An Examination of the Adoption of Web 2.0 Technologies in Program Delivery in Cooperative Extension

by

Latresha Minna' Brady-Pinkston

A dissertation submitted to the Graduate Faculty of
Auburn University
in partial fulfillment of the
requirements for the Degree of
Doctor of Philosophy

Auburn, Alabama
December 14, 2019

Keywords: Cooperative Extension, Web 2.0 technologies, technology perception

Approved by

Maria Witte, Chair, Professor, Educational Foundations Leadership and Technology
James Witte, Professor, Educational Foundations Leadership and Technology
Jonathan Taylor, Associate Professor, Educational Foundations Leadership and Technology

Abstract

Cooperative Extension has a mission to take the university to the public. Therefore, one of the major goals is to disseminate timely research based information for local and state use. Extension has formed solid networks between government agencies, universities, state and county staff. Web 2.0 technologies can help Extension expand efforts for outreach and education. Scholars presented the benefits of social media platforms for Extension use (Fox, J., Leeds, R., & Barrett, E., 2014; Gharis et al., 2015; Nordby, 2014). This study examined the perceptions of the use of Web 2.0 technologies in educational programming of Extension educators employed with the Alabama Cooperative Extension System. The Expanded Technology Acceptance Model (TAM2) designed by Davis and Venkatesh was the instrument used in this study. TAM2 predicts or explains the acceptance or adoption of new technologies by end users.

Sixty-two survey instruments were completed by educators in the six program areas of agriculture; forestry, wildlife, and natural resources; family and consumer science; economic and community development; information technology; and 4-H. The response rate for this study was 25 percent. Most of the mean scores for the TAM2 measured above the established mean score which suggests that educators had good perceptions of Web 2.0 technologies. Correlational analysis was conducted to examine relationship between age and gender and Web 2.0 perceptions. The analysis revealed that there was no correlation between the gender and age of educators and Web 2.0 perceptions. One-way analysis of variance was conducted to examine if there was any difference in Web 2.0 perceptions based on level of education, years of employment, and position type. The results indicated that level of education and position type had a significant effect on technology perceptions.

Acknowledgements

This dissertation is dedicated to the memory of my beloved mother, Patricia Ann Brady (1952 - 2017), who believed in me, taught me to always put God first and never give up. Thank you for sacrificing so much, making it possible for me to be at this place in time. Words cannot convey how much your love, support, and encouragement meant to me. I miss you daily, but I know that you are always with me. I wish you were here to celebrate in this accomplishment.

I want to thank God for guiding and keeping me, and giving me the ability to achieve this great accomplishment. To my beautiful sister, Heavenleigh Brady you are amazing, and I am so proud of the young woman you have grown to be. I appreciate you for accepting me for who I am and believing in me. I know mama is extremely proud of her girls. I would like to thank my family and friends for encouraging me throughout this process, especially my father Mr. Willie James Pinkston, my favorite cousin Dr. Frankie Askew Bell, Bishop Nolan Torbert, and Lady Diane Torbert for your love and support of Heavenleigh and I. This support system truly helped me to accomplish this milestone. A heartfelt thank you to my committee, Dr. Maria Witte, Dr. Jim Witte, and Dr. Jonathan Taylor for taking time to help me through this process. Dr. Maria Witte, committee chair, I truly thank you for the support and special encouragement you have given me from the beginning of my doctoral pursuit. Your door was always open, and I always left each meeting inspired and motivated to continue pushing forward. I would like to extend a special thank you to the outside reader Dr. Leane Skinner for your time and valuable help. This has been a long process and I could not continue to persevere without God and some wonderful people by my side. I am truly blessed. I appreciate you all.

Table of Contents

List of Tables

List of Abbreviations

ACES	Alabama Cooperative Extension System
ATT	Attitude
BI	Behavioral Intentions
PBC	Perceived Behavioral Control
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
SN	Subjective Norm
TAM	Technology Acceptance Model
VOL	Voluntariness

CHAPTER I

INTRODUCTION

Cooperative Extension System is a university-based nonformal education organization that consists of a network between local county administration, land-grant universities, and the United States Department of Agriculture (USDA). Cooperative Extension is a leader in non-formal adult education. According to White and Burnham (1995), the rudimentary mission of the Cooperative Extension System is to create learning partnerships that facilitate improvement of individuals' quality of life and communities. Using research-based knowledge Extension educators provide opportunities for lifelong learning. The Cooperative Extension System, the largest adult education organization in the United States, is "an extension of the land-grant university", with over 3,000 county-based locations offering education programs in food and nutrition, family and consumer sciences, agriculture, youth and community development (Griffith, 1991).

Historical Perspective

The Cooperative Extension Service provides resources from land-grant universities to fulfill the need of the public through nonformal instruction and programs. The system consists of professional educators, researchers and paraprofessionals. This model embodies a nonformal, lifelong, public educational system constructed as an enterprise that connects research and education of the United States Department of Agriculture and land grant universities, established by the Federal Morrill Acts of 1862 and 1890 (White & Burnham, 1995). Each partner operates independently, self- governing staffing, programs, and funding. The overall system aim is to provide a community-based education, which connects clientele to research and knowledge

(White & Burham, 1995).

The formation of today's Cooperative Extension Service began with the Morrill Act of 1862, known as the Land-Grant Act (White & Burnham, 1995). This bill provided for states to acquire federal land to establish the land-grant university system, a national network of colleges or universities (National Research Council, 1995). Although the Morrill Act made education available to more people, there was a need for faculty of land-grant institutions to explore resources for the classroom. Therefore, to meet this need, the Hatch Act (1887) created agricultural experiment stations in every land-grant institution to provide useful and real-world information, acquired through experimentation, to the public. Nearly thirty years later (1890) the second Morrill Act was passed. This act procured funding for land-grant institutions and established a land-grant system for African American institutions (Comer & et, al., 2006).

The passage of the Morrill Acts and the Hatch Act were the foundation of the Cooperative Extension existence, extending education in a nonformal environment. The passage of Smith-Lever Act of 1914 began a national effort to devote research-based programs and education to address the needs of the public, with the purpose of

> …inaugurate, in connection with these colleges, Agriculture Extension work, which shall be carried on in cooperation with the United States Department of Agriculture…in order to aid in diffusing among the people of the United States useful and practical information on subjects relating to Agriculture and Home Economics, and to encourage the application of the same. (Seevers, 2007)

Delivering nonformal education outside of the classroom setting has contributed to the success of Cooperative Extension.

Statement of the Problem

Nationally, the Cooperative Extension Service is the largest adult education organization, providing practical research-based information to constituents to meet needs and concerns. The mission of the Cooperative Extension Service is one of adult education and lifelong learning. Providing educational programming to a diverse population of adult learners, Cooperative Extension facilitates the development of skills, problem solving, personal growth and behavior change. A past and continued priority of Cooperative Extension is to deliver quality educational programs (Harder & et, al., 2009).

Cooperative Extension is a leader in adult lifelong learning and behavioral change. Lifelong learning is essential for the adult population. As the nation's demographics change, and the educational needs of the population become more diverse Extension had to continue to adapt to meet the needs of clientele. In conjunction with national trends, Extension clients are changing their demand for information delivery. In a study on customer satisfaction commissioned by Kentucky Cooperative Extension Service, Extension clients believed Cooperative Extension underutilized the Internet to deliver information (Rennekamp, et al. 2001). Cooperative Extension seeks to establish a modern image to communicate its valuable work to clientele (Hammond, 2004; Hodson & Kotrlik, 2002; King, 1993; Telg, Irani, Hurst, & Kistler, 2007). The Cooperative Extension System has been challenged with differentiating educational program delivery and information dissemination as society shifts to the digital age.

Cooperative Extension will experience an increased demand for the use of technology to meet clients' needs due to the rise of the millennial generation, also known as Generation Y or the Net Generation, as Extension clients. This generation has grown up in a world filled with

computers, the internet, and social networks. They are comfortable with using the Internet for learning and accessing information. According to a report from the Pew Research Center, internet use has become increasingly present in some demographic groups, but there are adoption gaps that continuously remain based on certain factors such as age. In 2019 the number of adults in the United States who use the internet as reported by age were 100% of adults ages 18-29; 97% of adults ages 30-49; 88% of adults ages 50-64; and 73% of adults age 65+ (Pew Research Center Internet/Broadband Fact Sheet, 2019). Pew Research Center also provided survey data on the use of social media among adults in the United States, stating "Today around seven-in-ten Americans use social media to connect with another, engage with news content, share information and entertain themselves (Pew Research Center Social Media Fact Sheet, 2019). In the United States, the use of social media has risen from 5% of adults use at least one social media platform to 72% of adults use at least one social media platform (Pew Research Center, 2019). As a result of the current trend, future Extension clientele will expect educational programs and information online and through social media platforms. This requires Cooperative Extension educators to revamp educational programming to offer a variety of program delivery methods.

Research has shown technology and internet based instructional technologies can improve teaching and outreach efforts. Despite the substantial growth of educational technologies and the increased use of technology in the learning environment, the integration of technology in Cooperative Extension educational programming has been limited. Currently, Extension educators primarily deliver educational programs and lessons by direct teaching in groups or one-on-one settings. Technology is mainly used within the organization for communicating with staff and colleagues. The demand for technology will continue to grow, as

the need for technological integration in the learning environment has been recognized. Cooperative Extension's capacity to reach and expand educational efforts may benefit from educators utilizing various types of technologies and integrating Web 2.0 technologies in their learning environment.

Nationally, the changing demographics of the population has been recognized and one notable change is the increase of Millennials (Frey, 2018). It is projected that the Millennials will outnumber Baby Boomers and continuously exceed them. By 2030, the number of Millennials will exceed Baby Boomers by twenty-two million. And the next generation entering adulthood are Generation Z. With the generational change, comes a change in Cooperative Extension's clientele and how they receive information. Millennials and Generation Z adults expect to use the computer to assess information and communicate. There is an increased demand for the utilizing the Internet as a means of disseminating Extension information to clientele to keep them engaged. Though there is a national trend to increase technology in Extension programming, currently, there is a limited use of Internet-based instructional technologies in Extension program delivery. Historically, Cooperative Extension has provided clientele information through courses and printed materials. However, the evolution of the internet has opened access to information and made research easier. As stated in Seevers and Graham (2012), "In the same way that information once obtainable only through libraries is now available on the Internet, so too is information that was once accessible only through visits to county Extension offices" (p. 20).

Rasmussen (1989) noted the historical adoption of new innovations in Cooperative Extension to disseminate information. In the 1920s, Cooperative Extension used the radio and the telephone to inform rural people of Extension activities and educational programming. The television was also later used to work with Extension clientele (Rasmussen, 1989). During the

1980s Cooperative Extension and the world was introduced to the personal computer, further changing communication. In a study Cantrell (1982), noted Extension educators were slow to adopt the innovation resulting in limited computer literacy compared to clientele. Ruppert (1992) stressed the need for Extension educators to challenge themselves and adapt to the computer revolution, as to stay abreast of technology in an effort to continue to help people. In 2000, Albright conducted a study evaluating the ability of Extension educator's information technology use and determined future training needs of Extension staff in a global economy. Albright reported the importance of knowledge in the global economy, and that dissemination of knowledge through the use of technology would be essential for organizations such as Cooperative Extension (2000).

According to previous studies (Albright, 2000; Cantrell, 1982; Ruppert, 1992) conducted, it is essential for Extension educators to learn and integrate instructional technologies and advances in information technology in educational programming and information delivery, in an effort to aid clientele. Albright (2000) noted "it is critical that organizations adapt to the technology explosion because many of these changes are made possible due to information technology" (p. 3).

Extension educators have used various methods to enhance educational program delivery, such as videos, slide and computer projectors, and overheads. To reach geographically dispersed clientele, Extension have used innovations such as radio, telephone and television. As innovations evolve Extension has the potential to enhance its outreach efforts and reach a wider audience.

Nationally, the need for the integration and use of technology in the learning environment has been recognized (Barton & et, al., 2017). There is an increased demand for the using the

Internet as a means of disseminating Extension information to the public. Though there is a national trend to increase technology in Extension programming, currently, there is a limited use of Internet-based instructional technologies in Extension program delivery and a lack of research in this area.

A number of studies exist on instructional technologies in higher education (Chuang & Chen, 2009; Groves & Zemel, 2000; Spotts & Bowman, 1995; Smith & Robinson, 2003); but the workplace application of instructional technologies by Extension professionals of the ACES is presently under-researched. Review of the literature for research on the adoption of Web 2.0 technology tools for educational programming in a non-formal educational setting such as Cooperative Extension produced negative results. This situation is significant to Cooperative Extension because the adoption of Web 2.0 instructional technologies bears directly on Extension's ability to meet the needs of its clientele. As such, determining the influence of factors in Extension educators' adoption of Web 2.0 technologies could aid Extension professionals in improving educational programming and Extension administration in planning and providing professional development and training.

Purpose of the Study

The purpose of this study was to examine Extension educators' adoption of Web 2.0 technology tools for non-formal educational program delivery within the Alabama Cooperative Extension System. Web 2.0 technology tools were considered to be emerging means for Extension program delivery. These technologies have the potential to enhance the communication between educators and learners and expand dissemination of information. The primary factors under investigation were perception, behavioral intention, and the implementation of Web 2.0 technologies in Cooperative Extension program delivery. Specific

goals of the research were to assess the degree to which a relationship exists between subjective norm (perceived social pressure), perceived ease of use, and perceived usefulness on Extension educators' intention to use Web2.0 technology tools in educational programming. There were limited studies that examined the adoption of Web 2.0 technologies in Cooperative Extension.

Research Questions

The following research questions were used in this study:

1. What are the scores, as measured by Technology Acceptance Model, of Extension educators?
2. What is the relationship between perceived ease of use and perceived usefulness?
3. What is the relationship between perceived ease of use an intention to use technology?
4. What is the relationship between subjective norm and perceived usefulness?
5. What is the relationship between subjective norm and intention to use technology?
6. What is the relationship between perceived usefulness and intention to use technology?
7. What is the relationship of age and scores, as measured by Technology Acceptance Model, of Extension educators?
8. What is the relationship of gender and scores, as measured Technology Acceptance Model, of Extension educators?

Significance of the Study

For years, the Cooperative Extension System has been the largest informal adult education provider in the United States (Seever et al., 1997). As society changes, Extension has adapted to meet public need and demand, “rapidly diversifying its portfolio in many ways to respond to needs of people in our rapidly changing society” (Gould et al., 2014, p. 4).

The current Cooperative Extension teaching environment consists of a population of

clients that are becoming increasingly diverse. Extension educators are now presented with clients who have a variety of learning needs, and to meet all of the learners' needs within the learning environment educators must differentiate their instructional roles and methods when delivering educational programs.

Therefore, this inquiry will add to the body of research on technology in Extension education, the workplace application of information technology among Extension professionals of the Alabama Cooperative Extension System; and serve to improve our understanding of the factors involved in the adoption if Web 2.0 technology tools by Extension educators and can be used to facilitate technology integration efforts in Cooperative Extension towards the land-grant mission. The results of this study can be useful for Extension administrative entities, and other parties interested in this issue, will be provided with objective, research-derived information that should provide an understanding of Extension professionals' Web 2.0 use, and subsequently facilitate training of staff.

Assumption of the Study

The study contained the following assumptions:

1. The researcher proceeded in a manner that did not bias the study.
2. The participants understood the self-reported instrument.
3. The participants who responded to the instrument did so with honesty and truthfulness.
4. The Technology Acceptance Model 2 (TAM 2) developed by Venkatesh & Davis (2000) is a valid instrument for examining the adoption of information technologies.

Limitations of the Study

The study contained the following limitations:

1. The questionnaire was self-reported; respondents were not able to ask for clarification to questions. Misinterpretation of the instrument texts may possibly cause some respondents to answer inaccurately.
2. A questionnaire was used to attain respondents' views; consequently, results were not objective as observed and recorded measurable behaviors.
3. Respondents were aware their adoption of Web 2.0 technologies for educational programming was the subject of research. Respondents may have answered based on their view of correct responses instead of accurate representation of the use of technologies.
4. This study was limited to faculty and staff employed with the Alabama Cooperative Extension System. This limits the generalizability of the findings of this study to Extension adult educators in Alabama; therefore, the results cannot be generalized to groups beyond that setting.

Definition of Terms

For this study, the following terms are defined:

Alabama Cooperative Extension System (ACES): An agency of the United States Department of Agriculture, administered by Alabama A&M and Auburn Universities, which provides educational programs throughout the state of Alabama.

