups. The study found that Stage of Concern differences exist in the different Internet use groups; no differences exist between the years of teaching experience groups. Finally, a multiple regression analysis test showed that Internet use had an interaction effect with an instructor's Stage of concern over an instructor's years of teaching experience. However, both variables interact significantly with the Stages of Concern together. The next chapter provides a discussion of the results found in the study.

CHAPTER 5

DISCUSSION AND CONCLUSION

The purpose of this study was to identify the Stages of Concerns (SoC) cited by Nigerian tertiary education instructors toward the implementation of information and communication technologies (ICT) such as the Internet and its tools for instructional purposes. The Stages of Concern profiles were identified using the Stages of Concern Questionnaire (SoCQ) developed by Hall, George, and Rutherford (1979). The research questions that aided the researcher in fulfilling the purpose of the study were:

1. What are Nigerian tertiary education instructors' concerns toward the use of the Internet and its tools for instructional purposes as measured by the Stages of Concern Questionnaire?
2.
 - a. Is there a relationship between the Stages of Concern profiles and the levels of Internet use?
 - b. Do instructors with varied levels of Internet use vary in their Stages of Concern?
3.
 - a. Is there a relationship between the Stages of Concerns profiles and the years of teaching experience?
 - b. Do instructors with varied years of teaching experience vary in their Stages of Concern?
4. Is there an interaction effect between the levels of Internet use and years of teaching experience, and the Stages of Concerns of an instructor?

The study sample included instructors in five Nigerian tertiary education institutions. The institutions are accredited by the tertiary education governing body in Nigeria; the National Universities Commission (NUC). The institutions were identified as institutions that have recently taken steps to implement ICT for instructional purposes. The institutions also cited low adoption of ICT as one of the barriers to implementation and institutionalization (Personal Communication, 2009). The Stages of Concern Questionnaire was delivered to potential respondents at the various institutions via email. A study sample size of 111 respondents was determined to produce an effective study. The researcher determined the sample size using the G*Power (Buchner, Erdfelder, & Faul, 1997; Erdfelder, Faul & Buchner, 1996). However, a total of 121 questionnaires were used to complete the data analysis of this study.

Profile of Respondents. The 121 instructors consisted of 41 Professors, 24 Senior Lecturers and 56 Lecturers. The instructors were divided into three groups, allowing the researcher the ability to assess the difference between the instructors' Stages of Concern profiles and Internet Usage. 13 instructors self-identified as non-users of the Internet, 50 instructors self-identified as new users or users who had one to four years of experience using the Internet and 58 instructors self-identified as seasoned users or users with five or more years of Internet usage experience. The instructors were also categorized into three groups depending on their level of teaching experience. There were 53 instructors who have taught in tertiary education for one to ten years, 38 for 11-20 years and 30 for 21 years and more. The profile of the respondents satisfied the contextual framework for the study.

Discussion

This section provides an overview of the findings from the Stages of Concern profiles. Certain themes are also identified from the level of use questions section and optional comments

found at the end of the questionnaire. The researcher used the results of this study to recommend strategic interventions that can be used to address the instructors' concerns. The findings from the study have produced implications for practice, and recommendations for future research.

Research Question 1. What are Nigerian tertiary education instructors' concerns toward the use of the Internet and its tools for instructional purposes, as measured by the Stages of Concern Questionnaire (SoCQ)?

The results of the Stages of Concern Questionnaire (SoCQ) showed that the instructors had high intensity concerns in Stage 5 (Collaboration) and Second High stage concerns in Stage 4 (Consequence). The majority of the respondents considered themselves to have intermediate knowledge of the Internet. However, they considered themselves novices when using the Internet and its tools for instructional purposes. The study sample would be classified as late adopters (Rogers, 2003) based on this profile. Alfieri (1998), Brzycki & Dudt (2005) and McLean (2005) showed that late adopter instructors usually have high personal concerns. The difference between the profile of the instructors in this study and the respondents of the studies mentioned above is the availability of support and resources to address the Awareness, Informational and Personal (Self Concerns) concerns of the instructors

Users who are slightly exposed to an innovation will seek collaborative measures as a means of acquiring knowledge about the innovation (Bellah & Dyer, 2009). Users with limited exposure to the innovation such as new users and late adopters are often concerned about the consequences of using the innovation and opportunities for collaboration with established adopters, to gain knowledge about the innovation. The innovation could affect the instructors' curricula; this could explain the high concern for the impact of the innovation on the students' learning experience.

The instructors also showed relatively high Stage 1 (Informational) concerns. The instructors concern for information regarding the innovation indicates that the instructors are willing to learn about the innovation before making the decision to adopt or reject the innovation. A recurring theme among the respondents was the interest in attending a workshop that showed the advantages and disadvantages of the innovation.

Overall, the instructors in this study were concerned about:

1. The students' attitudes toward this innovation.
2. The impact of the innovation on the students.
3. Opportunities to collaborate with other adopters in efforts to acquire knowledge about the innovation.

Research Question 2a. Is there a relationship between the Stages of Concern profiles and the levels of Internet use?

The researcher sought to determine if there was a relationship between the Stages of Concerns and the level of Internet usage. A correlation analysis showed that there is statistically significant evidence that a relationship exists between the Stages of Concern that an instructor has towards the adoption and implementation of the innovation and the instructor's level of Internet use. Knowledge of the Internet is an essential part of implementing the innovation for instructional purposes. Therefore, a relationship between both variables is highly likely and has been supported by the results of the study.