Behavioral Intention: An individual's subjective prospect that he or she will engage in a specific behavior.

Blogs: A discussion website that is contains personal commentary, videos, photos, and

hyperlinks that is updated regularly and written in an informal style.

Clients: Individuals who participate in educational programs provided by the Alabama Cooperative Extension System.

Cooperative Extension Service: An educational network between the United States Department of Agriculture, a land-grant college or university, and county administration established by the Smith-Lever Act of 1914 that provides aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics (Seevers, 1993).

Extension Educator: Extension staff responsible for planning and conducting educational programming, providing subject matter expertise, and evaluating education programming for clientele.

Information Technology: Computer software and hardware, and peripheral devices connected to computers.

Instructional Technology: The theory and practice of design, development, management and evaluation of technological processes and resources for instruction or training.

Land Grant University System: A land-grant university is an institution of higher education given federal land through legislation and is federally mandated to provide instruction in agriculture and mechanical arts, and also facilitate higher education's reach to broader segments of the population.

Perceived Ease of Use (PEOU): The degree to which an individual believes that using a technology would be free of effort.

Perceived Usefulness (PU): The degree to which an individual believes that using a technology would enhance his or her job performance.

Podcasts: A digital audio file on the internet that may be downloaded on a mobile device, typically available in a series.

Reliability: The degree of consistency of a measure.

Social Media: Applications and websites that allow people to share information, ideas, and other content.

Subjective Norm: The perceived social pressure to perform a behavior.

Technology Acceptance Model (TAM): Developed by Davis (1989), an information systems theory that represents how users accept and use a technology or information system.

Web 2.0 Tools: Technology developed to create, collaborate, and share user-generated content online.

Validity: The degree to which a research study measures what it intends to measure.

Voluntariness: An individual's ability to make choices of their free will.

Organization of the Study

The purpose of this study and research questions was to examine the Web 2.0 technology tools used in instructional delivery of adult educators employed with the Alabama Cooperative Extension System. Chapter I contains an introduction of the study, as well as the presentation of the problem, research questions, the limitations, and definition of terms. Chapter II includes a review of literature. Chapter III presents the procedures used in this study. Chapter IV reports the findings. Chapter V contains a summary of the study, conclusions and recommendations for future practice and research.

CHAPTER II. REVIEW OF LITERATURE

Introduction

The first chapter discussed the statement of the problem, the purpose of the study, research questions, the significance of the study, assumptions, limitations, definition of terms, and the organization of the study. This chapter provided background of the study and consists of literature related to adult education and Web 2.0 technology tools. First, it presented an overview of adult education followed by definitions of andragogy and pedagogy. Then, the literature related to Cooperative Extension Service as an adult education provider and the use of technology in Extension is investigated. Lastly, Web 2.0 technology tools and the Technology Acceptance Model 2 (TAM 2) is discussed.

The use of technology in Extension educational programming is important in the extension-client interaction. As technological advances have changed and impacted education, face-to-face teaching has cease being the only method to reach learners. Integrating technology in teaching can contribute to restructuring teaching and learning practices that match the needs of an informational society (Jarvela, 2001). Cooperative Extension educational programming could be enhanced by the use of Web 2.0 technologies to engage current and potential clientele in addition to traditional strategies. Web 2.0 technologies have revolutionized the internet as a medium for collaboration and interaction with others, and content creation and sharing (Dadashzadeh, 2010). In recent years various entities – businesses, governments, non-profit organizations, and educational providers have been increasing efforts to have a presence on social media websites to engage clientele and constituents, as social media is an essential outreach strategy (Dadashzadeh, 2010). There are studies that provides some evidence for the use of Web 2.0 technologies within current Extension activities, there is little empirical research

that explores Extension educators' attitudes toward the use of technology.

Purpose of the Study

The purpose of this study was to examine Extension educators' adoption of Web 2.0 technology tools for non-formal educational program delivery within the Alabama Cooperative Extension System. Web 2.0 technology tools were considered to be emerging means for Extension program delivery. These technologies have the potential to enhance the communication between educators and learners and expand dissemination of information. The primary factors under investigation were perception, behavioral intention, and the implementation of Web 2.0 technologies in Cooperative Extension program delivery. Specific goals of the research were to assess the degree to which a relationship exists between subjective norm (perceived social pressure), perceived ease of use, and perceived usefulness on Extension educators' intention to use Web2.0 technology tools in educational programming. There were limited studies that examined the adoption of Web 2.0 technologies in Cooperative Extension.

Research Questions

The following research questions were used in this study:

1. What are the scores, as measured by Technology Acceptance Model, of Extension educators?
2. What is the relationship between perceived ease of use and perceived usefulness?
3. What is the relationship between perceived ease of use an intention to use technology?
4. What is the relationship between subjective norm and perceived usefulness?
5. What is the relationship between subjective norm and intention to use technology?
6. What is the relationship between perceived usefulness and intention to use technology?
7. What is the relationship of age and scores, as measured by Technology Acceptance Model, of Extension educators?

8. What is the relationship of gender and scores, as measured Technology Acceptance Model, of Extension educators?

Overview and Background of Adult Education

During the 1920s adult education became a professional field of practice (Rubenson, 2011). Adult education has continuously advanced to respond to societal needs from religious training; occupation preparation; educating and retraining adults to remain competitive in the global economy. Since the inception of the adult education field in 1926, adult education been associated with social goals and has included technical, job-training, and human resource development orientation in the late twentieth century (Merriam & Brockett, 2007). Economic changes, rapid technological advances, and cultural changes have facilitated the evolution of adult education. According to the 2009 report published by the United Nations Educational, Scientific, and Cultural Organization (UNESCO), "Adult education went from being seen as promoting international understanding in 1949 to being seen as a key in the economic, political and cultural transformation of individual, communities, and societies in the 21st century" (p. 15). By responding to various needs and purposes of society, the field of adult education has become diverse with numerous organizations and agencies providing services.

The term adult education has been under much debate and discussion since the inception of the field of study. Defining adult education has varied by cultural and institutional context with changing boundaries dependent on historical situations (Rubenson, 2011). In an effort to achieve its goal of UNESCO (1976, p. 11-12) offered the following abbreviated definition as adult education:

> The term 'adult education' denotes the entire body of organized processes, whatever the content, level and method, whether formal or otherwise, whether they prolong or

> replace initial education in schools, colleges and universities as well as apprenticeships, whereby persons regarded as adult by the society to which they belong develop their abilities, enrich their knowledge, improve their technical or professional qualifications or turn them in a new direction and bring about changed in their attitudes or behavior in the twofold perspective of full personal development and participation in balanced and independent social, economic and cultural development.

Most adult education definitions refer to the learner's adult age and the purpose of the activity. Darkenwald and Merriam (1982) defined adult education as a process of adults participating in learning activities to increase or change their knowledge, attitudes, values, or skills. Houle (1972) defined adult education as the process by which men and women seek to improve themselves by increasing their skill, knowledge, or sensitiveness. While Malcolm Knowles, a very prominent figure in the field of adult education, defined it as "a set of organized activities carried on by a wide variety of institutions for the accomplishment of specific educational objectives" (Knowles, 1973, p. 35). The definitions of the field used in the literature are broad and interpreted several ways by people dependent on their association with adult education. Adding more complexity to the issue, adult education has also been related to continuing and recurrent education (Preece, 2011). Adult education literature primarily addresses designing and organization of adult educational activities, appropriate instructional methods, and how adults learn (Rubenson, 2011), as the adult learning process varies from that of children.

Adult Learners

As the study of adult learning became prevalent in the early 20th century researchers took different theoretical approaches to the study of learning and adult learning (Merriam, 2014). The adult learner has been the subject of numerous studies since the 1920s, when adult education

became a professional field (Merriam, 2001). Three major theories of adult learning provide the foundation of the research on how adults learn – andragogy, self-directed learning, and transformative learning. The most prominent adult learning theory was developed by Malcolm Knowles and is called Andragogy. It is designed to address the characteristics of adult learners and their needs. Self-directed learning is the second major adult learning theory, derived from the work of Tough (1971). It is designed to address adult learner characteristics, why adults learn, and how adults learn. The most recent of the three theories, Transformational Learning, was developed by Mezirow (1978). This theory focuses on the mature cognitive function of adults, a perspective transformation.

Adult learners are distinctly different from preadult learners and traditional students. Teaching adult learners requires a different approach than teaching child and adolescent learners, and an understanding of the nature of adult learning. Many adults have responsibilities and situations, that affect their learning process, adult learners are motivated to seek education to answer to their personal situation. Solving problems motivate adult learners and the process of adult education begins (Merriam & Caffarella, 2007).

Adult learners possess the ability to think critically, assessing their situation, and seeking answers through education. Adult learners are self-directed and control their own learning, with the ability to control and be responsible for their learning progression. And they are likely to have an interest in gaining skills or solving problems. Therefore, the different instructional methods have to be used in an adult educational group.

There are a number of characteristics to describe the adult learner, and no single learning theory can be applied to all adults. Understanding the characteristics of adult learners and adult learning theories provide a foundation for educators, and instructional designers. Each individual

learner is different; adult learners are diverse with different motivations, obstacles to overcome, approaches to learning, and experiences. Therefore, though each theory provides insight into adult learning not one theory that can fully explain how adults learn. Andragogy and similar theories are learner-centered and argue the importance of an individualized approach to learning.

Andragogy

Historically, the term andragogy was authored by Alexander Kapp (1833) as a description of Plato's educational theory (Henschke, 2016; Smith, 1996, 1999). The term was not used mainstream for many years. Malcolm Knowles, a central adult education scholar in the United States, presented andragogy to distinguish adult learning from that of preadults in 1968. The term's definition is "the art and science of helping adults learn" (Knowles, 1980, p. 42). Knowles' introduction of andragogy unified the field of adult education as it gave separate education principles for adult learners (Forrest & Peterson, 2006). Andragogy defines essential characteristics to adult learning that transcend all adult learning situations. Adult educators should ensure the learning environment includes the whole individual – emotional, psychological, and intellectual (Holmes & Abington-Copper, 2000). The andragogical model is based on five distinct principles in adult learning, as adults have distinct needs. These assumptions describe the adult learner as (1) have a need to know, (2) a self-directed learner, (3) uses life experiences as resource for learning, (4) learning needs related to changing social role, (5) application of knowledge to solve problems, (6) has intrinsic motivation to learn.

The first assumption, the learner's need to know, describes adult's need to recognize the value of the content. Knowles presented the facets adult learners need to know: (a) how learning will be conducted, (b) what learning will occur, and (c) why learning is important (Knowles et al., 1998). To be beneficial to the learning environment adult learners should know the content is

relevant and why it is important. The second assumption, a self-directed learner, refers to the independence and self-reliance of adults toward goals. The adult learner takes responsibility for their learning. Adults are autonomous and self-directed, therefore need to be free to direct themselves (Cercone, 2008). Adult educators should provide the framework for adults to be involve in their learning process. The third assumption uses life experiences as a resource for learning, an adult accumulates a growing reservoir of experience, which is a rich resource for learning (Merriam & Caffarella, 1999, p. 272). Adult learners can be a learning resource for themselves and others. Adult educators should provide learners the opportunity to collaborate with one another. The fourth assumption, readiness to learn, refers to the notion that adults are ready to learn information they believe fulfills a professional, societal, or personal role. Adult learners are focused on learning to achieve a developmental goal. The fifth assumption, the orientation of learning, considers adults learning as geared towards problem-centered or tasks with immediate application (Chan, 2010).

Adult learners have a need for immediate practical application of information as related to problems versus content. Including simulations, cases, technology, and collaborative learning opportunities to the learning environment for adults will relate theory to practice (Galbraith, 1990; Wankel & Defillippi, 2003). The sixth assumption focuses on adult's intrinsic motivation as opposed to external motivation. Adults have the tendency to be more motivated to learning that provided internal benefits as well as external motivators. "Adults are ultimately motivated to learn internally and more effective learning occurs when personal goals, interests, attitudes, and beliefs come from learners" (Caruth, 2014, p. 27). As adult learners are intrinsically motivated to learn information to address problems and real-world situations, and andragogy emphasizes the interaction between the teacher-learner relationship and the how adults learn. The principles of

Knowles' andragogical theory meets the adult learners need for autonomy throughout the learning process.

As a foundational theory in adult learning, andragogy has been commonly used in adult education, nursing, human resource development, religion, agriculture, and business. It has received its criticism as well as support. Merriam and Caffarella (2007) stated that andragogy is "the best known 'theory' of adult learning, but also that "it has caused more controversy, philosophical debate, and critical analysis than any other concept/theory/model proposed" (pp.249-250). Critiques can be found in literature Daveport (1993), Hartee (1984), Jarvis (1977), and Lindsay (1984). Prominent leaders in the field of adult education have questioned andragogy in a debate as to what andragogy really is (Henscheke, 1998). Andragogy has been described as a set of assumptions (Brookfield, 1986), a philosophy (Pratt, 1993), and a set of guidelines (Merriam, 1993). Hartee (1984) suggested that andragogy were just principles of good practice, or descriptions of 'what the adult learner should be like (p. 205). Despite the years of debate and critique the the core principles of adult learning derived from andragogy have maintained (Davenport & Davenport, 1985; Hartee, 1984; Pratt, 1988). These principles are the bases for designing effective learning environments for adult learners. Knowles presented principles which also encompassed adult learning: the involvement in assessment and planning, reflection of the learning progression, real-world experiences; and problem-solving situations (Pappas, 2013).

The traditional pedagogical teaching model is founded on presenting information to fill the void of limited to no experience on the part of learners (Loughran, 2013). This model of teaching brings the subject matter and the educator to the center of focus in the learning environment. Children do not possess the amount of experience as opposed to adult learners, and

the traditional teaching model of transmitting knowledge serves the purpose of filling the void of real-world experience, scaffolding teaching methodology towards the principles of andragogy becomes paramount as young leaders mature (Ferreira, 2016).

Cooperative Extension Service as an Adult Education Provider

One of the nation's largest informal adult education providers is the Cooperative Extension Service. The Cooperative Extension Service is a national, publicly funded, non-formal educational system that links the educational and research resources and activities of the U.S. Department of Agriculture (USDA) with over one hundred land grant institutions in every state, territory, and the District of Columbia (Zacharakis, 2008, p. 14). The primary mission of Cooperative Extension Service is to facilitate citizens in improving their quality of life by disseminating research-based information to address real-world problems and issues. The organization's educational programming is based on the needs of the citizens and their local communities. Extension work differs from state to state and county to county (Rennekamp & Engle, 2008). For example, urban area programming differs from programming for rural areas because the needs of the citizens are different.

Historically, Cooperative Extension Service has provided adult education in times of great societal challenge. Extension programming operates under the premise of the adult education's teaching-learning process, teaching people how to solve their problems and learn from others who have had similar problems (Zacharakis, 2008). Extension programs are organized to increase the knowledge and skill set of its program participants. Extension offers programs on subjects such as nutrition and health, financial management, horticulture, food safety and preservation, and community development.

An individual's experience with adult education organizations influences their definition

of adult education. Countless organizations and agencies offer adult education; in a variety of settings such as colleges and universities, local/state community organizations, housing communities, correctional facilities, libraries and museums. Adult education experiences can consist of a skill training or workshop for staff and professionals of a business or organization, a community course offered by a local college or university, and a demonstration program given by the local county Cooperative Extension Service. Each experience, though different, is part of the broader field of adult education. The diverse organizations, activities, and objectives reflected in programming have added to the field's strength, while concurrently hindering the development of a universal identity. The wide range of variation in activities and purposes in adult education is strength but has also aided in the lack of common identity (Merriam & Brockett, 2007). As diversity in the field continues to grow, the challenge remains to create a comprehensive image of adult education. Adult education has evolved tremendously since its inception and continues to develop and increase in its complexity as an educational system and as a field.

Cooperative Extension educational programming provides both informal and formal learning. Formal learning, "where learners are engaging with materials developed by an educator to be used during a program of instruction in an educational environment, highly structured, institutionally sponsored, and generally recognized in terms of a certificate or a credit upon completion" (Gikas & Grant, 2013, p. 19). And informal learning, where unstructured social and leisure activities occur, but have intentional goals to learn skills or knowledge. The Cooperative Extension System provides learning opportunities to Americans offering various educational programs in nutrition, horticulture, agriculture, food safety, personal and financial management, and community development. The common mission throughout the organization is to improve

the lives of citizens with research-based information. Informal and formal learning complement each other, with the use of Web 2.0 technologies and mobile and online learning, the Cooperative Extension System can bridge the formal and informal learning it provides its learners enhancing their learning experience.

Information Technology Use in Cooperative Extension

Technology has continuously changed the way our society communicates, operates, and functions. The county Cooperative Extension office connects local participants with research-based information from Extension Specialists and Researchers at the university level. Therefore, communication is essential with and among Cooperative Extension personnel. Technology, such as computers and the Internet have given Extension personnel the opportunity to connect with both local clientele and university specialists and faculty in a different way. As computer technology increased, Extension scholars have noted the importance of electronic technology to provide sustainable education to expanding audiences. “We in Extension will lose the support of the public if we don’t take an active role in using this new technology in our educational programs” (Douce, 1979, p. 12). By 1988, a national initiative was developed to enhance and promote the use of technology. Extension’s use of computers consisted of office management and educational uses, and Extension personnel needed to acquire and maintain skills for computer applications and computer technology transfer. Since the early 1990s, Extension Specialists have expressed the need to provide an enhanced delivery system and information that makes a difference (Astroth, 1990). Ladewig (1999) stated “Face-to-face communication with clientele is very important method that we will always rely on to bring timely information to our clientele. However, we must also examine how computer technology can help county Extension agents deliver relevant information and support educational programs” (p. 251).

Therefore, the ability to learn and use information technologies to effectively service Extension clientele became job-related skill necessary for programming. Extension educators needed to the ability to adjust and adopt various technologies to enhance educational programming. “It is critical that Cooperative Extension re-invest in employees and train them in the necessary skills to remain competitive and serve a dynamic community” (Albright, 2000, p. 4). Martin (1998) also stated, “with more clients using computers to obtain information, it will be critical for agents and other field staff to gain the computer skills necessary to use computers as a means for gaining greater efficiency in obtaining and sharing educational information” (p. 3).

As society changed and the Internet became a major component of life, including work, education, and social, Extension needed to be strategic about its approach to instruction. According to Elbert & Alston (2005), Extension could be viewed as a potential digital content provider and information literacy instruction (Woods & Langcuster, 2014). Conveying the importance of Extension educators’ acceptance and adoption of technology. Presently Extension educators use some aspects of technology in program delivery. Globally information technology’s (IT) role has increased in Cooperative Extension Services. Leading Cooperative Extension to provide readily available resources for learners, and new formats for program delivery. Extension used computer technology to reach clientele with video conferences (Pankow, Porter, & Schuchardt, 2006), webcasts (LGEAN 2004), electronic newsletters (Westa, Broderick, & Tyson, 2005), curriculum and training materials on Web sites and CD-ROMs (Dunn, Thomas, Green & Mick, 2006; Zimmer, Shriner, & Scheer, 2006), online communities (Kalliornata, Vlosky & Leavengood, 2006).

To be effective Extension personnel must be using current technologies, possess IT skills, and remain abreast of technologies to enhance learning. According to Rasmussen (1989) the new

method was for Extension educational program delivery to include technology such as the personal computer, teleconferencing, and computer networks. The Internet allows information to be disseminated to a wider range of individuals, despite distance. Today, the Internet and Web 2.0 technology tools can be beneficial to educational programming and Extension educators may find new ways to disseminate information and deliver programming. With the rapid technological innovations Extension personnel must maintain relevant by utilizing current information technologies. Rasmussen (1989) stated: "Communication is the key to the operations of the county Extension office. More and more county Extension office are turning to computers and other electronic technology to improve the communications with the state offices and with the university specialists, as well as with the people they serve" (p.8). Martin (1989) further expounded stating "Computer and information technologies are vital components of Extension's infrastructure. Staff will have to transmit information between offices and clientele at a distance" (p. 3).

The Internet has created numerous opportunities for Extension personnel to broaden their reach and impact, "there are tremendous opportunities for Cooperative Extension (CE) on the Internet. These opportunities are for improved functionality of the CE system, and new opportunities for communities that sustain the CE system" (Tennessen, Pon Tell, Romine, & Montheral, 1997, p. 1). Extension professionals can guide clientele's use of the Internet to obtain information. Presently, web conferencing is used by Cooperative Extension for professional development, meetings, and project collaboration. Murphrey and Coppernoll (2006) highlighted the benefits of adopting web conferencing for Extension professionals' training and professional development, giving staff the opportunity to attend meeting without the constraints of time, money and distance.

Extension educators have used emergent technologies such as podcasting to deliver educational programming. Podcasting is a Web-based technology that allows end-users to download content and playback on their personal devices. Podcasts are published through RSS (Really Simple Syndication), allowing instant syndication on the Internet. This technology brings flexibility to Extension's reach, giving clientele the ability to download and access the information and contents at their convenience.

Various Extension educators have expanded their outreach efforts with the use of blogs to discuss topics and provide information. A blog is an online informational website, a platform where an individual or a group can share their perspectives and views on a subject. Jones et al. (2011) found that Cooperative Extension can use blogs for disseminating information and maintain Extension's reputation of the personalized connection. Blogs are on the Internet and accessible to the public Extension educators can provide relevant information in a timely manner, create an environment for discussion (through comment section), build relationships and track impact through web-based metrics.

Extension educators may find social media a useful method for communication and education. Social media tools, such as Facebook, allow Extension educators to build connections, interact with clientele and market the programs and events they have planned. Cornelisse et al. (2011) presented, "Social media tools offer quick and widespread distribution of information, which can be valuable to Extension personnel reaching out to audiences who may not know about Extension otherwise" (p. 2).

As information technology continues to rapidly evolve and change, Extension personnel must maintain up-to-date skills to meet the changing Extension clientele. To meet training and professional development needs Cooperative Extension leadership has used technology

internally to deliver training and communicate. Therefore, Extension professionals can use information technology to effectively achieve communication between all entities, improve the functionality of Cooperative Extension, and provide new opportunities for communities that sustain the Cooperative Extension System.

In 2011 Kinsey conducted a study evaluating the various technologies utilized within the professional phases of one's educator career. Results were 46% of early-career (0-10) educators, 14% mid-career (11-20 years) educators, and 0% (21+ years) educators use daily or weekly social networking sites. Studies have been conducted on the general use of social media by Extension Family and Consumer Sciences agents (Kinsey, 2011; O'Neil, Zumwalt, Ravenscraft, Swanson, & Seiling, 2011). Many difficulties were cited as reasons for lack of technological use, limited time to learn and use Web 2.0 technologies, awareness of technologies, time commitment to maintain technologies (O'Neil et al., 2011).

The mission of Extension education is to help individuals meet their needs, by reaching the individual where they are. With the rapid advancement of technology and the constant use of technologies in our society, Extension personnel have the challenge and opportunity to meet learners online. Despite the challenges Extension educators can engage learners using Web 2.0 technologies and benefit from technological advances.

Education

In the mid-1960s computer-based simulations and computer-based employee training programs were becoming popular, and computing began in education. Advanced computing technology was available for K-12 education institutions, but equipment cost, and limited experienced personnel delayed the use of computing. Loughary (1966) indicated computers were natural parts of our environment, this included mainstream education. "The concepts underlying

systems and electronic communication devices are playing increasingly important roles in education and, if the thinking and planning of some educational leaders is valid, are destined to become basic and necessary to education in the not too distant future" (Loughary, 1966, p. xi). Loughary's stance advocated for the use of computers for instructional purposes, as he foresaw change. During this time, professional educators were reluctant of the adoption of computers for instructional purposes. Lougharty insisted, "While anticipating the possibilities for individualizing and enriching instruction, he is reluctant to part with the professional methods developed over the years and in which he has a real personal investment. Few people after having gained professional status enjoy returning to the role of novice" (Loughary, 1966, p. 6). Loughary saw the importance of educators embracing new technology and the potential of technology enhancing the teaching and learning environment. "Nevertheless, the extent and rapidity with which man-machine systems and new technology are implemented in education will depend on the willingness of professional, experienced teachers at all levels – kindergarten through college – to experience some basic re-education in machine and systems technology" (Loughary, 1966, p. 6).

Nearly two decades later, the microcomputer has encompassed most society, and use began increasing in education. This was the major catalyst to the major use of computers in schools (Winship, 1989). Though computers became a part of the educational environment in the 1980s, by 1999 only ten percent of U.S. high schools had a 1:10 student/computer ratio (diSessa, 2001). Despite the rapid evolution of computer technology, the adoption of computer technology use in education was slow.

The educator's role in technology adoption and acceptance is a critical one. "Teachers in general seem to resist technological progress and may appear to be the biggest stumbling block

inhibiting changes in the way computers are used in schools" (Winship, 1989, p. 29). Research has been conducted on teachers' resistance and reluctance to technology (Clark & Salomon, 2001; Cradler & Cradler, 1995; McKenzie, 1999; McNierney, 2004; Sprague et al., 1988; Stuhlman, 1998).

Computers have impacted education and society since the 1960s, changing the home, work, and educational environments. Even 20 years ago the computer and information technology were not used as they currently are, but scholars recognized the potential to revolutionize education. diSessa expressed, "Computers are incontestably transforming our civilization. Comparisons of our current information revolution to the industrial revolution are commonplace and apt" (diSessa, 2001, p. 3). Computers would have a profound effect on literacy in contrast to text-based literacy achievements (diSessa, 2001).

Technology has been prevalent in education for many years, and educational technology has become a field of study. It has been a challenge for scholars to create a centralized definition for educational technology. Which has resulted in many various definitions of technology and educational technology. Garrison and Anderson (2003) presented the following definition from The Association for Educational Communications and Technology (AECT) Definitions and Terminology Committee. Educational technology is "an array of tools that help in advancing student learning and may be measured in how and why individuals behave in the classroom" (p. 16). Technology has been referred to material things used to improve humanity, including systems software and hardware. More recent technology tools are iPads, smartphones, tablets, and laptops.

The use of technology has increased, and the inception of the Internet has been a catalyst in the increased use of technology. Technology provides learners the opportunity to be active

participants in their learning (O'Banion, 1997). Kershaw (1996) reported that effective change management leads to successful technological integration. It is imperative for educators to participate in technology training and development to have higher levels of technology integration in the teaching-learning environment (Adams, 2002). Integrating technology in the teaching and learning environment enriches collaboration and a student-centered approach (O'Banion, 1997). TapScott and Williams (2010) reported that "First, we need to eject the old educational model of pedagogy (how learning is accomplished) and replace it with a new advanced model called collaborative learning. Second, we need an entirely new *modus operandi* for how the subject matter, course materials, texts, written, and spoken word, and other media are created" (p. 16).

Information technology is pivotal in higher education, in 2000 42.7% of colleges used web resources for courses and 59.3% used electronic mail for courses (Campus Computing Project Survey, 2000). Currently, colleges and universities use information technology for a myriad of functions such as communication, tuition payment, registration, grading, and online course offerings (Campus Computing Project Survey, 2000). Institutions are employing mobile wireless technologies for the teaching-learning environment, such as applications to transform webpages to format for mobile devices, student wiki projects, faculty and students sharing thoughts through blogging websites, and requiring students use mobile devices to complete assignments (Berg, 2011; Grosseck, 2009). Integrating Web 2.0 technologies into higher education through various activities allows institutions to keep students engaged and increase the community building.

Education has changed drastically with the creation of digital technologies such as the computer, digital media, mobile devices, and social networking sites which are transforming

learning and training. Throughout society individuals are using technologies in formal and informal education, thus learning on their individual terms. The recent technologies create challenges for traditional learning of schools, colleges, and extension. Information technology has allowed education to shift to learner-centered, with learners deciding topic of learning, how they learn and where learning take place.

The current educational system, change sparked by the industrial revolution, has always attempted to adapt to change. “Our current model of schooling grew out of the technologies and social practices of the industrial revolution” (Collins & Halverson, 2009, p. 18). The rise of the industrial revolution brought universal schooling, and the rise of information technologies is redefining this system.

Adult Education

Adult education has become more prevalent in the United States, as more adults are seeking to further education, degrees, increased skill sets, and overall general learning. As the Internet has been used by many adults to research and learn about various topics of interest. “While much of the learning that goes on is recreational, it still provides valuable knowledge that sometimes may lead to a second career or pursuit of a long-time interest” (Collins & Halverson, 2009, p. 21).

Technology has become an integral part of education, with various applications and platforms providing alternatives and supplements to traditional classroom education. Integrating technology into adult learning and instruction will complement instruction and extend learning. Beer and Burrows (2007) argued that Web 2.0 technologies would expand our abilities and possibilities, and “reconfigure our relations with objects, spaces, and each other” (2007, para. 1.2). The advancement of Web 2.0 technologies has impacted education, empirical studies have

been conducted to examine student educational use of social networking sites (Ellison, Steinfield, & Lampe, 2007; Selwyn, 2007) educators use of social networking sites (Hewitt & Forte 2006; Mason 2006; Mazer, Murphy, & Sumonds, 2007); and privacy (Boyd, 2007; Dwyer, Hiltz, & Passerini 2007). Web 2.0 technologies have produced in interactive teaching-learning environment with collaboration, knowledge sharing, and participatory learning.

The present technological changes have transformed the way society functions, resulting in demands for new educational approaches (Fischer & Konomi, 2005). Internet technologies enhanced traditional classroom education design and delivery; whereas the use of Web 2.0 technologies expanded the growth of the teaching and learning environment.

Technology has allowed education to take place beyond the traditional learning environment; learners are not only active participants, but co-producers of content and learning. According to Klamma et al. (2007) "emergent new Web 2.0…concepts and technologies are opening doors for more effective learning and have the potential to support lifelong competence development" (p. 664).

There are numerous studies on online learning, particularly instructional technology, to determine the effect of social interaction and communication on learning. According to Birch and Volkov (2007) and Wilson and Stacey (2004) the social constructivist ideal is based on learner-centered learning, where learners share information, skills, and viewpoints with instructors and peers. Wang (2010) presented learning theories emphasizing an environment in which learners share and access knowledge and resources. These arguments support online learning, and its benefits to the learning process and outcomes (Shih, 2011). Web 2.0 technologies are also supported by constructivist learning theories, placing the learner center of the knowledge. Therefore, online learning appears beneficial to the learning process and

outcomes (Lee & Woods, 2010).

Web 2.0 Technology

Originally, the Web was developed by Sir Tim Berners-Lee with the vision of "a collaborative workspace where everything was linked to everything in a single, global information space" (McLoughlin & Lee, 2007, p. 665). Sir Tim Berners-Lee's web software prototype contained the same read/write concept as Web 2.0. However, the original Web did not include the read/write aspect. The original web was one-directional allowing read-only capabilities. The read/write concept first appeared in 1994-1995 with the first wiki, called the WikiWikiWeb that was the website with editable pages in the internet browser (Leuf & Cunningham, 2001); and blogs in 1997 appeared. "Web 1.0 or the first-generation web" (Cormode & Krishnamurthy, 2008, p. 1) was thought to be an educational resource, like the conventional resources, such as a book a source of information; an overhead transparency, a method to present content; or a speaker, a channel to communicate information (Wallace, 2004, p. 449). The majority of Web 1.0 consisted of hierarchically assembled websites with content controlled by a limited number of providers; users searched and read information of interest. Web 1.0 was designed from a classical perspective with experts of the field with substantial credentials in academic disciplines provided the information to the public based on their research and findings. (Dede, 2009). The experts were the creators of all content, users simply search and received information. Web 2.0 revolutionized information sharing.

"Web 2.0 is a set of internet services and practices that give a voice to individual users" (Crook, 2008, p. 8). In 2004 Dale Daugherty coined the term Web 2.0, though the term was officially attributed to Tim O'Reilly, owner of O'Reilly Media Inc. O'Reilly published a paper entitled, "What is Web 2.0: Design Patterns and Business Models for the Next Generation of

Software", which highlighted features associated content sharing and collaboration. O'Reilly defined Web 2.0 as "a network as platform, spanning all connected devices" (Wu, 2011). Two distinct differences consistent with Web 2.0 are: platform and participation. "Web 2.0 is a platform with applications and files stored on the Web rather than on a user's desktop" (Darwish & Lakhtaria, 2011, p. 204); and secondly, user participation is possible. McLoughlin and Lee (2007) defined Web 2.0 as "a second generation, or more personalized, communicative form of the World Wide Web that emphasizes active participation, connectivity, collaboration and sharing of knowledge and ideas among users" (p. 665).