Research Question 2b: Do instructors with varied levels of Internet use vary in their Stages of Concern?

Analysis of Variance (ANOVA) was conducted to examine the possibility of a statistically significant difference between the Stages of Concerns profiles of the three groups of

instructor Internet use. The researcher categorized the respondents into three groups of users. This allowed the researcher to understand the differences in concerns expressed by members of each group and further explain the relationship of the levels of Internet use and the Stages of Concern. The majority of respondents indicated that they were seasoned users of the Internet (five or more years) followed by the instructors who indicated they were new users (one to four years). A small number of respondents indicated that they were non-users of the Internet; this is not uncommon, especially in a region like Nigeria where access to the Internet was rare as of 2003 (Oyelaran-Oyeyinka & Ayeya, 2004).

Understanding the background experiences of adopters can help explain resistance toward the innovation; it is also beneficial information when developing interventions to address or prevent resistance toward an innovation.

1. The non-users were concerned with obtaining information about the innovation (Stage 1); they also had high Stage 0 concerns (Awareness) and low Stage 6 (Refocusing) concerns. According to (Hall & Hord, 2001), this indicates a possibility of resistance toward the innovation; resistance among non-users can be expected because they know little about the innovation.
2. The new users (one to four years) had high Stage 4 (Consequence) concerns. These respondents were concerned about the impact of the innovation on their students. The Internet and its tools could present students with opportunities for plagiarism; new users mentioned plagiarism as a major concern for implementing the innovation. The instructors could view the innovation as a tool used to create short cuts for their students, thereby sacrificing the quality of students' work. Rogers (2003) states that an adopter will weigh the relative advantage of an innovation against the already established routine

to decide whether to adopt or reject the innovation. The new users show a Stage 4 concern because they see a low relative advantage of implementing the innovation.

3. The seasoned users (five years and more) had high Stage 5 (Collaboration) concerns. Seasoned users use collaborative measures to acquire knowledge about an innovation (Hall et al., 1986). The seasoned users mentioned a lack of training efforts in their institutions and their Stage 5 concerns support Hall et al., (1986) notion that this kind of adopter will seek information about an innovation in other possible avenues. This indicates that the seasoned users are receptive to implementing the innovation; however, change agents should take advantage of this receptiveness and create effective avenues for collaboration and information acquisition about the innovation.

Research Question 3a. Is there a relationship between the Stages of Concern profiles and the years of teaching experiences?

The results showed that there is no statistically significant relationship between the Stages of Concern of instructors and their years of teaching experiences. Although teaching experience is an important variable, it is possible that the lack of relationship is due to its parallel nature with the innovation. An instructor who has taught for 12 years and never used the Internet for instructional purposes might not have different concerns from an instructor who is classified as a non-user of the innovation and has five years of teaching experience.

Research Question 3a. Do instructors with varied years of teaching experience vary in their Stages of Concern?

An analysis of variance (ANOVA) was conducted to examine the possibility of a statistically significant difference between the Stages of Concerns profiles of the three groups of teaching experience. The three groups had distinct profiles in terms of their identified level of

Internet usage and instructional technology training. The three groups were instructors with one to ten years, 11 to 20 and 21 and more years of teaching experience. A correlational analysis has previously shown that there was no relationship between the Instructors teaching experience and their Stages of Concern. The ANOVA test also showed that there was no statistically significant difference between the teaching experience groups and their Stage of concern profiles. The groups showed similar High and Second High Stage concerns, alternating between Stage 4 and Stage 5 concerns. The groups also showed very similar concern scores in Stages 0, 1, 2, 3 and 6.

1. Instructors with one to ten years of teaching experience had High Stage 4 (Consequences) concerns. A closer examination of the instructors with one to ten years of teaching experience showed instructors that were likely to have been exposed to ICT tools during their pre-service training. The instructors had concerns about the consequences of the Internet and its tools on their students learning process. A number of the instructors also made comments about the techniques they have employed to integrate technology into their classrooms. The instructors in this group stated their interest in receiving more training opportunities to better understand the innovation. An instructor in the group mentioned openness to collaboration efforts with other universities in Nigeria or abroad, in efforts to educate his colleagues about the innovation. An interesting notation is the instructors Stage 3 (Management) concerns. Stage 3 indicates an adopters' concern with the time management and coordination of tasks related to everyday duties and implementation of the innovation. The instructors are relatively new to their profession; they are yet to become acclimated to their positions. The addition of an innovation could cause stress to the adopter; this could lead to ineffective use of the innovation or rejection of the innovation.

2. Instructors with 11-20 years of teaching experience had high intensity of concerns in Stage 5 (Collaboration) and Second High Stage 4 concerns. This group consisted of Senior Lecturers, Associate Department Heads and Professors. Although, they wish to use collaborative measures to acquire knowledge about the innovation, the instructors indicated interest in helping other instructors use the innovation. These instructors had very low Stage 3 (Management) concerns as expected of a group that are established in their profession.
3. Instructors with 21 years and more of teaching experience also had high intensity Stage 5(Collaboration) concerns and Second High Stage 4 concerns. Similar to the 11-20 years of experience group, these instructors are concerned about collaborating with other instructors to implement the innovation. The need for information is explained by the instructors' lack of exposure to teaching with the innovation (unlike the one to ten year group). These instructors pre-service training occurred prior to the introduction of ICT instructional tools. Instructors teach the way they were taught (Coutinho, 2007; Li, 2007). The concerns' profile for this group showed a willingness to adopt the innovation but this will likely happen once their concerns are addressed.

Research Question 4. Is there an interaction effect between the levels of Internet use and years of teaching experience, and the Stages of Concerns of an instructor?

The multiple regression test showed that there is a positive interaction effect between an instructor's level of Internet use and Stages of concern. The interaction effect between the level of Internet use and Stage of Concern indicates that the level of Internet use impacts an instructor's Stage of Concern. Examining the data closely, there was a general consistency with the concerns of instructor's who indicated that they have never used the Internet and its tools for

instructional purposes. The users who have been exposed to the Internet for less than five years had concerns about the consequences of using the innovation and seasoned users were interested in collaboration efforts that would increase their knowledge of the innovation. There was no interaction effect between the years of teaching experience and an instructor's Stage of concern.

An instructor with one to ten years of teaching experience could be a seasoned user of the Internet with differing concerns than an instructor with 21 years and more of experience and one to four years of Internet use. However, the multiple linear regression analysis showed that knowledge of both variables combined will have an interaction effect with the instructor's Stage of Concern.

Level of Use Questions and Optional Comments

The participants responded to three open ended questions at the end of the SoCQ. The open-ended questions allowed the respondents to mention precise concerns, questions or general thoughts about the innovation. 20 respondents requested follow up interviews to discuss their concerns in greater detail. The open-ended questions are as follows:

1. In your use of the innovation, do you consider yourself a Non-User, Novice, Intermediate, Old Hand or Past User?
2. Have you received formal training regarding the innovation?
3. Are you currently in the 1st or 2nd year of use of some other major innovation other than this one?

47% of the respondents identified as Intermediate users of the innovation and indicated that they have received training on the use of the innovation. The respondents indicated that their use of the Internet is limited to personal and administrative purposes in the optional comments section of the questionnaire. The respondents also stated that the training

opportunities provided by their institutions, focused on the use of the Internet to complete administrative duties such as checking email and registration. The respondents requested effective training workshops that would focus on using the Internet and its tools for teaching, similar to their counterparts who have successfully implemented the innovation.

There were multiple mentions of the use of another instructional technology innovation, the smart board. The smart board is being diffused into tertiary education institutions in Nigeria. The instructors mentioned the possibilities of combining the smart board, and the Internet and its tools in their classrooms. A small number of adopters, 2% stated that the smart board is a safer innovation in comparison to the Internet and its tools.

A group of late adopters with low implementation rates usually consists of non-users and past users of the innovation. The past users who participated in this study have experienced the innovation and decided to reject adoption of the innovation because of a lack of knowledge about the innovation. Only 2% of respondents identified as past users due to lack of training geared toward the implementation of the innovation. One respondent stated “The innovation frustrated me to no ends, my students have taken advantage of the Internet and plagiarism is the order of the day in my classroom.” Training can be used to address past user concerns; however, there are also policy issues that need to be addressed in the situation mentioned above. Personal communication with decision makers at one of the participating institution showed a gap in advising students about the consequences of plagiarism.

A significant number of respondents, 73% indicated that they have received training on the use of the Internet for personal and administrative purposes. Eighty percent of the trained respondents stated the need to introduce effective training that focuses on use of the Internet and its tools in their classrooms. These are some of the comments from trained instructors in the

study “My current knowledge of the Internet is centered on checking my email and research; I would like to understand how my students can benefit from the innovation;” “Training focused on how to use Microsoft Word and Excel, and how to log onto the Intranet are my experience with training,” and “I was educated abroad, I was taught with technology but my efforts to integrate into my courses has been frustrated for a lack of better words...who wants to be the black sheep when no one else is doing it.”

These comments allowed the researcher to understand the respondents’ position on the innovation and the possibility of its implementation in their classrooms. There were few comments of change leaders who are showing their fellow instructor colleagues the benefits of the innovation. However, one change leader among the respondents stated that “it is a daunting task to introduce your colleagues to this innovation, when you are trying to teach your courses, and conduct research.”

Summary

The instructors’ profiles did not have the typical pattern that Rogers (2003) predicts for a social system that consists of late adopters. An example of the abnormal nature of the profiles is the instructors High Stage of Concern in Stage 5 (Collaboration). Stage 5 concerns are usually seen in adopters who have used the innovation at an intermediate level, instructors who have progressed from the Self Concerns. The instructors concern with the consequences of the innovation and relatively high concern with acquiring information about the innovation indicated a presence of adopters who might be uneasy about the implementation of the innovation. The unease results from a lack of training opportunities, information sessions about the innovation, effective support services directed to the instructional technology and opportunities to collaborate with instructors or institutions that have successfully implemented the innovation.

The general consensus based on the responses is the need for interventions to address the concerns of the instructors. A one size fits all mode of training has not been successful in increasing the implementation rates; change agents can use the concerns identified to create strategic interventions. The researcher has used the SoC profiles from the study to recommend interventions.

Proposed Interventions

The instructors in this study identified Stage 5 (Collaboration) as their High Stage of concern. The Collaboration concern indicates a need to collaborate with other adopters to acquire knowledge about the innovation; collaboration with both new adopters and adopters who have successfully implemented the innovation. Usually, a High Stage of concern in Stage 5 is noticed in intermediate to experienced adopters, but these instructors seek collaboration efforts because there are limited opportunities to acquire knowledge about the innovation via institution sponsored informational sessions and training workshops. The researcher has provided a general recommendation for all the Stages of Concern, as seen in figure 14 below.