As Web 1.0 evolved into Web 2.0 there were some similar features: Web 2.0 supports user interconnectedness by: "(a) user-defined linkages between users and content (e.g., posting on other pages), (b) simple mechanisms to share multimedia content (e.g., blogs), (c) prominent personal profiling (e.g. displaying user preferences on customized profile pages), and (d) intertechnology applications, enabling interfaces with services and features on other sites" (Cormode & Krishnamurthy, 2008). Howe (2006) presented five general processes reflected in Web 2.0 applications:

1. User-contributed content is shared;
2. Large amounts of user contributed content;
3. For user community content development;
4. Location of trends and overviews of contribution;
5. Creation of the simulated and virtual worlds and artifacts within the worlds.

It provides accessible decentralized knowledge, established by collective agreement of users, and broad engaged community of peers.

Various scholars have argued that Web 2.0 environments facilitates self- reflection,

expression, and better methods collaboration. Although the increased use of Web 2.0 technologies has changed the daily lives of society, Cooperative Extension limits the use of Web 2.0 in the learning environment. Extension educators and personnel need to understand the opportunities Web 2.0 technology tools provide in the teaching and learning environment, and effective implementation of tools for teaching. Extension educators could benefit from Web 2.0 technologies as a supplement to educational programming. "Web 2.0 has the potential to create more interactive and powerful learning environments in which learners become knowledge creators, producers, editors, and evaluators" (Richardson, 2009, p. 1). Web 2.0 users have more control over their data and information.

Web 2.0 has grown, and its applications are more popular. The Web 2.0 consists of web-based tools that connect people and sharing allowing individuals to create and share knowledge and collaboration. According to Brown and Adler (2008), "Web 2.0 technologies have blurred the line between producers and consumers of content and has shifted attention from access to information toward access to other people" (p. 18). Web 2.0 technologies provide platforms for connecting people, discussions, and sharing; thus, providing community support and exploration and development.

Web 2.0 has become a prominent means for providing and sharing information. Current web technology is used in communication among or within communities. Digital technology has become a constant today and began with the evolution of the personal computer, the Internet, cell phones, iPods/iPads, and Web 2.0 technologies. Society has become more comfortable with digital technology, as it now includes the "Net generation" and "digital natives". Web 2.0 technology tools – blogs, wikis, podcasts, and social networking – offer a new way of communication, encouraging users to become active participants. The Internet has evolved from

mainly access to obtain information to creation of information and sharing with others. As people have become accustomed to Web 2.0 technologies, it has begun shaping the way individuals today communicate, engage, learn and teach. Therefore, shaping and changing the teaching-learning environment.

The use of Web 2.0 technologies has the potential to enhance the teaching and learning environment, by encouraging and enabling interactive collaboration. Web 2.0 gives learners the capability to express their ideas and share their feedbacks in text, photos, videos, and audio format. Therefore, learners are creators and evaluators of knowledge. As noted by Wu (2011), "learners' critical thinking skills can be enhanced through the opportunity to regularly compare their own contributions to those of their peers, and the affirmation of their relative standing in the class may be powerful motivation for learning (p. 9).

The emergence of Web 2.0 technologies has changed the broader learning and teaching environment. According to Cash, Lee, and Frass (2010), "prior to the introduction of the Internet, the traditional methods of public education have been unaltered for almost 300 years" (p. 63). Previously, the learning environment consisted of the instructor controlling the teaching learning exchange; whereas presently students have the responsibility to understand materials (Gottwald, 2005). As times have changed, instructors cannot remain stagnant in this digital age. They must incorporate technology in their instruction, as students are already equipped with knowledge about Web 2.0 technologies and use them frequently. Extension educators should incorporate Web 2.0 technologies into their educational programming to engage participants.

Types of Web 2.0 Tools

The Internet changed the world's communication; however, the use of traditional communication tools (phone and television) revealed limitations. The emergence of Web 2.0

proved to enhance the world's digital connectedness. More dynamic and interactive that Web 1.0, Web 2.0 is a collection of technologies and social trends that allow users to access information and contribute knowledge as well. Web 2.0 technology tools include but not limited to – instant messaging, internet telephony, social bookmarking, web logs (blogs), wikis, Really Simple Syndication (RSS), podcasting, and social networking sites, consist of many technologies that allow users to share content easier. The use of these technologies has the potential to enhance learning experiences with customization, personalization and collaboration (McLoughlin & Lee, 2007). The following describes a few Web 2.0 technologies:

Blogs

Derived from the 'personal homepage' concept, a weblog, otherwise known as blog, is a website and authoring tool that consist of two-way communication. The user publishes content on open platforms such as WordPress (www.wordpress.com) and Blogger (www.blogger.com). Similar to an online diary or journal where individuals' express thoughts, ideas, and comments in the form of text, images, and links to websites. With the collaborative nature of blogs, they have begun to prove beneficial in education. Blogs provide content on a specific topic in such a form that users can get the most recent information first or have community discussion on a topic of interest (Yang & Chang, 2011; Rudestam & Schoenholtz-Read, 2010). Blogs have advanced beyond strictly text and have evolved into other forms – audio (podcasts), and video (vlogs). Blogs allow communication between the viewer and the blogger, by the commenting features. According to Darwish and Lakhtaria (2011), blogs encourage critical thinking, facilitate reflective thinking, allow feedback, and active learning.

Blogs can be useful in supporting traditional face-to-face learning and education. "Blogs can be used as an instructional tool for communication, articulation, reflection, evaluation, and

analysis" (Kitsantas & Dabbagh, 2010, p. 167), while also connecting learners to subject-matter experts and the opportunity for public commentary (Rudestam & Schoenholtz-Read, 2010).

Wikis

The creators of wiki defined wikis as "a freely expandable collection of interlinked Web pages, a hypertext system for storing and modifying information – a database where each page is easily edited by any user with a form capable Web browser client" (Leuf & Cunningham, 2001, p. 14). Wiki users have the ability to create, edit, and link content; thus, creating collaborative web pages. The beginning of the Web 2.0 era introduced Wikipedia. Wikipedia's definition of wiki is "a page or collection of web pages designed to enable anyone who accesses it to contribute or modify content. Wikis are often used to create collaborative websites and to power community websites" (Leuf & Cunningham, 2001, p. 22).

Researchers have discussed the benefits of using wikis for education, as they are good for collaborative learning (Parker & Chao, 2007; Schaffert, et al., 2006, Wales, 2004). The information sharing and collaboration features will improve peer interaction, as the collaboration tool allows individuals' input to fashion results. Collaborative learning has been defined as "an activity that is undertaken by equal partners who work jointly on the same problem rather than on different components of the problem" (Brandon & Hollingshead, 1999, p. 54). Learners are responsible for their learning as well as constructing new knowledge with other learners (Schaffert, et al., 2006). The collaborative nature of wikis lends to their effectiveness in teaching and learning, as they support project-based learning, inquiry based and social constructivist learning, and collaborative learning. The educational uses of wikis are:

- Learner Projects – Collaboration of ideas and organization of documents and resources.
- Presentation Tools – ePortfolios, creation of collaborative handout for learners; learner

journaling.

Learner FAQ -- Creation and maintenance of learning discussion and debate area; place to aggregate web resources; project support.

Really Simple Syndication (RSS)

Really Simple Syndication (RSS) facilitates interaction between various social media. Almost all Web 2.0 technology benefits from RSS. Murugeson (2007) defines RSS as, "a family of web feed formats used for syndicating content from blogs or web pages. RSS is an XML file that summarizes information items and links to the information sources" (35). RSS readers review changes or updates on blogs or websites of interest and inform users and display the updates or changes. RSS can be employed in the following:

- Time saving information updates.
- Information from sources of interest; sharing work among users.
- Replace traditional email lists.
- Keep course specific webpages current and relevant.

Video Sharing

The largest growing Web 2.0 technology has been video and photo sharing services. Popular sites such as YouTube (youtube.com) allow individuals to share videos and photos on a massive scale. Millions of individuals participate in sharing and viewing videos daily, making YouTube the largest video sharing site on the Web and the second largest social networking site next to Facebook. These services can be used for educational programming in the following ways:

- Creation of subject specific videos with learners.
- Location of videos on current subjects or relevant issues.

Podcasts

The term podcast was birthed from the combination of the iPod by Apple and broadcasting. Podcasting can consist of audio files and images and videos, similar to a blogging but for an audio device (Buffington, 2010). Podcasts emerged with the increased use on mobile devices – iPods, iPads, smartphones, MP3 players and are downloaded on the device for the user to listen to the broadcast. The process of user-generated podcasts has been reformatted for simplified distribution, allowing learners and educators the opportunity to create and share content for the learning environment. Audacity (audacityteam.org) is an example as it is a digital audio editor and recording application.

New podcasts, items, or videos notifications are sent by Really Simple Syndication (RSS) or by email using a web-based/software-based aggregator. RSS 2.0 has an enclosure, which sends the URL of the media file and downloaded by the podcatcher. Podcast can be beneficial in the teaching and learning environment, as learners can have an opportunity to listen to educators, as well as publish their won podcasts (Lee et al., 2011).

Social Networking

Social networking provides interaction among users, essentially it is the building of online communities. The number of social websites has dramatically increased in recent years, allowing users to create knowledge and make contributions. Encyclopedia Britannica Online (2019) defines a social network as "online communities of individuals who exchange messages, share information and cooperate on joint activities" (p. 1). Social networking applications and websites "support the maintenance of personal relationships" (Zyl, 2008, p. 909). Social networking sites (SNS) encourage individual engagement and interaction through a web interface that connects friends and others, by user created profiles. Examples of social

networking tools are Facebook (facebook.com), Twitter (twitter.com), Instagram (Instagram.com), and Snapchat (snapchat.com). According to Kitsantas and Dabbagh (2010), social networking applications create community networks for users to share interests, multimedia, and collaborate ideas, creating an environment that connects knowledge, community and learning.

Social networks sites are like blogs, consisting of software that facilitate collaboration, information sharing, and communication of users from various locations with common interest. Darwish and Lakhtaria (2011) stated, “Social networks can also be viewed as, for example, pedagogical tools that stem from their affordances of information discovery and sharing, attracting and supporting networks of people and facilitating connections between them, engaging users in informal learning and creative expressive forms of behavior and identity seeking, while developing a range of digital media” (p. 20). In 2004 Mark Zuckerberg created Facebook, initially it was designed to connect college students with one another, a means of communication. Facebook is an online network where users create persona profiles and share content with other individuals they relate to for free. In 2007 Facebook began providing universities with fan pages; universities could market their educational services (Greenhow, 2011). Social media and Web 2.0 tools, or “web apps” encompasses (1) social media, such as Facebook, Instagram, and Twitter, (2) media sharing, such as YouTube, (3) creation and publishing tools, such as wikis and blogs, (4) republishing through RSS feeds, and (5) content tools (Greenhow, 2011, p. 140).

Social networking sites (SNS) have become popular among college students and young adults, as well as seniors. The use of social media website and mobile apps have increased from 5% (2005) to 69% (2018), with the growth representing a broader range of demographics (Social

Media Fact Sheet, Pew Research, 2018). In a 2018 study conducted by Pew Research, of adults in the United States regarding social media, resulted in Facebook and YouTube being heavily used websites. With 68% of adults using Facebook, it is considered the primary social networking site in America. Social media goes beyond Facebook, with YouTube the video sharing site is used by 73% of adults. Resulting in the two sites dominating the social media landscape. Social media is thought to essential to education, though the media themselves are not designated solely for education.

Web 2.0 Usage and Education

The most recent evolution of the Internet was coined Web 2.0. Though defined from various perspectives (Alexander, 2006; O'Reilly, 2008; Siemens, 2008; Zimmer, 2007), the definitions collectively give insight into Web 2.0 technologies. "Web 2.0 refers to the social use of the Web which allow people to collaborate, to get actively involved with creating content, to generate knowledge and to share information online" (Grosseck, 2009, p. 478).

Supporters of Web 2.0 technology tools advocate for use of these technologies in education, with potential to provide collaborative and innovative avenues to address needs of learners. There has been continuous debate about the use of Web 2.0 technologies in education, "Compounded by the fact that there is very little reliable, original pedagogic research and evaluation evidence and that to date, much of the actual experimentation using social software within higher education" (Anderson, 2007, p. 32).

Technically inclined educators integrate technology into their teaching, using blogs, wikis, and websites to facilitate learning. These technologies encourage learners to explore and discover knowledge by communicating with global peers and colleagues. In contrast, educators with limited technical ability may not realize the benefits of the software applications and

websites. Some educators find Web 2.0 activity within education may prove to be difficult to manage (Crook, 2008, p. 7). With rapid technological changes in society, teaching must change to benefit learning. Removing the assumption that learners are virtually the same as they have traditionally been, and therefore the same methods will transcend current and future learners (Prensky, 2001). Educators should "learn to communicate in the language and style of their students, not changing the meaning of what is important or good thinking skills" (Prensky, 2001, p. 4). To remain competitive educators must adapt and stay abreast of emerging technologies and incorporate them into learning.

Web 2.0 technologies – social media, blogs, podcasts, and wikis are widely used and have illustrated to be useful in learning. Educators should learn and understand the benefits of integrating these technologies in education (Williams & Chinn, 2009). When integrating Web 2.0 into education, it is important to consider: (1) learning activities within Web 2.0 technologies are constructed within the understanding that 21st century education should provide a theoretical perspective of pedagogy (Pea, 2004; Stahl, 2005; Vygotsky, 1978), (2) Learning opportunities from Web 2.0 technologies offers learners critical thinking, writing, and reflection skills; information sharing and social learning. Learners can control their learning, providing more informal learning (Hall, 2009; Ravenscroft, 2009; Siemens, 2005), (3) Lastly, most young adults are engaged by Web2.0 in the personal lives (e.g. social networking). Most learners are familiar with new Web 2.0 spaces. Many educational settings are adopting an environment to promote the use of Web 2.0 technologies to learners.

Factors Influencing the Adoption of Technology

Increased competition decreased government funding, and aging facilities have posed a challenge for Cooperative Extension. Technology potentially can offer many opportunities for

extension education. Extension faculty and educators have access to innovative technologies to enhance the teaching and learning environment. Hooper and Rieber (1995) presented the traditional role of technology in education with two types of technologies, "product technologies" and "idea technologies". Product technologies consist of computer hardware, software, and internet connectivity and idea technologies are generally represented through technology such as pedagogical alternatives, new theoretical assumptions, and learning environments" (Hooper & Rieber, 1995). Integrating technology into the teaching and learning environment is important in formal and informal education areas, as it has the ability to benefit education and offers potential to enhance teaching and learning. Though there may be resistance to change to integrate technology into educational programming, educational technology provides both educators and learners greater options in the teaching and learning environment. The body of literature pertaining to adoption and diffusion of innovations is vast, resulting in many unrelated diffusion theories. General diffusion theories can be applied to a number of organizations and instructional technologies.

Rogers' (1985) diffusion of innovation model provides a description of technological change. The flow of innovation consists of innovators – individuals who readily adopt new technologies early; two groups subsequently adopting the innovation; and lastly, the group of individuals that resist to the end. The level and speed of technology adoption is related to the resources and acceptance of technologies by educators and faculty. Also, Rogers' theory of innovation attributes presented "potential adopters decide to adopt or reject an innovation based, in part, upon their perceptions of the innovation's attributes" (Surry et al., 2005, p. 615). This theory points innovation adoption is based on an individual's personal or professional goals, the innovation's complexity, and the benefits observed. These perceptions are crucial to an

individual's innovation adoptions.

There are diffusion theories presented for the field of instructional technology, within educational settings. Ernest Burkman's (1987) User Oriented Instructional Development model, sought to examine adopters' perceptions and use those perceptions to design instructional technology. Hall and Hord's (1987) Concerns Based Adoptions Model (CBAM) focuses on the roles individuals within organizations facilitating change, categorizing individuals into seven different stages of concern about technology. These theories can help with the development of strategies for technology implementation and integration the teaching and learning environment and overcoming potential barriers.

The literature provides analysis of technological integrations strategies and barriers in education. One such barrier to overcome for successful use of technology in education is the instructor's resistance. The use of technology has been limited, primarily because the instructors' beliefs on teaching, learning, and the educational environment may be a major hindrance to technology integration. Hew and Brush (2006) defined attitudes as specific feelings that indicate whether a person likes or dislikes something. The instructor's beliefs about Web 2.0 technologies may shape his or her attitude on the purpose for the teaching and learning environment. Therefore, instructors have a variety of reactions to integrating technology in education from eagerness to anxiety, and these beliefs can impact the success of technology integration.