An understanding of the background experiences and concerns of potential adopters allows change administrators to implement the right interventions for their target audience. This study has used the SoCQ to gather information about the potential adopters' background experiences. Figure 15 shows a customized list of strategic interventions that can address the concerns of the study sample based on the results of the SoCQ

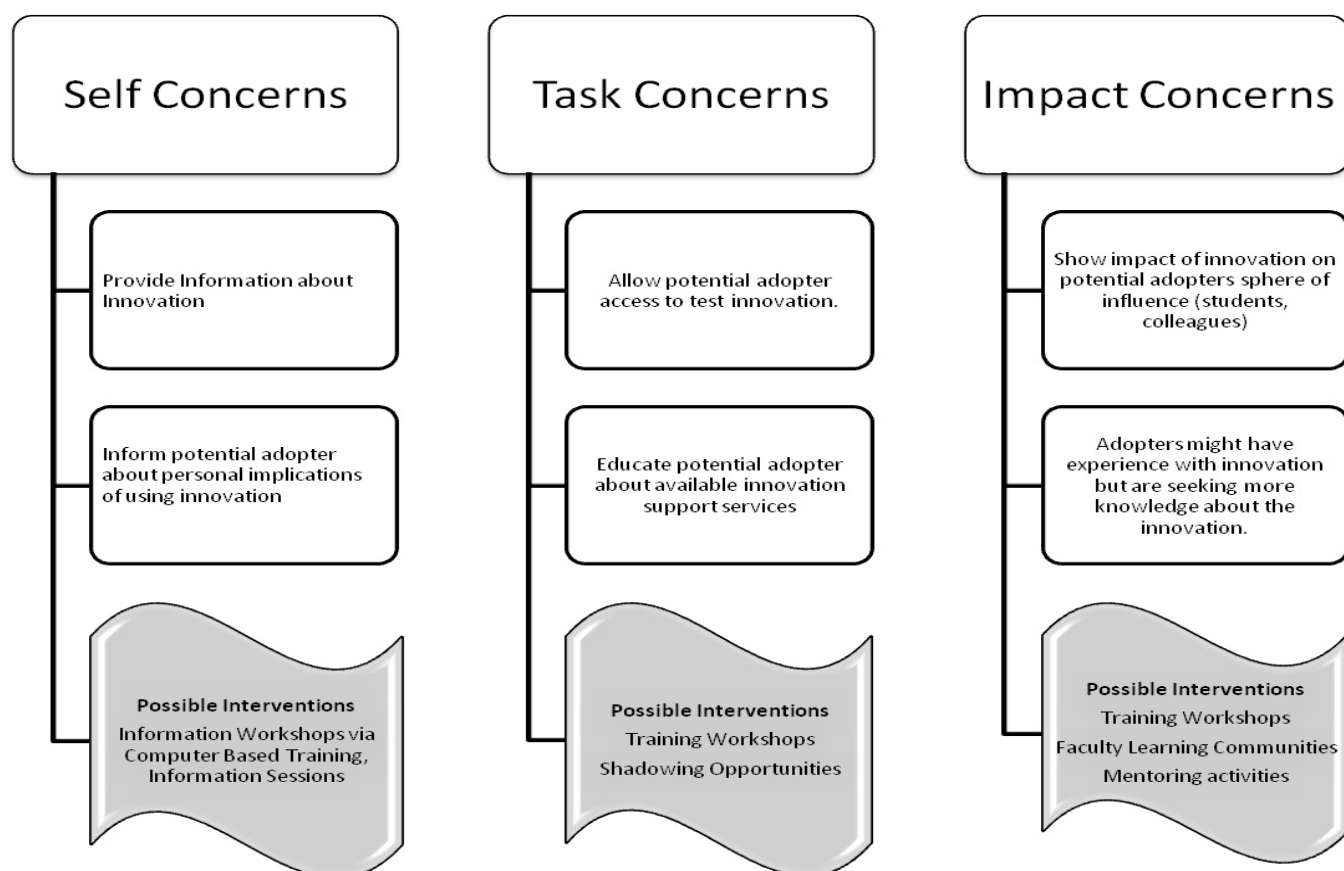


Figure 14. Interventions for Each Stage of Concern.

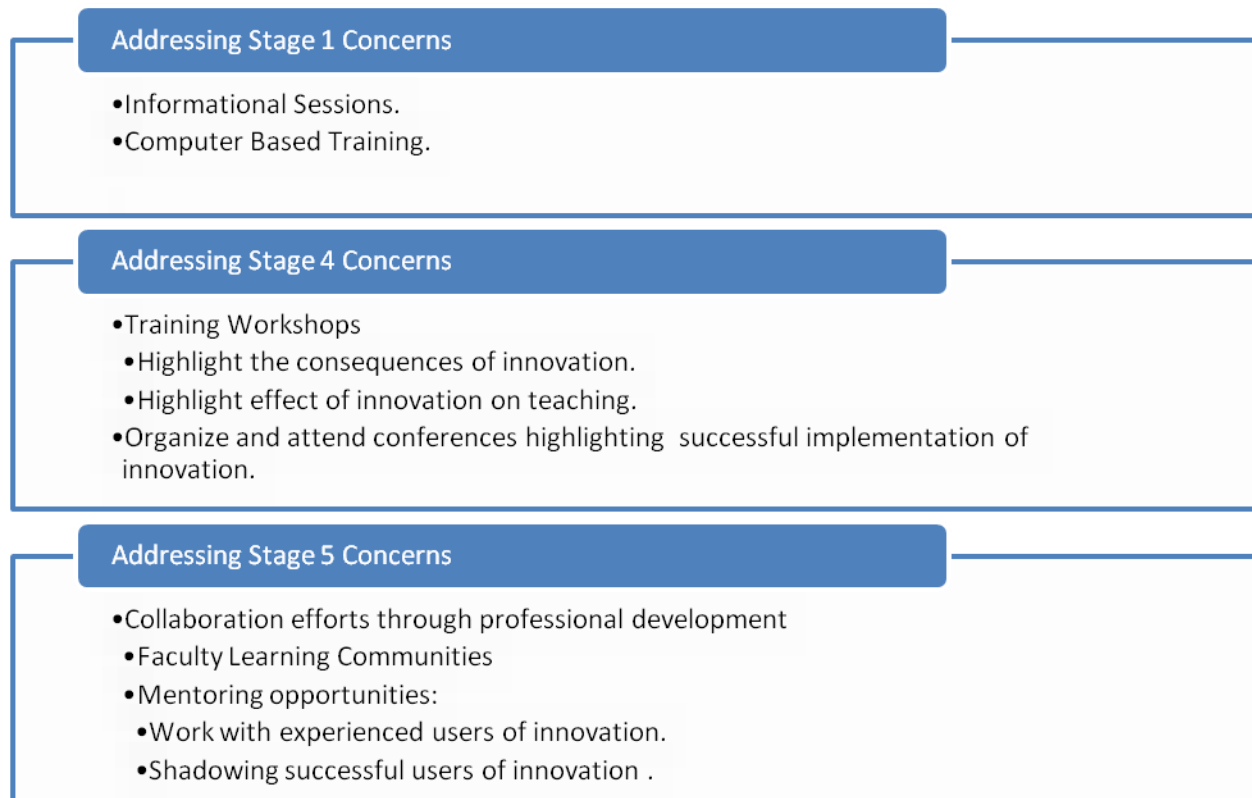


Figure 15. Proposed Interventions for this Research Study

Application of Proposed Strategic Interventions

This study believes that the steps taken to design the proposed strategic intervention will be successful in meeting the needs of instructors that will be using the innovation. The interventions should be designed to address multiple instructors with their collective concerns as identified with the Stages of Concerns Questionnaire. The High Concerns that were identified were Stage 5 (Collaboration), Stage 4 (Consequence) and Stage 1 (Informational).

Strategic Intervention 1: Informational Sessions (What)

The first intervention should provide innovation information to the potential adopters. Providing knowledge about the innovation can help reduce other concerns that have been identified. The intervention will introduce the innovation, explain the goals and expectations of

the innovation, and highlight the support resources available during the innovation use. Change administrators can provide an overview of the implications of the innovation on the adopter, students and the institution.

Information Sessions can be used to address informational concerns. Intervention information sessions have been conducted via workshops (varying in length from one day to one week), computer based training, advertising and presentations during faculty meetings. The instructors in this study indicated that they use the Internet for personal browsing, the institutions can use this opportunity to provide information about the innovation via computer based delivery, and websites dedicated to the introduction of the innovation.

Strategic Intervention 2: Training and Implications (How)

The study participants indicated Stage 4 (Consequence) as their Second High Stage of concern. The Stage 4 Concerns are Impact Concerns. Potential adopters with Stage 4 concerns are concerned about the implications of the innovation for their students. The adopters want to know how the innovation will affect their students' learning experiences (positively or negatively). Such concerns stem from a lack of understanding the innovation (as shown by their Stage 1 concerns) and a lack of effective training and support that shows the uses of the innovation in the classroom.

This concern can be addressed alongside informational concerns. Potential adopters are introduced to the innovation and provided with training sessions that show examples of the innovation use. The potential adopters can also use the sessions to satisfy innovation trialability (Rogers, 2003). The change administrators can implement real world examples during the training sessions such as designing a course in a course management system, simulating the use of an online discussion board, etc. The instructors can benefit from seeing examples of adopters

who have successfully implemented the innovation. These opportunities can be found at academic or industry conferences that showcase other adopters from different institutions in Nigeria or other nations using the innovation.

Strategic Intervention 3

The instructors showed a High Stage 5 concern. Stage 5 is also an Impact Concern. Instructors with Stage 5 (Collaboration) concerns are interested in collaborating with other adopters to gain knowledge about successfully implementing the innovation. Professional development activities such as Faculty Learning Communities (FLC) and mentoring opportunities will address Stage 5 concerns. Stage 5 concerns are usually expressed by adopters who have advanced knowledge of the innovation. These adopters seek an in-depth knowledge of the innovation. The profile of the study participants" show that they are not advanced users of the innovation; their collaboration concerns are due to a need to seek information about the innovation via other means since training and informational sessions are lacking.

If the strategic interventions listed above are followed, the instructors will receive knowledge about the innovation via the appropriate informational sessions and outlets. The instructors will receive hands on technical and pedagogical training via the training sessions. The proposed interventions for Stage 5 concerns can be used as another resource for ongoing professional development. The proposal to include Faculty Learning Communities, Mentoring opportunities and participation in academic and industry conferences can also address future Stage 6 concerns (which were minimal during the time of the study).