Technology Acceptance Model

Since the 1970s, advances in information systems and technologies have grown improving the quality of products and services and changing professional and personal lives. With the change, research in information systems on new and emerging information systems and technologies have provided better insight of processes and outcomes. A significant amount of

research efforts has focused on factors that facilitate implementation of information technologies in education and business (Bowns, Rotherham, & Paisley, 1999; Cresswell, Bates, Sheikh, 2013; Ferrerira & Kuniyoshi, 2015). As a result, factors that influence the use of information technology have been considered and examined. In the 1980s, researchers focused on developing and testing models to predict technological use and implementation. Studies consistently illustrated that positive user attitude towards an information technology or system results in successful implementation of the system. Therefore, user satisfaction has been a concentration of information technology research as an explanation of system use. Bailey and Pearson (1983) presented a thirty-nine-question survey to measure user satisfaction, identifying factors that may influence user satisfaction and making a significant contribution to the development of a tool to measure and analyze user satisfaction. This tool became one of the most widely used instruments to address information technology and system user satisfaction before the inception of the Technology Acceptance Model. The research on user satisfaction and the user satisfaction models developed were prevalent in Information System research, but they were limited and did not include the demand for incorporating user satisfaction into Information System design and implementation (Ditsa & MacGregor, 1996).

Studies have indicated positive user attitudes and beliefs towards the information technology or system is essential for success (Bailey & Pearson, 1983; Coombs, Doherty, & Loan-Clarke,,2001; Davis, 1993; DeLone & McLean, 1992; Grantham & Vaske, 1985; Lucas, 1978 and 1981). Researchers have studied the effects of social issues on user interactions and satisfaction, determining three categories: perceived benefits and convenience, user background and involvement, and organizational attitude and support (Mahmood et al., 2000). The literature identifies dimensions of the aforementioned categories as: perceived benefits and convenience –

job related benefits the user believes the information technology will provide him/her; user background and involvement – the user's disposition to use the information technology; and lastly, user and management attitude toward the information technology. The combination of these related factors and variables are researched to determine IT end-user satisfaction and effectiveness. As regards to the variables that seem to contribute to IT system use, research indicates perceived ease of use and perceived usefulness are essential indicators of user acceptance (Davis, 1989; Venkatesh & Davis, 1996; Venkatesh et. al, 2000) to predict user satisfaction with information technology.

The use of information technologies has grown exponentially in the field of education and have become an essential part of education. As institutions and organizations invest and implement information technologies at an increased rate, user acceptance is critical to successful implementation and enhanced programming and education. Underutilized technologies result in missed opportunities to increase the effectiveness of education. As stated by Davis et al. (1989), "As technical barriers disappear, a pivotal factor in harnessing this expanding power of computer technology becomes our ability to create applications that people are willing to use" (p. 982). Therefore, understanding user acceptance of technologies has been extensively researched by IT practitioners and researchers on various information technologies and user groups. A prominent portion of information systems research has been the adoption and use of information technologies and systems, as there have been advancing information systems implemented that have yielded limited and low-end user usage. Researching user attitudes towards information technologies are important, as understanding and creating conditions in which information system are successfully used can contribute to the success of an organization. Information systems research has yielded significant results in understanding and predicting user acceptance

in the workplace. Results concluded that user acceptance was critical to IT adoption and it could be predicted and explained by surrounding factors. The relevant factors contributing to the investigation of the determinants of IT acceptance include individual characteristics, technology characteristics, and the organizational characteristics.

Before the conception of the Technology Acceptance Model (TAM) early researchers concentrated on developing tools to measure user satisfaction. Bailey and Pearson (1983) presented the study of user satisfaction and identified thirty-nine factors that may influence user satisfaction. Cheney et al. (1986) consolidated the factors Bailey and Pearson (1983) into three categories: (1) Uncontrollable (task technology and organizational time frame); (2) Partially Uncontrollable (psychological climate and systems development backlog); and (3) Fully Controllable (end user computing training, rank of EUC executive, and EUC policies). Researchers used various models to understand the nature of IT acceptance and adoption. These include, but not limited to, the Theory of Diffusion of Innovations (Rogers, 1995), Theory of Task-Technology fit (TTF) (Goodhue & Thompson, 1995), the Theory of Reasonable Action (TRA) (Fishbein & Ajzen, 1975), Theory of Planned Behavior (TPB) (Ajzen 1985, 1991), Decomposed Theory of Planned Behavior (Taylor & Todd, 1995). Kwon and Zmud's Diffusion Implementation Model (1990), and Davis' Technology Acceptance Model (1989) are examples of models aimed at investigating IT acceptance (Patrick et al., 1999). As opposed to comparable frameworks TAM has abundant empirical support, a strong theoretical basis, and IT specificity. Throughout IT research the Technology Acceptance Model (TAM) has proven to be the most influential and used model to measure and predict end user intentions (Paul, John and Pierre, 2003; Venkatesh, 2000). The Technology Acceptance Model (TAM) has received considerable empirical support from various studies through validation, replications, and applications (Adams,

1992; Chin & Gopal, 1993; Chin & Todd, 1995; Davis, 1993; Davis, 1989; Davis et al., 1989; David and Venkatesh, 1996; Mathieson, 1991; Segars & Grover, 1993; Szajna, 1994, 1996; Taylor & Todd, 1995; Venkatesh, 1999; Venkatesh & Davis, 1996; Venkatesh & Morris, 2000), illustrating that TAM is reliable regardless of setting, technologies, or population. Several empirical studies have concluded that TAM accounted for a substantial amount of the variance in usage intentions and behavior (Venkatesh & Davis, 2000).

The Technology Acceptance Model was developed by Davis to examine computer-usage behavior (Hu et al., 1999), designed to understand the role of user attitudes towards new technology. "The goal of TAM is to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the seam time being both parsimonious and theoretically justified" (Davis, Bagozzi & Warshaw, 1989, p. 985). TAM was derived from Fishbein and Ajzen's Theory of Reasoned Action (TRA), which proposed beliefs influence attitudes, develop intentions, and guide behavior. Fishbien and Ajzen (1975) proposed the Theory of Reasoned Action (TRA) to speak to individual behaviors in specific situations. The principles presented in the Theory of Reasoned Action (1975) provided a solid motivational linkage between stimuli and actual use, such as an individual's behavior may be determined by his or her intention and beliefs about the given behavior (Davis, 1985). They suggested an individual's intention proceeding an actual behavior as the individual's behavioral intention. According to Fishbein and Ajzen, the behavioral intention could be influenced by an individual's attitude regarding the actual behavior, as well as the subjective norm correlated to the behavior (1975). They described the positive and negative feelings an individual possesses about performing the behavior as the attitude. An additional concept described in Fishbein and Ajzen's

TRA (1975) was the influence of the social pressures of others as it related to performing the behavior, known as subjective norm. Subjective norm was said to be a determinant of behavioral intention (Chuttur, 2009).

Davis developed the Technology Acceptance Model (TAM) (1985) from the closely related Theory of Reasoned Action (TRA), adjusting the relationship of belief-attitude-intention-behavior to IT user acceptance model. Davis (1985) presented the Technology Acceptance Model (TAM) to describe the context of user acceptance or rejection of information systems and technologies. Davis determined the Theory of Reasoned Action to be appropriate to explain user behavior, due to use of the system or technology is an actual behavior (Chuttur, 2009). "A key purpose of TAM is to provide a basis for determining the impact of external variables on and individual's beliefs, attitudes, and intentions" (Davis, Bagozzi & Warshaw, 1989, p. 985). The changes Davis made to the TRA are: (1) not including subjective norm in determining actual behavior, and (2) mainly focused on perceived usefulness and perceived ease of use as predicting factors describing use. Davis omitted subjective norm, as the construct was the least understood in the TRA model (Chuttur, 2009). Therefore, Davis primarily focused on an individual's attitude toward a behavior. This model highlighted the importance of perceived usefulness (PU) and perceived ease of use (PEOU) on new technology acceptance and adoption. Davis identified perceived usefulness and perceived ease of use as factors to predict attitude towards a specific behavior. Perceived of ease of use and perceived usefulness are the two most essential factors describing system use (Legris, Ingham, & Collerette, 2003). The Technology Acceptance Model and the Theory of Reasoned Action are consistently use to present arguments regarding the mediation of external variables, such as system characteristics, on intention on beliefs, such as perceived ease of use and perceived usefulness.

Preceding Davis' (1985) study, there were studies conducted illustrating the correlation of perceived ease of use and perceived usefulness in predicting behavior (Schultz & Slevin, 1975; Robey, 1975; Tornatzky & Klein, 1982; Bandura, 1982; and Swanson, 1982). Schultz and Slevin (1975) conducted a study with the results of perceived usefulness as a strong predictor of a decision model (Chuttur, p. 4). Robey (1979) conducted a replication of Schltz and Slevin's study and corroborated the relationship between perceived usefulness and system usage. Bandura's (1982) study highlighted the significance of perceived usefulness and perceived ease of use as indicators of behavior. As a result of his study he determined self-efficacy (comparable to perceived ease of use) and outcome judgements (comparable to perceived usefulness) as key factors influencing behavior. Swanson (1982) showed evidence of perceived ease of use and perceived usefulness influence behavior.

The Technology Acceptance Model (TAM) presents perceived ease of use and perceived usefulness as determining factors of an individual's behavioral intention to use a technology. Davis et al. (1989) withheld the attitude towards using technology construct as there was a partial link to the impact on beliefs and intention. Researchers proposed there could be instances where are individual may develop a behavioral intention to use information technologies/systems and not form an attitude (Davis et al., 1989). It is the philosophy of TAM, all things being equal, perceived usefulness is impacted by perceived ease of use, as the easier a technology is to use the more useful it will be (Venkatesh, 2000). Perceived ease of use is defined as the "extent to which a person believes that using a technology will be free of effort" (Venkatesh, 2000, p. 343). This construct is attached to the individual's judgment of the effort required in system use. Perceived usefulness is defined as "the extent to which a person believes that using a technology will enhance her/his productivity" (Venkatesh, 2000, p. 344).

The original version of TAM consisted of the following five components: perceived usefulness (PU), perceived ease of use (PEOU), attitude towards using (AT), behavioral intention to use (BI); and actual use (U). These components and the TAM structure provided the following relations: (1) PEOU – PU; (2) PU – AT; (3) PEOU – AT; (4) PU – BI; (5) PEOU – BI; (6) AT – BI; (7) AT – U; (8) BI – U; (9) PEOU – U; and (10) PU – U. As the development of TAM evolved, introduction of the behavioral intention variable was influenced by perceived usefulness (Davis, Bagozzi, & Warshaw, 1989). Davis et al. (1989) proposed there could be instances where an individual may develop a behavioral intention to use information technologies/systems and not form an attitude. This additional research modified the TAM model. Davis, Bagozzi, and Warshaw (1989) conducted a longitudinal study measuring users' intention of system use. The results indicated strong correlations between perceived usefulness and intention as well as perceived ease of use and intention. Thus, the attitude construct was eliminated from the model. In using the TAM, Taylor and Todd (1995) reported that "usage behavior (B) is a direct function of behavioral intention (BI). BI is, in turn, a function of attitude toward usage (A), which reflects feelings of favorableness or unfavorableness toward using the technology and perceived usefulness (PU), which reflects the belief that using the technology will enhance performance. Attitude is determined jointly by perceived usefulness and perceived ease of use (PEOU)" (p. 561). The intent to use construct is omitted when actual use is reported.

Replication studies have been conducted to examine TAM (Adams et al., 2008; Davis, 1993; Sambamurthy & Chin, 1994; Subramanian, 1994). Throughout the studies, the TAM results maintained consistency and validity in explaining users' IS acceptance behavior (Lee et al., 2003). Researchers and practitioners often compared TAM to other models that measured user intent, the Theory of Reasoned Action and Theory of Planned Behavior (TPB). Research

suggested that the TAM model better explained and predicted an individual's acceptance intention, compared to the TRA model. When compared to the TPB model, it was "found that TAM offers a slight empirical advantage and is a much simpler, easier to use, and more powerful model to explain users' technology acceptance" (Lee et al., 2003, p. 755). Therefore, it was concluded that using the Technology Acceptance Model could successfully predict IS acceptance behavior throughout various settings (Lee et al., 2003).

As the development of TAM evolved, studies have been conducted to extend and modify the original TAM model in a variety of ways, including additional constructs as antecedents of TAM constructs (e.g., Karahanna & Straub, 1999; Venkatesh, 2000; Venkatesh & Davis, 2000). Studies have conducted to consolidate results (King & He, 2006; Legris, Ingram & Collerette, 2003; Ma & Liu, 2004; Sharp, 2007; Yousafzai, Foxall, & Pallister, 2007). Venkatesh and Davis (2000) presented TAM2 as an extension of TAM, with additional variables to determine perceived usefulness variables in TAM. As a result, Venkatesh and Davis gained further insight into reasons users believe system information technologies are useful.

When using the TAM model and participants are presented with new technology Web 2.0, several factors may influence their decision about how and when they will use it. Age, gender, and educational attainment represent an external factor that may influence the perceived usefulness (PU) and perceived ease of use (PEOU) of educators, which may affect their attitude towards technology (AT), behavioral intention (BI), which may affect the actual use (U) of Web 2.0 technology tools (Davis, 1989). In an effort to explain IT usage, various attitudinal, social, and control factor models were used (Davis, 1989; Davis et al., 1989; Hartwick & Barki, 1994; Mathieson, 1991; Moore & Benbasat, 1991; Thompson et al., 1991).

Technology Acceptance Model 2

The Technology Acceptance Model has continuously evolved since its inception, attempting to resolve issues with the model. TAM 2 is an elaboration of the original TAM model, Venkatesh and Davis (2000) introduced TAM2 as the millennium version of TAM. This model is an integration of efforts and response to requests for an enhanced version of the model. It provides a clear definition of the variables perceived usefulness and perceived ease of use, as it contained external variables to explain perceived usefulness and usage intentions. The studies conducted by Venkatesh and Davis (2000) defined the external variables of PU, such as social influence (subjective norm) and cognitive instruments (job relevance, image, quality, and result demonstrability). Also, Venkatesh (2000) defined the external variables PEOU, (as computer self-efficacy, computer anxiety, and perceptions of external control) and adjustments (perceived enjoyment and objective usability).

Perceived Usefulness

Davis' TAM model (1989) explained and predicted user acceptance of information technology. The key component perceived usefulness (PU) is known to be a key indicator of TAM (Davis, Bagozzi, & Warhsaw, 1989). Perceived usefulness is defined as, "the degree to which a person believes that using a particular system could enhance his or her job performance: it is the extent to which an individual believes that using the system enhances his or her performance" (Saade & Bahli, 2005, p. 318). Information technology research presents studies supported perceived usefulness as positively related to usage. "A system that does not help people perform their jobs is not likely to be received favorably" (Nysveen, Pedersen, & Thornbjomsen, 2005, p. 537). Perceived usefulness is a determinant of user's attitude toward the information technology use, and usage intention or actual use. Technology research has resulted

in perceived usefulness which influences computer usage directly (Adams et al., 1992; Cragg & Cavaye, 1997; Davis, 1989; Mathieson, 1991; Ramayah et al., 2004; Segars & Grover, 1993).

Perceived Ease of Use

Davis (1989) defined perceived ease of use as, "the degree to which a person believes that using a particular system would enhance his or her job performance" (p. 985). This construct is a determinant of user's perceived usefulness of the information technology. Research has proposed that perceived ease of use influences a user's intention to use a technology, perceived ease of use positively influences technology acceptance (Davis et al., 1989; Zhu et al., 2000).

Perceived Behavioral Control

The Technology Acceptance Model 2 presents the impact of social influence processes in the adoption or rejection of a new information technology or system (subjective norm and voluntariness). Perceived behavioral control is defined as the extent to which the behavior is under voluntary control, the ease or difficulty of performing the behavior. Perceived behavioral control is included as an exogenous variable that has both a direct effect on behavior through intentions. The direct path from perceived behavioral control to behavior is assumed to reflect the actual control as individual has over performing the behavior.