There are instances where adopters" progress from one level of concern to the next, i.e. Self-Concerns (Stage 0, Stage 1, and Stage 2) to Task Concerns (Stage 3) to Impact Concerns (Stage 4, Stage 5, and Stage 6). This happens when adopters progress in usage of the innovation.

Establishing interventions and avenues to continuously monitor the concerns of adopters will ensure that the concerns are addressed in a timely manner. As shown by the comments of the participants of the study, adoption and implementation are likely to be successful when concerns are addressed.

Limitations

The researcher found the study to be insightful and helpful in uncovering the concerns of instructors toward the adoption of the ICT innovation, however there were limitations that were present during the data collection and analysis process. When addressed, these limitations can become stepping stones for more studies in a region. The researcher conducted this study at a distance; the researcher was in the United States while the instructors were all located in Nigeria. The number of usable questionnaires might have been higher if the researcher was able to visit the institutions and build relationships with instructors. Also, the researcher could have conducted question and answer sessions about the terminology of the questionnaire during a visit to the country. Some potential respondents contacted the researcher about not completing the questionnaire due to lack of understanding the questionnaire. Due to the ongoing diffusion of the Internet into Nigerian tertiary education institutions, the results of this study can only be limited to institutions that have adopted the innovation.

The Stages of Concern questionnaire was validated in a study conducted by Hall et al (1979), although the questionnaire has been used successfully in recent studies (Alfieri, 1998; Beller & Dyer, 2009; Christou, Eliophotou-Menton & Philippou, 2004), there is no recent validation of the questionnaire. The success of this study and other studies conducted after the original validation study can be questioned because the instrument has not been recently validated.

Lastly, the survey methodology presented its limitations. Survey method of data collection cannot be used to establish cause and effect relationships, only likely relationships. The basis for an in-depth study can be based on the survey data collected from this study. Despite limitations, the results of this study have produced a foundation for change agents in Nigerian tertiary education institutions to increase the rates of adoption and implementation of the Internet and its tools, and other instructional technology tools among instructors in the region.

Recommendations for Further Research

The Concerns Based Adoption Model has been used as a viable means of assessing the concerns of adopters in a social system comprising of late adopters and developing countries. The Stages of Concerns questionnaire has also been used to assess concerns of late adopters of technology. However, the Stages of Concerns Questionnaire has not been validated in a context different from Hall et al. (1979) original validation study. There have been technological advancements and change in educational practices since the 1970's and the questionnaire needs to be validated to reflect any changes in technology and education practices since its last validation.

The present study was conducted to identify concerns of instructors prior to adoption. A research study can be conducted using the experimental quantitative method specifically a pre and post hoc study. The study could determine the success of interventions that are used to address adopter concerns. The Stages of Concern questionnaire is very useful in quantitatively identifying concerns of adopters; however, a qualitative study is recommended to understand the concerns that cannot be identified using the Stages of Concerns Questionnaire.

The Concerns Based Adoption Model consists of the Stages of Concern, Levels of Use and Innovation Configuration dimensions. The scope of this study centered on the Stages of Concern, a future study could focus on the behaviors exhibited by instructors who have implemented the innovation. The Levels of Use helps change agents assess the effectiveness of training efforts and adopter use of the innovation. Also, the researcher suggests that a study can be conducted to interview users in different levels of Internet use to assess their Levels of Use after the innovation is adopted and implemented. Change administrators can use the Levels of Use as formative evaluation during the implementation process.

As the innovation progresses through the innovation adoption process, a study should be conducted investigating the Innovation Configuration dimension. The study will examine instructors that are implementing the innovation using different techniques. Administrators might uncover innovative implementation techniques that can be helpful to other instructors. Lastly, this study can be replicated with data collection spanning an entire school session; the probability of larger number of respondents will be increased.

Conclusion

The successful implementation of an innovation depends largely on the adopters of the innovation. When there are low rates of implementation, it is important to understand the concerns and needs of the adopters. This research study has begun the process of identifying concerns that adopters in Nigerian tertiary education institutions have toward the implementation of ICT for instructional purposes. This research study identified the Stages of Concerns of Nigerian tertiary education instructors toward the implementation of the Internet and its tools for instructional purposes. The concerns highlighted a need for effective strategic interventions that provided information about the innovation to the potential adopters. An overwhelming response

to the optional comments portion of the data collection showed the instructors' willingness to implement the innovation, once concerns are addressed. Change administrators must be prepared to address resistance that comes with innovation adoption by addressing concerns and using those concerns to design effective interventions.

This study has contributed to the knowledge base about the Stages of Concerns of adopters of information and communication technologies (ICT) in education, specifically late adopters. The study has also contributed to the growing literature on technology adoption and integration in Nigerian tertiary education institutions. The study has created a foundation for preparation for adoption and successful implementation of educational innovations in other levels of education in the country and other tertiary education institutions that are preparing to adopt the innovation.

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APPENDIX A

IRB Approval

PROJECT NUMBER: 2009-10886-0

PRINCIPAL INVESTIGATOR: Dr. Robert Maribe Branch

Dear Dr. Branch,

Please be informed that the University of Georgia Institutional Review Board (IRB) reviewed and approved your above-titled proposal through the exempt (administrative) review procedure authorized by 45 CFR 46.101(b)(2) - Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, /unless:/ (i). the information obtained is recorded in such a manner that human participants can be identified, directly or through identifiers linked to the participants; /and /(ii). any disclosure of the human participants' responses outside the research could reasonably place the participants at risk of criminal or civil liability or be damaging to the participants' financial standing, employability, or reputation.