Subjective Norm

Social influences are known to impact education, as education is a social activity. Educational requirements, expectations of administrators, compliance, and identifying the best environment for learning all influence educational activities. The subjective norm construct was originally used in the Theory of Reasoned Action (Fishbein & Ajzen, 1975). It is defined as a "person's perception that most people who are important to him think he should or should not perform the behavior in question" (Fishbein & Ajzen, 1975, p. 302). The Theory of Reasoned

Action was presented as a framework to understand how the social norm of compliance, conformity, and identification determine behavior (Shen, Laffey, Lin, & Huang, 2006). It was determined in TRA (Fishbein & Ajzen, 1975) and in the Theory of Planned Behavior (TPB) (Ajzen, 1991) that subjective norm is a direct cause of behavioral intention. "The rationale for a direct effect of subjective norm on intention is that people may choose to perform a behavior, even if they are not themselves favorable toward the behavior or its consequences, if they believe one or more important referents think they should, and they are sufficiently motivated to comply with the referents" (Venkatesh & Davis, 2000, p. 187). In previous research conducted on end user adoption, subjective norm direct effect on intention yielded mix results Mathieson (1991).

Research indicates subjective norm are a predictor of behavior (Bagozzi et al., 1992; Fishbien & Ajzen, 1975). Ajjan and Hartshorne (2008) presented three social groups that influence teacher adoption of a technology: superiors, peers, and students. Though administration (superiors) may feel adopting Web 2.0 technology will enhance learning and the teaching environment, other educators (peers) may attest that the use of new technology will diminish the current process. Whereas learners may find the technologies appealing as they are familiar with Web 2.0 technologies. Therefore, subjective norm seems to be a strong variable for explaining use of Web 2.0 technologies in Extension education.

Voluntariness

Throughout information system research the objective has been to investigate factors that affect individual's use of information systems, resulting in the development of the Technology Acceptance Model (TAM). Similar research examined social influence variables. Voluntariness is one such variable that has been researched in two contexts: its role between behavioral intention and subjective norm (Hartwick & Barki, 1994; Venkatesh et al., 2003), and its

influence on IT adoption and use (Agarwal & Prasad, 1997; Karahann et al., 1999). Examining the role of voluntariness in conjunction with TAM constructs will allow researchers to understand the model's performance in various environments. Brown et al. (2002) concluded investigating voluntariness in TAM would facilitate researchers' knowledge of any differences in TAM relationships in voluntary and mandatory environments.

Voluntariness has been defined as "the degree of free will be involved in the adoption of an information system" (Wu & Lederer, 2009, p. 420). Various contextual factors (such as job duties or responsibilities, organizational policies, and administrative mandates) may influence an individual's use of an information system or technology. Voluntariness is dependent on an individual's perception of free will. Some information systems researchers have included voluntariness in studies. Hartwick and Barki (1994) examined user participation and system use by mandatory and voluntary groups. Agarwal and Prasad (1997) examined user voluntariness by current and future intention use. Karahanna et al. (1999) investigated the use voluntariness and behavioral intention.

Behavioral Intention

Ajzen (1988) added perceived behavioral control to the original Fishbein and Ajzen's Theory of Reasoned Action (TRA) model to address barriers to complete an activity. "Perceived behavioral control can influence intention, as can attitude and subjective norm; it can also predict behavior directly in parallel with the potential influence of intention, in situations when behavior is not under the total control of the individual" (Godin, Valois, & Lepage, 1993, p. 83).

Summary

This chapter discussed the literature review related to the study. The chapter included an historical overview and background of adult education and adult learning. Integrating technology

into education was introduced. Web 2.0 technologies and the types were discussed. The Technology Acceptance Model (TAM) and the extended version of the Technology Acceptance Model 2 were described. The next chapter will discuss the design of the study and methods utilized.

CHAPTER III

METHODS

Introduction

Chapter 1 provided a historical background, introduction of the study, problem statement, research questions, significance of the study, definition of terms and limitations of the study. Chapter 2 presented a review of the literature related to Cooperative Extension as an adult education provider, Extension professionals as adult educators, and technology adoption. Specifically, Chapter 2 presented an overview of adult education, literature related to Cooperative Extension Service as an adult education provider and an investigation of its history, Web 2.0 technologies, categorizations and types of Web 2.0, and Technology Acceptance Model (TAM). The current chapter describes the methods and procedures that were used in the study, organized into five sections. The first section discusses the purpose of the research study, the research questions, and the design of the study. The second section explores the target population of the study. The third section describes the instrumentation used in the study, as the fourth section gives the details of the data collection procedures. The fifth section examines how the data were analyzed.

Purpose of the Study

The purpose of this study was to examine Extension educators' adoption of Web 2.0 technology tools for non-formal educational program delivery within the Alabama Cooperative Extension System. Web 2.0 technology tools were considered to be emerging means for Extension program delivery. These technologies have the potential to enhance the communication between educators and learners and expand dissemination of information. The

primary factors under investigation were perception, behavioral intention, and the implementation of Web 2.0 technologies in Cooperative Extension program delivery. Specific goals of the research were to assess the degree to which a relationship exists between subjective norm (perceived social pressure), perceived ease of use, and perceived usefulness on Extension educators' intention to use Web2.0 technology tools in educational programming. There were limited studies that examined the adoption of Web 2.0 technologies in Cooperative Extension.

Research Questions

The following research questions were used in this study:

1. What are the scores, as measured by Technology Acceptance Model, of Extension educators?
2. What is the relationship between perceived ease of use and perceived usefulness?
3. What is the relationship between perceived ease of use an intention to use technology?
4. What is the relationship between subjective norm and perceived usefulness?
5. What is the relationship between subjective norm and intention to use technology?
6. What is the relationship between perceived usefulness and intention to use technology?
7. What is the relationship of age and scores, as measured by Technology Acceptance Model, of Extension educators?
8. What is the relationship of gender and scores, as measured Technology Acceptance Model, of Extension educators?

Research Design

The study was descriptive-correlational in nature, a quantitative research designed to investigate the Alabama Cooperative Extension System faculty and staff perception of Web 2.0 technologies in the non-formal education program delivery setting. Holton and Burnett (1997),

stated “One of the real advantages of quantitative methods is their ability to use smaller groups of people to make inferences about larger groups that would be prohibitively expensive to study” (p. 71).

Descriptive research is used to answer questions concerning current conditions and relationships of the subject of the study. According to Best (1999), descriptive research is employed to explain existing conditions and relationships; practices exercised; preferences and attitudes; ongoing processes; and developing trends. It is designed to measure and interpret what currently exists and is often used to examine educational queries.

Correlational research designs are used for predictions or explanation purposes and depict the supposed strength and direction of a relationship. Therefore, they involve establishing relationships between variables. Some inferential statistics procedures were utilized to examine the possibilities of significant differences between some variables of interest. Ruppert (1992), Albright (2000), and Gregg (2002) utilized similar research methods in their respective studies of Extension personnel information technology use.

Permission was granted by the Auburn University Institutional Review Board to conduct this study (see Appendix A). This study used the Technology Acceptance Model 2 (TAM2) developed by Venkatesh and Davis (2000) to investigate the acceptance of Web 2.0 technologies among the participants, in addition a nine-question demographic survey designed by the researcher provided demographic information. The data collection method used in this study was an online questionnaire survey. The Alabama Cooperative Extension System Director was contacted and asked to permit the researcher to recruit participants (see Appendix B).

Each participant received an information letter via email with a link to the online survey (see Appendix C). The participant information letter presented information as it pertains to this

research study such as data collection, number of questions, length of time to complete the survey, and the researchers contact information for any questions. Participants were not offered any incentives for their contribution to this study.

Participants

The target population for this study consisted of all adult educators employed with the Alabama Cooperative Extension System and included State Administrators and Specialists, State Administrative Professionals, Regional Extension Agents, County Extension Agents, Extension Associates, and Agent Assistants. The participants in this study provide Extension Education in the 67 counties throughout Alabama. These educators provide educational program in one of the five program areas – agriculture, forestry, family and consumer sciences, economic and community development, wildlife and natural resources, and 4-H and youth development. The survey was directly emailed to the ACES staff responsible for provided education totaling 250 people.

The researcher selected participants based on the qualifications of their position within the Alabama Cooperative Extension System, as they provide direct education and outreach to clientele and may use Web 2.0 technologies to assist in these efforts. Extension professionals have various experiences which have shaped their differences and characteristics (age, social class, gender), education (college graduate, university attended, program of study), and other factors (Baker et al., 1997). To gain a greater understanding of the participants, the researcher asked respondents to answer demographic questions that indicated their program area, the highest degree they have earned, and years of employment.

Instrumentation

The data collection instrument for this study was an online form questionnaire, consisting of one instrument and a demographic section (see Appendix D). The online survey was organized into two sections. The first section was the expanded version of the Technology Acceptance Model known as the Technology Acceptance Model 2 (TAM2); an assessment used to examine the participants' acceptance of Web 2.0 technologies. After review of the literature the specific Web 2.0 technologies selected for examination were: blogs, Facebook, Twitter, podcasts, RSS, and wikis. These technology mediums are known to be beneficial in the teaching and learning environment, providing collaborative and innovative avenues to address needs of learners (Grosseck, 2009; Rudestam & Schoenholtz-Read, 2010; Williams & Chinn, 2009; Yang & Chang, 2011). It is proposed that educators learn and understand the benefits of integrating these technologies in education (Williams & Chinn, 2009). The second section collected demographic information about participants (see Appendix E).

Technology Acceptance Model 2 (TAM2)

The Technology Acceptance Model 2 (TAM2) was developed by Davis and Venkatesh (2000) as an expansion of the original Technology Acceptance Model developed by Davis (1989). The original TAM was created to address individual acceptance and use of new information technologies. The original TAM was a modification of the Theory of Reasoned Action (TRA) developed by Fishbein and Ajzen (1975), a general socio-psychological theory that was proven useful in understanding an individual's behavior regarding specific situations. The key purpose of the Technology Acceptance Model (TAM) is to provide a basis for determining the impact of external variables on and an individual's beliefs, attitudes, and intentions. Davis' model proposed that an individual's intention to use technology is influenced

by their perception of its ease of use and usefulness, and they are the two most influential factors determining use (Legris, Ingham, & Collerette, p. 192). After the inception of TAM, other researchers began to apply the model to various system and technological implementations. TAM has been cited frequently in most user technology acceptance research (Lee, Kozar, & Larsen, 2003). There have been several research studies conducted examining the relationship between perceived ease of use and perceived usefulness, attitudes, and information technology usage (Adams, Nelson, & Todd, 1992; Davis, Bagozzi, & Warshaw 1989; Davis et al. (1996); Davis & Venkatesh, 1996; Hendrickson, Massey, & Cronan, 1993; Mathieson, 1991; Subramanina, 1994). Research which used the Technology Acceptance Model to examine the acceptance of information systems and technologies lead to the demonstration of relationships between factors directly and indirectly influenced acceptance (Chen et al., 2002; Hubona & Burton-Jones, 2002; Lederer et al., 2000; Luarn & Lin, 2005; Rawstone et al., 2000; Davis, 1989; Venkatesh & Davis, 2000). The Technology Acceptance Model (Davis, 1989) was a powerful model that suggested perceived usefulness (PU) and perceived ease of use (PEOU) were essential determinants of a new technology's acceptance (Mascha & Adya, 2011). The development of the TAM has evolved due to three phases. In the adoption phase, the TAM was tested by using the model in a large number of information technology research. The next phase, validation, determined that TAM accurately measured user acceptance of information technologies. And the third phase, extension, expanded the original model due to researchers presented variable and relationship to TAM constructs (Momani & Jamous, 2017).

The Technology Acceptance Model 2 is an expansion of the original Technology Acceptance Model, as the first TAM only measured perceived usefulness and perceived ease of use. Though modeled after the TRA the correlation between subjective norm and intention

yielded no significant effect on intentions greater than perceived usefulness and perceived ease of use, resulting in subjective norm eliminated from the original TAM. With limitations in the original TAM model, Davis et al. (1989) indicated additional research was needed to further investigate conditions present in which social influences impact usage behavior. The original model did not delve into the reasons behind the perceived usefulness and perceived ease of use variables. “TAM had some limitations in explaining the reasons for which a person would perceive a given system useful, and so they proposed that additional variables could be added as antecedents to the perceived usefulness variable in TAM” (Chuttur, 2009, p. 14). Therefore, TAM was extended to include the examination of the impact of interrelated social influences an individual deciding on technology adoption or rejection: subjective norm, voluntariness, and image and cognitive instrumental processes (perceived ease of use, result demonstrability, and job relevance). With the Technology Acceptance Model 2, Venkatesh and Davis (2000) provided further details regarding reasons participants found a system or technology useful. They proposed TAM2 with the premise that social influence is related to the perceived usefulness and perceived ease of use of an information system or technologies. “Extending TAM to TAM2 by including some constructs from older theories in addition to some moderators to perceived usefulness and perceived ease of use will enhance the performance model” (Momani & Jamous, 2017, p. 53).

Measures

Survey items were adapted from previously developed research scales – perceived usefulness, perceived ease of use, perceived behavioral control, subjective norm, voluntariness, and behavioral intention have established psychometric properties (Davis, 1989; Davis & et al., 1989; Matheison, 1991; Taylor & Todd, 1995; Venkatesh & Davis, 1996). These preexisting

constructs used in TAM or extended versions of TAM met the criteria of validity and reliability.

Perceived Usefulness (PU). Perceived usefulness is the extent to which an individual believes using the technology or system can enhance their job performance. If one determines Web 2.0 technologies to be useful, their attitude about using Web 2.0 technologies will be positive. The four survey items that measured perceived usefulness were used from Venkatesh and Davis (2000), their research concluded a strong reliability ($\alpha = .98$). Perceived usefulness is an independent construct of the Technology Acceptance Model (TAM), found to be a determinant of behavioral intention. Perceived usefulness has been proven to have a significant effect on the adoption intention (Davis, 1989; Davis et al., 1989; Davis et al., 1992; Moon & Kim, 2001; Tan & Teo, 2000; Venkatesh, 2000; Venkatesh & Davis, 2000). In this study, PU referred to the Extension educators' perception of the extent to which Web 2.0 technologies are useful in educational programming.

Perceived Ease of Use (PEOU). Perceived ease of use the extent to which an individual believes using the technology or system will be free of effort. An individual's perceived ease of use is determinant on the amount of physical and mental exertion they need to use Web 2.0 technologies. The easier they perceived using Web 2.0 technologies are their attitude about use will be positive. The five items used in this study to measure perceived ease of use were used from Venkatesh and Davis (2000), their research concluded strong correlation reliability ($\alpha = .94$). Perceived ease of use is an independent construct of the Technology Acceptance Model, found to a determinant of behavioral intention. Evidence has been provided that perceived ease of use has had a significant effect on usage intention (Venkatesh, 2000; Venkatesh and Davis, 1996; Venkatesh and Morris, 2000). In this study, PEOU referred to the Extension educators' perception of the extent of Web 2.0 technologies being easy to use.

Perceived Behavioral Control (PBC). Perceived behavioral control is defined as "internal and external resource constraints, or skills, resources and opportunities necessary to use the system" (Holden & Karsh, 2010, p. 159). An individual's perceived behavioral control is determined by their belief of adequate resources to use Web 2.0 technologies, as well as the individual's confidence in their ability to use Web 2.0 technologies. The five items used in this study to measure perceived behavioral control were from Ajzen's Theory of Planned Behavior (TPB) (1988), whose research concluded a good correlation reliability ($\alpha = .70$). The perceived behavioral control construct is independent and has had an effect in user intention. In this study, perceived behavioral control referred to the Extension educators' perception of the extent of their ability to use Web 2.0 technologies.

Subjective Norm (SN). Subjective norm is the extent to which an individual's perceive social pressures to perform an activity. Subjective norm is defined as a "person's perception that most people who are important to him think he should or should not perform the behavior in question" (Fishbein & Ajzen 1975, p. 302). An individual's subjective norm is determined by their extent of social pressure to use Web 2.0 technologies. The subjective norm construct consisted of five items from Fishbein and Ajzen's Theory of Reasoned Action (1975), whose research concluded a strong correlation reliability ($\alpha = .90$). In this study, subjective norm referred to the Extension educators' perception of social pressures to use Web 2.0 technologies in their educational programming.

Voluntariness (V). Voluntariness is the extent to which an individual believes using the technology or system is their choice. It is defined as individuals in an organization are free to choose to use or not use new information technology (Venkatesh & Davis, 2000; Hartwick & Barki, 1994). An individual's voluntariness is determined by their ability to choose to use Web

2.0 technologies. The voluntariness construct consisted of three items derived for from Ajzen's Theory of Planned Behavior (TPB) (1988), whose research concluded a correlation reliability (α = .80). In this study, voluntariness referred to Extension educator's beliefs of non-mandatory choices to use Web 2.0 technologies in their educational programming.

Behavioral Intention to Use (BI). Behavioral intention is the extent to which an individual believes he or she will use the technology or system in the future. An individual's behavioral intention to use a technology or system is a predictor of use. Extensive research has been conducted on behavioral intentions and proven that intention predict use or actually doing activity (Ajzen, 1991; Bagozzi & Warshaw, 1990; Davis, 1989; Davis et al., 1989; Fishbein & Ajzen, 1975; Venkatesh, 2000; Ventkatesh & Bala, 2008; Venkatesh & Davis, 1996; Venkatesh & Davis, 2000; Venkatesh et al., 2003). The behavioral intention construct was measured with two items adapted from Venkatesh and Davis (2000), their research concluded a strong correlation reliability (α = .96). In this study, the behavioral intention construct assessed Extension educator's extent of desire to use Web 2.0 technologies in their educational programming.

The Technology Acceptance Model 2 (TAM2) was designed to assess user acceptance (perceived ease of use, perceived usefulness, and behavioral intention) and adoption (subjective norm, voluntariness, and perceived behavioral control) towards new technology. The instrument, divided into six sections and consisting of twenty-four items, can be completed in 5-10 minutes. The instrument is self-administered, and participants indicate their perceptions on Web 2.0 technology tools as they consist of established measures of perceived ease of use, perceived usefulness, subjective norm, behavioral control, voluntariness, and behavioral intention described in each statement. Each statement was scored on a Likert scale from 1 to 6,

with a 1-rating indicating strong disagreement and a 6-rating indicating strong agreement and an option for not applicable.

For the purpose of this study, TAM2 was used to measure the acceptance and adoption of Web 2.0 technology tools among Alabama Cooperative Extension System adult educators. The instrument is divided into six sections; the first section consists of four items asking the extent to which Web 2.0 technology tools meet usefulness characteristics. Respondents rate their perceptions about Web 2.0 technology tools that will help him or her achieve their work goals. The second section consists of five items asking the extent to which Web 2.0 technology tools meet perceived ease of use characteristics. Respondents rate their perceptions about the use of Web 2.0 technology tools that will require no effort to use and understand. The third section consists of five items asking the extent to which Web 2.0 technology tools meet the behavioral control characteristics. Respondents rate their perceptions of their ability to use Web 2.0 technology tools. The fourth section consists of five items asking the extent to which Web 2.0 technology tools meet the subjective norm characteristics. Respondents rate their perceptions of important individuals' belief of their use of Web 2.0 technology tools. The fifth section consists of three items asking the extent to which Web 2.0 technology tools meet the voluntariness characteristics. Respondents rate their perceptions about the decision to use Web 2.0 technology tools as non-mandatory. The sixth section consists of two items asking the extent to which Web 2.0 technology tools meet the behavioral intention characteristics. Respondents rate their perceptions of the likelihood they would use Web 2.0 technology tools.

Demographic Survey

The researcher designed the demographic survey that included eight questions to obtain the demographic information for this study. The demographic section of the instrument

consisted of the following items:

Extension Program Area – 1) Agriculture; 2) Family Consumer Sciences; 3) 4-H and Youth Development; 4) Economic and Community Development; 5) Urban Affairs and New Nontraditional Programs; 6) Forestry, Wildlife, and Natural Resources; 7) Other. The measurement level for this section was nominal.

Professional Position – 1) Agent Assistant; 2) Regional Extension Agent; 3) State Specialist; 4) State Administrator; 5) Other. The measurement level for this section was nominal.

Number of Years Employed by Cooperative Extension – 1) Less than 1 year; 2) 1-3 years; 3) 4-7 years; 4) 8-10 years; 5) 11-15 years; 6) More than 15 years. The measurement level for this section was ordinal.

Highest Educational Degree Obtained – 1) High School/GED; 2) Bachelor's Degree; 3) Master's Degree;4) PhD. The measurement level for this section was ordinal.

Academic Major in Highest Educational Degree – 1) Education (including Agriculture, Education, Environmental Education, Adult and Continuing Education, Extension Education, or General Education); 2) Family and Consumer Sciences (including Nutrition, Family Resource Management, Clothing and Textiles, or Family Relations and Human Development); 3) Agriculture (including Animal Science, Horticulture, Agronomy, Agriculture Economics, or Agriculture Engineering); 4) Natural Resources or Biology (including Entomology, Biochemistry, Plant Pathology, Forestry, or Ecology); 5) Social Science, Rural Sociology, Sociology, Psychology, Community Development or Youth Studies; and 6) Other. The measurement for this section was nominal.

Professional Teaching Experience Outside of the Cooperative Extension – 1) No; or 2) Yes. The measurement level of this section was nominal. Participants that recorded positive responses

were asked to indicate the amount of: A) Youth; or B) Adult teaching experience external of Cooperative Extension. The measurement of teaching experience external of Cooperative Extension was interval.

Gender – 1) Male; or 2) Female. The measurement level for this item was nominal.

Age – 1) 20-25 years; 2) 26-30 Years; 3) 31-40 Years; 4) 41-50 Years; or 5) 51 – 65 Years. The measurement level for this category was ordinal.

Reliability and Validity

Researchers develop strategies to ensure and maintain design quality. Reliability and validity are key concepts to quality research design. Reliable findings ensure the process can be repeated. Research bridges the gap between theory and practice. Therefore, research that is conducted has to be useful and relevant in practice. Cook and Campbell (2001) described validity as the best available approximation to the truth and falsity of propositions, including propositions about causation. Proper planning, design, and analysis are essential in ensuring validity. Validity of an instrument is the test's ability to measure what it intends to measure, confirming the accuracy of a research tool. There are a number of measures to determine validity: content, construct, and criterion validity. Validity helps researchers understand possible variations of experiment results. Data collection instrumentation used in research must be reliable and valid. Reliable findings ensure the process can be repeated. Reliability is the consistency of results of an instrument's responses, with little variability (Nardi, 2014). Reliability can be determined by split-half, interrater, parallel forms, and test-retest measures. Based on the principles and methods of validity and reliability the Technology Acceptance Model (TAM) and its extension The Technology Acceptance Model 2 (TAM2) are valid and reliable instruments.

Research studies have been conducted to determine the validity and reliability of TAM constructs. Adam et al. (1992) replicated Davis' (1989) TAM original work in two setting with multiple samples to provide evidence of consistency. Other research studies also replicated or extended TAM research (Chau, 1996; Chau & Hu, 2002; Horton et al., 2002; Lee et al., 2003), further supporting TAM's theoretical description of user acceptance of technologies. An extension of TAM, TAM2 included additional theoretical constructs of social influences (subjective norm and voluntariness) and cognitive instrumental processes (perceived ease of use and perceived behavioral control).

The Technology Acceptance Model (TAM) reliability and internal consistency was established from previous research. Four studies were conducted measuring reliability and validity, resulting in the Cronbach alpha reliability coefficients for perceived usefulness ranged from 0.92 – 0.98, reliability for ease of use ranged from 0.90 – 0.94, and reliability for behavioral intent ranged 0.84 – 0.90 (Davis, 1989; Davis et al., 1989). Behavioral intent did significantly correlate with actual usage, resulting in a correlation of as much as 0.63 in one study.

Internal validity is an important focus of the research design (Ferguson, 2004). Internal validity is an integral part of research design quality because it helps researchers determine if the experiment is being performed correctly. It is the level to which the research design controls extraneous variables, eliminating the possibility that alternative factors contribute to research results. Systematic error and random error can threaten internal validity (Hartung & Touchette, 2009). As a study's internal validity increases the external validity may decrease. As researchers plan for control of extraneous variables that could confound the findings of causal relationship, they limit the external validity and generalizability of those findings (Ferguson,

2004).

There are a number of measures to determine validity: content, construct, and criterion validity. A common subset of construct validity are convergent validity and divergent validity. Convergent validity measures the relationship of two items measuring the same construct. Resulting in a high correlation between items measuring the same construct. Divergent validity measures the absence of relationship of items that are not supposed to be related. Evidence of convergent and divergent validity establish construct validity. The TAM2 instrument was tested using the multitrait-multimethod analysis (MTMM) and both convergent and divergent validity were measured and supported. Perceived usefulness had significant monotrait-heteromethod correlations to the .05 level; and ease of use had 95.6% significance of the monotrait-heteromethod correlations, confirming convergent validity (McCord, 2007). As for divergent validity, of the comparisons perceived usefulness was 100% supported; ease of use was 97% supported, showing a high divergent validity (McCord, 2007).

Throughout previous studies, TAM has explained between 47% - 51% of a user's intent and predicted .40% of the variance in intent or actual use (McCord, 2007). Consistently, perceived usefulness has been a predictor of intentions, as represented by standard regression coefficients of 0.6 (Venkatesh & Davis, 2000).

The original TAM study from 1989 examined email, word processing, graphics software, and a text editor (Davis, 1989; Davis et al., 1989). Its extensive use has further validated the instrument, TAM has been used to examine various different technologies and systems maintaining reliability. The test-retest method of reliability was conducted by Hendrickson, Massey, and Cronan (1993) using database management system. TAM's construct validity has been tested and confirmed by research conducted on the user acceptance of various technologies

(Davis, 1989; Kim, 2005; Venkatesh, 2002; Venkatesh & Davis, 2000).

Data Collection Procedures

To conduct the study, approval was sought by the researcher's doctoral committee, and then the research protocol was submitted and approved by the Auburn University Institutional Review Board for Research Involving Human Subjects (see Appendix A). Following approval for the study, the researcher obtained email addresses of Cooperative Extension educators affiliated with ACES. The researcher sent the ACES Director the email invitation, information letter, and survey link. Upon receipt the ACES Director forwarded the email to 250 Extension educators to invite them to participate in the study in an effort to communicate that ACES' supported the research effort. An email invitation to participate in the survey was emailed to participants (see Appendix B) on March 9th, 2016. In this study, all potential participants had a university email address for delivery of survey invitations. The email contained a link to an Informed Consent letter (see Appendix C) to inform respondents of the purpose of the study, description of the study, information pertaining to the confidentiality of their participation, an approximation of time to complete the survey, and the study's potential usefulness. The Informed Consent also contained a link to a web-based questionnaire developed in Qualtrics for respondents that agreed to participate. The questionnaire consisted of the following a demographic survey and the Technology Acceptance Model 2 (see Appendix D). Recipents were assured that participation was voluntary and individual responses would be kept confidential. After the initial invitation to participate, three follow -up reminders were sent out. The survey was officially closed on May 10th, 2016. Secure Sockets Layer (SSL) protocol was used to ensure respondents' data was transmitted securely over the Internet. SSL encryption is use for transmitting private documents and information over the Internet.

Data Analysis

The Statistical Package for the Social Sciences (SPSS) was used to analyze the data. The first objective of this study was to describe certain characteristics of personnel of the Alabama Cooperative Extension System. Frequencies, percentages, measures of central tendency and variability were calculated for all appropriate survey items and presented. Relationship between construct variables were described using correlations. Independent samples t-test, regression tests were used for analyzing the data to address research questions. Results were analyzed for significant at the alpha .05 level.

Summary

This study involved educators from the Alabama Cooperative Extension System (ACES) in an attempt to determine ACES personnel attitudes and perceptions of the use of Web 2.0 technologies in educational programming. One survey instrument, composed of 33 items, was emailed to 250 Extension educators in ACES. A total of 62 participants responded to the survey (24.8%).

The TAM2 was adapted and tailored to Extension educators. The questionnaire examined the variables in the adoption model that identifies user acceptance of a technology. The variables are perceived usefulness, perceived ease of use, perceived behavioral control, subjective norm, voluntariness, and behavioral intention. Literature indicates that a user's beliefs, attitudes, and intentions impact his or her use of a technology.

CHAPTER IV

RESULTS

Introduction

This study investigated the acceptance and use of Web 2.0 technology tools among Extension personnel of the Alabama Cooperative Extension System (ACES). The chapter describes the purpose of the study and the research questions that were used in the study. Also, results of the analyzed data in response to the research questions are included. This chapter presents the demographic profile of participants. The Statistical Program for the Social Sciences (SPSS) version 25 was used to analyze all the data. Data were collected following the guidelines of the Auburn University Institutional Review Board (IRB) (see Appendix A).

Purpose of the Study

The purpose of this study was to examine Extension educators' adoption of Web 2.0 technology tools for non-formal educational program delivery within the Alabama Cooperative Extension System. Web 2.0 technology tools were considered to be emerging means for Extension program delivery. These technologies have the potential to enhance the communication between educators and learners and expand dissemination of information. The primary factors under investigation were perception, behavioral intention, and the implementation of Web 2.0 technologies in Cooperative Extension program delivery. Specific goals of the research were to assess the degree to which a relationship exists between subjective norm (perceived social pressure), perceived ease of use, and perceived usefulness on Extension educators' intention to use Web2.0 technology tools in educational programming. There were limited studies that examined the adoption of Web 2.0 technologies in Cooperative Extension.

Research Questions

The following research questions were used in this study:

1. What are the scores, as measured by Technology Acceptance Model, of Extension educators?
2. What is the relationship between perceived ease of use and perceived usefulness?
3. What is the relationship between perceived ease of use an intention to use technology?
4. What is the relationship between subjective norm and perceived usefulness?
5. What is the relationship between subjective norm and intention to use technology?
6. What is the relationship between perceived usefulness and intention to use technology?
7. What is the relationship of age and scores, as measured by Technology Acceptance Model, of Extension educators?
8. What is the relationship of gender and scores, as measured Technology Acceptance Model, of Extension educators?

Demographic Characteristics of Respondents

This study examined the use of Web 2.0 technology tools of Extension adult educators employed with the Alabama Cooperative Extension System. Invitation emails with the description of the study and a link to the survey on Qualtrics were sent to 250 perspective participants. Sixty-two participants, or 24.8%, of this population completed the study's survey instrument.

For this study, demographic data was collected from respondents. This included age, gender, position, years employed, program area, highest degree earned, and degree major.

Age

Participants were asked to indicate their age on the survey. Ages were grouped into age categories. Sixty-two respondents indicated their ages, which ranged from 26 to 65. The largest group (*N*=24 or 39 percent) fell within the 51-65 category. The next largest group (*N*=19 or 31 percent) fell within the 41 to 50 age category.

Table 1

Distribution and Percentages of Respondents by Age groups

Age Group	*n*	%
26-30	3	4.8%
31-40	16	25.8%
41-50	19	30.6%
51-65	24	38.7%

N=62

Gender

Males and females participated in this study. As can be seen in Table 2, the majority of survey respondents were female (*N*=31 or 50 percent). Males comprised of 45.2 percent (*N*=28) of study participants.

Table 2

Distribution and Percentages of Respondents by Gender

Gender	*n*	%
Female	33	53.2%
Male	28	45.2%

N=62

Program Area

Cooperative Extension educators primarily focus on specific program areas and offering educational programming in those areas. Each respondent was asked to identify the program area they spend the most significant amount of time. Out of the 62 respondents, 23 identified their program area as Agriculture which represented the highest percentage of participants. Followed by 4H and Youth Development with 16 respondents. The fewest respondents were the Economic and Community Development and Information Technology program area, with 3 respondents in each category.

Table 3

Distribution and Percentages of Respondents by Program Area

Program Area	*n*	%
Agriculture	23	37.1%
Family and Consumer Sciences	7	11.3%
4-H and Youth Development	17	27.4%
Economic and Community Development	3	4.8%
Forestry, Wildlife and Natural Resources	8	12.9%
Other (Information Technology, Aquatic Resources)	4	6.5%

N=62

Professional Position

Respondents participating in this study reported their current position with the Alabama Cooperative Extension System (ACES). State Specialists were the highest percentage of respondents in this study with 23 participants. Followed by Regional Extension Agents with 19

respondents. The fewest respondents were other professional positions, such as Information Technology Specialists and 4H Foundation Agents, with 3 respondents.