Please remember that no change in this research proposal can be initiated without prior review by the IRB. Any adverse events or unanticipated problems must be reported to the IRB immediately. The principal investigator is also responsible for maintaining all applicable protocol records (regardless of media type) for at least three (3) years after completion of the

study (i.e., copy of approved protocol, raw data, amendments, correspondence, and other pertinent documents). You are requested to notify the Human Subjects Office if your study is completed or terminated.

Good luck with your study, and please feel free to contact us if you have any questions. Please use the IRB number and title in all communications regarding this study.

Sincerely,

LaRie Sylte, M.H.A, M.A., CIP

Human Subjects Office

University of Georgia

www.ovpr.uga.edu/hso/

APPENDIX B

Questionnaire Cover Letter

Dear Participant:

I am a Ph.D Candidate under the direction of Dr Robert Maribe Branch in the Department of Educational Psychology and Instructional Technology at The University of Georgia. I invite you to participate in a research study entitled Stages of Concerns about Information and Communications Technologies as expressed by tertiary education instructors. The purpose of this study is to identify stages of concerns cited by instructors toward the implementation of information and communication technological innovations such as the Internet and its tools for instructional purposes. Your participation will involve completing the survey in the link attached before and after your workshop and should only take about 10 minutes. Your involvement in the study is voluntary, and you may choose not to participate or to stop at any time without penalty or loss of benefits to which you are otherwise entitled. Please note that Internet communications are insecure and there is a limit to the confidentiality that can be guaranteed due to the technology itself. However, once we receive the completed surveys, we will store them in a locked cabinet in my office and destroy any contact information that we have by August 14th, 2009. If you are not comfortable with the level of confidentiality provided by the Internet, please feel free to print out a copy of the survey, complete it by hand, and mail it to me at the address

given below, with no return address on the envelope.

The results of the research study may be published, but your name will not be used. In fact, the published results will be presented in summary form only. Your identity will not be associated with your responses in any published format.

The findings from this project may provide information that allows universities to provide adequate training for faculty members who use instructional technology. There are no known risks or discomforts associated with this research.

If you have any questions about this research project, please feel free to call me at (678)-542-7670 or send an e-mail to dai011@uga.edu. Questions or concerns about your rights as a research participant should be directed to The Chairperson, University of Georgia Institutional Review Board, 612 Boyd GSRC, Athens, Georgia 30602-7411; telephone (706) 542-3199; email address irb@uga.edu.

By completing and submitting this questionnaire in the following page, you are agreeing to participate in the above described research project.


Thank you for your consideration! Please keep this letter for your records.

Sincerely,

Diane A. Igoche

APPENDIX C

Permission to use Stages of Concerns Questionnaire

 **gene.hall@unlv.edu** to Diane [show details](#) May 9 [Reply](#)

Thank you for the email. You are welcome to use the Stages of Concern Questionnaire, just do not change the wording of the 35 items and be sure to cite the technical manual and our text "Implementing Change (Second Edition)." Also, be sure to use the new form of the SoCQ (Form 075). It and its technical manual are available from the Southwest Educational Development Lab. in Austin, TX.

If you have any questions about use, or interpretation of SoC data please contact me.

-----digoche@gmail.com wrote: -----

To: gene.hall@unlv.edu
From: Diane Igoche <dai011@uga.edu>
Sent by: digoche@gmail.com
Date: 05/08/2009 07:03PM
Subject: Authorization to use Stages of Concern for Data Collection Instrument
- Show quoted text -

[Reply](#) [Forward](#)

[« Back to Search Results](#) [Archive](#) [Report spam](#) [Delete](#) [Move to Inbox](#) [Labels ▼](#) [More actions ▼](#)

APPENDIX D

Demographic Data

Please provide responses to the questions below.

1. What is your gender?
2. What is your rank as an Instructor?
3. How many years have you been an Instructor?

APPENDIX E

Stages of Concern Questionnaire

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 circle "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. We do not hold to any one definition of the innovation so please think of it in terms of your own perception of what it involves. Phrases such as “this approach” and “the new system” all refers to the same innovation. Remember to respond to each item in terms of your present concerns about your involvement or potential involvement with the innovation.

Thank you for taking time to complete this task.

1. I am concerned about students' attitudes toward the innovation. 0 1 2 3 4 5 6 7
2. I now know of some other approaches that might work better. 0 1 2 3 4 5 6 7
3. I am more concerned about another innovation. 0 1 2 3 4 5 6 7
4. I am concerned about not having enough time to organize myself each day 0 1 2 3 4 5 6 7
5. I would like to help other faculty in their use of the innovation. 0 1 2 3 4 5 6 7
6. I have a very limited knowledge of the innovation. 0 1 2 3 4 5 6 7
7. I would like to know the effect of reorganization on my professional status 0 1 2 3 4 5 6 7
8. I am concerned about conflict between my interests and my responsibilities 0 1 2 3 4 5 6 7
9. I am concerned about revising my use of the innovation. 0 1 2 3 4 5 6 7
10. I would like to develop working relationships with both our faculty and outside faculty using this innovation. 0 1 2 3 4 5 6 7
11. I am concerned about how the innovation affects students. 0 1 2 3 4 5 6 7
12. I am not concerned about the innovation at this time. 0 1 2 3 4 5 6 7
13. I would like to know who will make the decisions in the new system. 0 1 2 3 4 5 6 7
14. I would like to discuss the possibility of using the innovation. 0 1 2 3 4 5 6 7

15. I would like to know what resources are available if we decide to adopt the innovation. 0 1 2
3 4 5 6 7

16. I am concerned about my inability to manage all that the innovation requires. 0 1 2 3 4 5 6 7

17. I would like to know how my teaching or administration is supposed to change. 0 1 2 3 4 5 6
7

18. I would like to familiarize other departments or persons with the progress of this new
approach. 0 1 2 3 4 5 6 7

19. I am concerned about evaluating my impact on students. 0 1 2 3 4 5 6 7

20. I would like to revise the innovation's approach. 0 1 2 3 4 5 6 7

21. I am preoccupied with things other than the innovation. 0 1 2 3 4 5 6 7

22. I would like to modify our use of the innovation based on the experiences of our students .
0 1 2 3 4 5 6 7

23. I spend little time thinking about the innovation. 0 1 2 3 4 5 6 7

24. I would like to excite my students about their part in this approach. 0 1 2 3 4 5 6 7

25. I am concerned about time spent working with nonacademic problems related to the
innovation. 0 1 2 3 4 5 6 7

26. I would like to know what the use of the innovation will require in the immediate future.
0 1 2 3 4 5 6 7

27. I would like to coordinate my efforts with others to maximize the innovation's effect. 0 1 2 3
4 5 6 7

28. I would like to have more information on time and energy commitments required by the
innovation. 0 1 2 3 4 5 6 7

29. I would like to know what other faculty are doing in this area. 0 1 2 3 4 5 6 7

30. Currently, other priorities prevent me from focusing my attention on the innovation. 0 1 2 3 4
5 6 7

31. I would like to determine how to supplement, enhance, or replace the innovation. 0 1 2 3 4 5
6 7

32. I would like to use feedback from students to change the program. 0 1 2 3 4 5 6 7

33. I would like to know how my role will change when I am using the innovation. 0 1 2 3 4 5 6
7

34. Coordination of tasks and people is taking too much of my time. 0 1 2 3 4 5 6 7

35. I would like to know how the innovation is better than what we have now. 0 1 2 3 4 5 6 7

Please complete the following:

1. How long have you been involved with the innovation, not counting this year?

Never ____ 1 year ____ 2 years ____ 3 years ____ 4 years ____ 5 or more ____

2. In your use of the innovation, do you consider yourself to be a:

non-user ____ novice ____ intermediate ____ old hand ____ past user ____

3. Have you received formal training regarding the innovation (workshops, courses)?

Yes ____ No ____

4. Are you currently in the first or second year of use of some major innovation or
program other than this one?

Yes ____ No ____

If yes, please describe briefly:

Thank you for your help!

APPENDIX F

Stages of Concern Questionnaire Items by Stage

Stage 0, Awareness

- 3. I don't even know what the innovation is.
- 12. I am not concerned about this innovation.
- 21. I am completely occupied with other things.
- 23. Although I don't know about this innovation, I am concerned about things in the area.
- 30. At this time, I am not interested in learning about this innovation.

Stage 1, Informational

- 6. I have a very limited knowledge about the innovation.
- 14. I would like to discuss the possibility of using the innovation.
- 15. I would like to know what resources are available if we decide to adopt this innovation.
- 26. I would like to know what the use of the innovation will require in the immediate future.
- 35. I would like to know how this innovation is better than what we have now.

Stage 2, Personal

- 7. I would like to know the effect of reorganization on my professional status.

- 13. I would like to know who will make the decisions in the new system.
- 17. I would like to know how my teaching or administration is supposed to change.
- 28. I would like to have more information on time and energy commitments required by this innovation.
- 33. I would like to know how my role will change when I am using the innovation.

Stage 3, Management

- 4. I am concerned about not having enough time to organize myself each day.
- 8. I am concerned about conflict between my interests and my responsibilities.
- 16. I am concerned about my inability to manage all the innovation requires.
- 25. I am concerned about the time spent working with nonacademic problems related to this innovation.
- 34. Coordination of tasks and people is taking too much of my time.

Stage 4, Consequence

- 1 I am concerned about students' attitudes toward this innovation.
- 11 I am concerned about the innovation affects students.
- 19 I am concerned about evaluating my impact on students.
- 24 I would like to excite my students about their part in this approach.
- 32 I would like to use feedback from students to change the program.

Stage 5, Collaboration

- 5 I would like to help other faculty in their use of this innovation.
- 10 I would like to develop working relationships with our faculty and outside faculty using this innovation.

18 I would like to familiarize other departments or persons with the progress of this new approach.

27 I would like to coordinate my efforts with others to maximize the innovation's effects.

29 I would like to know what other faculty are doing in this area.

Stage 6, Refocusing

2 I now know of some other approaches that might work better.

9 I am concerned about revising my use of the innovation.

20 I would like to revise the innovation's instructional approach.

22 I would like to modify our use of the innovation based on the experience of our students.

31 I would like to determine how to supplement, enhance, or replace the innovation.

(Hall, George, and Rutherford, 1986, p. 25)