Table 4

Distribution and Percentages of Respondents by Professional Position

Position	*n*	%
Regional Extension Agent	19	30.6%
County Extension Coordinator	17	27.4%
State Specialist	23	37.1%
Other (Information Technology Specialist, Webmaster, and 4H Foundation Agent)	3	4.8%

N=62

Years Employed with Cooperative Extension

Participants were asked to select a category indicating the number of years they have been employed within Cooperative Extension. As shown in Table 5, the category with the largest percentage was over 15 years of employment (*N* = 20, 32.3 percent) Followed by 4-7 years of employment with 21 percent, *N* = 13.

Table 5

Distribution and Percentages of Respondents by Years of Employment

Years of Service	*n*	%
Less than 1 Year	5	8.1%
1-3 Years	8	12.9%
4-7 Years	13	21%
8-10 Years	10	16.1%
11-15 Years	6	9.7%
More than 15 Years	20	32.3%

N=62

Education Level

Participants were asked to select a category indicating the highest educational degree he or she has achieved. As shown in Table 6, the category with the largest percentage is Master's degree with 56.5 percent of participants (*N* = 35). The next largest educational level group was Ph.D. with 33.9 percent of participants (*N* = 21).

Table 6

Distribution and Percentages of Respondents by Education Level

Education Level	*n*	%
Bachelor's Degree	6	9.7%
Master's Degree	35	56.5%
Ph.D.	21	33.9%

N=62

Academic Major

Participants were also asked to select a category to indicate their academic major of study in their highest degree. As displayed in the following Table 7, the two largest academic major of study was Education (including Extension Education, Agricultural Education, Environmental Education, Adult and Continuing Education, and General Education), and Agriculture (including Animal Science, Dairy Science, Poultry Science, Agronomy, Horticulture, Agricultural Engineering, or Agricultural Economics) with 30.6% (*N* = 19) respectively.

Table 7

Distribution and Percentages of Respondents by Academic Major

Academic Major	*n*	%
Education (including Extension Education, Agricultural Education, Environmental Education, Adult and Continuing Education or General Education.	19	30.6%
Family and Consumer Sciences (including Nutrition, Family Resource Management, Clothing and Textiles, Family Relations and Human Development).	5	8.1%
Agriculture (including Animal Science, Dairy Science, Poultry Science, Agronomy, Horticulture, Agricultural Engineering, or Agricultural Economics).	19	30.6%
Natural Resources or Biology (including Entomology, Biochemistry, Plant Pathology, Forestry or Ecology).	14	22.6%
Social Science, Rural Sociology, Sociology, Psychology, Community Development, or Youth Studies.	3	4.8%
Other (Graphic Design and JD)	2	3.2%

N=62

Technology Acceptance Model 2

The first section of the survey included 24 questions that asked the ACES personnel, by using a scale of strongly disagree to strongly agree, to identify which statements most closely matches their agreement with each statement.

Survey Question 1 asked the participants if using Web 2.0 technologies improves their job performance.

Respondent Frequency

Table 8

Frequency Table – Perceived Usefulness Construct

Perceived Usefulness Questions	N/A	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
Web 2.0 technology tools…							
enable me to accomplish tasks more quickly.	1	4	6	4	10	23	14
have improved my quality of work.	1	6	5	3	15	19	13
make it easier to do my job.	2	5	7	3	16	19	10
enhance my effectiveness on the job.	2	4	3	2	19	19	13

Survey Question 2 asked the participants if using Web 2.0 technologies are free of effort.

Table 9

Frequency – Perceived Ease of Use Construct

Perceived Ease of Use Questions	N/A	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
My interaction with Web 2.0 technology tools has been clear and understandable.		4	2	8	13	27	8
Overall, Web 2.0 technology tools are easy to use.		1	4	7	17	26	7
Learning to operate Web 2.0 technology was easy for me.		2	4	6	11	29	10
I rarely make errors when using Web 2.0 technology tools.		4	8	18	19	10	3
I am rarely frustrated when using Web 2.0 technology tools.		6	6	17	19	10	4

Survey Question 3 asked the participants to measure their self-efficacy and controllability using Web 2.0 technologies.

Table 10

Frequency Table – Perceived Behavioral Control

Perceived Behavioral Control Questions	N/A	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
I am able to confidently use Web 2.0 technology tools.		3	3	6	10	31	9
I have the knowledge to use Web 2.0 technology tools.		1	4	2	13	30	12
I have the resources to use Web 2.0 technology tools.			5	5	11	28	16
I have the ability to use Web 2.0 technology tools.			2	2	11	34	13
I have control using Web 2.0 technology tools.			4	6	13	28	11

Survey Question 4 asked participants to measure the social influence on the use of Web 2.0 technologies.

Table 11

Frequency – Subjective Norm

Subjective Norm Questions	N/A	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
People who influence my behavior think I should use Web 2.0 technology tools.	1	1	5	7	13	26	9
People who are important to me think I should use Web 2.0 technology tools.			5	3	20	28	5
My immediate supervisor thinks I should use Web 2.0 technology tools.		1	3	7	15	21	14
My peers think I should use Web 2.0 technology tools.	1		4	7	19	22	9
People whose opinions I value prefer that I use Web 2.0 technology tools in my work.		1	6	8	15	26	5

Survey question 5 asked participants if using Web 2.0 technologies is their choice.

Table 12

Frequency Table – Voluntariness

Voluntariness Questions	N/A	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
My use of Web 2.0 technology tools is voluntary.		2	3	10	12	24	10
My supervisor requires me to use Web 2.0 technology tools.	1	9	15	7	12	13	5
Although it might be helpful, using Web 2.0 technology tools is not compulsory in my job.		4	7	11	9	24	7

Survey Question 6 asked participants if there is a likelihood they will use Web 2.0 technologies in the future.

Table 13

Frequency Table – Behavioral Intention

Behavioral Intention Questions	N/A	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
I intend to…							
continue using Web 2.0 technology tools.	1		3	1	9	27	21
frequently use Web 2.0 technology tools.	1		5	5	11	23	17

The Technology Acceptance Model 2 (TAM2) is a Likert-type scale consisting of 24 statements. There are 6-point scales to measure the perception of information technologies and systems through six subscales. The first subscale contained four items and measured the perceived usefulness (PU) of the information technologies. The second subscale contained five

items and measured the perceived ease of use (PEOU) of the information technologies. The third subscale contained five items and measured perceived behavioral control (PBC) of information technologies. The fourth subscale contained five items and measured the social norm (SN) associated with information technologies. The fifth subscale contained three items and measured the voluntariness (VOL) of users toward information technologies. The sixth subscale contained two items and measured the behavioral intention (BI) of users toward information technology. The 7-point scale of TAM starts at 1 to represent strongly disagree, 2 represents disagree, 3 means slightly disagree, 4 represents slightly agree, 5 means agree, 6 means strongly agree, and 7 represents not applicable. If the respondent mean score was greater than 3, it represents a positive perception of the use of Web 2.0 technology tools.

Data revealed the Technology Acceptance Model 2 (TAM2) has a high internal reliability. A Cronbach's Alpha was performed to observe the internal consistency of the scale. Subscales (PU, PEOU, PBC, SN, VOL, and BI) were evaluated by disaggregating survey items. The full TAM2 Cronbach's Alpha was .923, indicating internal consistency and signifying strong reliability. The six subscales (PU), (PEOU), (PBC), (SN), (VOL), and (BI) Cronbach's Alphas were respectively, .959, .880, .896, .886, .240, and .947. Performing Cronbach's Alpha on the subscales resulted in five subscales with good internal consistency, and the Voluntariness subscale results indicated unacceptable internal consistency. These results concluded that the construct Voluntariness should not be relied on to explain the degree of educators' acceptance of Web 2.0 technologies.

The subscale of Voluntariness had a low Cronbach's Alpha (α = 2.40), based on 1) My use of Web 2.0 technology tools is voluntary, 2) My supervisor requires me to use Web 2.0 technology tools, and 3) Although it might be helpful, using Web 2.0 technology tools is not

compulsory in my job. It was found that the exclusion of item 2 increased the level of internal consistency obtained .847, as can be observed in table 14. The minimum corrected item-total correlation was -.259. Therefore, deleting item 2 increased the consistency of the voluntariness subscale to .847. The total TAM2 alpha increased to .925

Table 14

Item-Total Statistics of the Voluntariness Construct

Voluntariness Questions	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
My use of Web 2.0 technology tools is voluntary.	7.40	3.458	.397	.540	-.785
My supervisor requires me to use Web 2.0 technology tools.	8.31	6.872	-.259	.081	.847
Although it might be helpful, using Web 2.0 technology tools is not compulsory in my job.	7.68	3.730	.278	.561	-.474

N=62

Table 15 shows the number of measurement items used to measure each of these six variables, and the reliability coefficients obtained. The measures used to address PEOU, PU, and PBC are reported in Davis (1985). The BI measures are based on published research (Venkatesh & Davis, 2000). The overall Cronbach's Alpha reliabilities for the majority of the subscales are above 0.80, thus providing strong evidence of reliable measures and high internal consistency.

Table 15

The Internal Consistency of TAM2

Scale	Cronbach's Alpha	*N* of Items
Perceived Usefulness	.959	4
Perceived Ease of Use	.880	5
Perceived Behavior Control	.896	5
Subjective Norm	.886	5
Voluntariness	.847	2
Behavioral Intention	.947	2
Total	.925	23

N=62

Research Question 1

What are the scores, as measured by the Technology Acceptance Model, of Extension educators?

Descriptive statistics for each variable in the TAM2 model revealed that Extension educators had positive perceptions of Web 2.0 technology tools. Table 16 that follows shows the total scores *N*, mean, standard deviation, skewness, and kurtosis for all variables.

Table 16

Summary of Total Scores and Standard Deviation of Participants of TAM2 Measurements

Variable	*M*	*SD*
Perceived Usefulness	16.84	6.03
Perceived Ease of Use	20.18	5.16
Perceived Behavior Control	23.38	4.58
Subjective Norm	21.61	5.23
Voluntariness	11.69	2.71
Behavioral Intention	9.55	2.46

N = 62

As seen in the results above, the scale BI has the lowest mean, indicating most respondents are undecided on the intention to use of Web technologies for educational programming. The highest mean is found for PBC, indicating most respondents consider themselves in control of using Web 2.0 technologies. PU represented the highest standard deviation, which meant the respondents differed in their answers as compared to the other scales. Behavioral intention of Web 2.0 technologies use differed the least in answers, illustrating most respondents had similar beliefs regarding intentions. Table 17 presents the summary of the mean participants' score and standard deviation of each TAM2 subscale.

Table 17

Summary of Mean and Standard Deviation of participants of TAM2 measurements

Variable	*M*	*SD*
Perceived Usefulness	4.21	1.51
Perceived Ease of Use	4.04	1.03
Perceived Behavioral Control	4.68	.916
Subjective Norm	4.32	1.05
Voluntariness	3.90	.905
Behavioral Intention	4.77	1.23

N=62

A correlation analysis was conducted among the six subscales (PU, PEOU, PBC, SN, VOL and BI) of TAM2. Data analysis showed a significant positive relationship for perceived usefulness, perceived ease of use, and behavioral intention among the total scores. Perceived behavioral control had significant relationships with PU (r = .458, p < .001), PEOU (r = .751, p < .001), BI (r = .429, p < .001). The voluntariness construct had significant relationships with PU (r = .574 p < .001), PEOU (r = .385, p = .002), and BI (r = .340, p = .007). Table 18 presents correlation for the data set.

Table 18

Correlation of Perceived Behavioral Control and Voluntariness

	PU	*PEOU*	*BI*
PBC	.458**	.751**	.429**
VOL	.574**	.385**	.340**

N=62

A standard multiple regression analysis was performed to examine how well the influence of perceived usefulness, perceived ease of use, perceived behavior control, subjective norm, and voluntariness explain behavioral intention for Web 2.0 technologies. Data analysis indicated multicollinearity was not presented among the total score of independent variables of perceived usefulness, perceived ease of use, perceived behavioral control, subjective norm, and voluntariness. Tolerance (T) and Variance Inflation Factor (VIF) are factors which identify multicollinearity, the Tolerance (T) was greater than .01 and the Variance Inflation Factor (VIF) was less than 10. These criteria indicate there is not an issue with multicollinearity in the analysis among independent variables. Table 19 below presents a summary of regression analysis.

Table 19

Summary of Regression Analyses for Variables Predicting Behavioral Intention (N = 62)

Variable	*B*	*SE B*	*Beta*	*t*	*Tolerance*	*VIF*
(Constant)	2.205	1.747		1.262		
PU	.123	.054	.301*	2.276	.613	1.631
PEOU	.119	.081	.250	1.464	.367	2.723
PBC	.028	.086	.051	.320	.418	2.394
SN	.101	0.54	.214	1.865	.808	1.237
VOL	.006	.106	.006	.054	.833	1.201
R^2		.402				
F		7.517**				

*$p < .05$. **$p < .01$.

According to analysis, the amount of variance of BI accounted for by the model of PU, PEOU, PBC, SN, and VOL is 40.2%, R = .800 which represents the strength of the relationship between BI and the variables PU, PEOU, PBC, SN, and VOL. An $R^2 = .402$, F (5,56) = 7.517, p

< .001is statistically significant. Therefore, there is a significant relationship between the weighted linear composite of BI and the variables PU, PEOU, PBC, SN, and VOL. The regression model is:

Total BI score = 2.205 + .123 x PU + .119 x PEOU + 0.28 x PBC + .101 x SN + 0.006 x VOL

Since the premise of TAM is the concerns the roles the variables PU, PEOU, PBC, SN, and VOL play in influencing BI, a stepwise multiple regression was performed on these variables with a criterion variable of Behavioral Intention, and the other five variables as predictors. The beta coefficients for perceived behavioral control, subjective norm, and voluntariness were non-significant. The first model regressed perceived ease of use (PEOU) alone on behavioral intention. Results indicated the amount of variance of BI accounted for by PEOU is 27.7%, R = .526 which represents the strength of the relationship between BI and PEOU. An $R^2 = .277$, F (1, 60) = 22.944, $p < .001$ is statistically significant. Perceived ease of use yielded a beta of .526 ($p < .001$).

The second variable perceived usefulness (PU) was added to determine the influence of PU while controlling for PEOU. This addition increased R^2 to .364, with results indicated the amount of variance of BI accounted for by PEOU and PU is 36.4%, R = .603 which represents the strength of the relationship between BI and PEOU. An $R^2 = .364$, F (2, 59) = 16.860, $p < .001$ is statistically significant. Perceived usefulness yielded a beta of .344 ($p = .006$). So, 36% of the behavioral intention variance can be predicted by the mix of perceived ease of use and perceived usefulness, not chance. The regression model is:

Total BI score = 3.828 + .166 x PEOU + .141 x PU

Research Question 2

What is the relationship between perceived ease of use and perceived usefulness?

Correlation analysis was conducted to explore the strength of the relationship between the perceived ease of use construct and the perceived usefulness construct. Data revealed there was a moderate correlation between the total score of perceived ease of use (PEOU) (M = 20.18, SD = 5.16) and the total score of perceived usefulness (PU) (M = 16.84, SD = 6.03), r = .521, p < .001. The results of the correlation analysis are displayed in Table 20 below.

Table 20

Correlation of Perceived Usefulness and Perceived Ease of Use Scores

	PU	PEOU
PU	1	.521*
PEOU	.521*	1

N= 62

Research Question 3

What is the relationship between perceived ease of use and intention to use technology?

Correlation analysis was conducted to determine the strength of the relationship between the constructs perceived ease of use and behavioral intention. Data concluded that there is a positive correlation between the total score of perceived ease of use (PEOU) (M = 20.18, SD = 5.16) and the total score of behavioral intention (BI) (M = 9.55, SD = 2.46), r = .567, p < .001. The results of the correlation analysis are displayed in Table 19 below, confirming that perceived ease of use is significantly related to BI towards Web 2.0 technologies. The results indicated

there was a significant positive correlation for perceived ease of use with the dependent variable behavioral intention, as it relates to the use of Web 2.0 technologies in Extension education.

Table 21

Correlation of Perceived Ease of Use and Behavioral Intention Scores

	PEOU	BI
PEOU	1	.567*
BI	.567*	1

N = 62

Research Question 4

What is the relationship between subjective norm and perceived usefulness?

Correlational analysis performed on the variables subjective norm and perceived usefulness to assess the strength of the relationship between the two variables. There was a positive correlation between subjective norm (M = 21.61, SD = 5.23) and perceived usefulness (M = 16.84, SD = 6.03), r = .524, p = .022. Table 22 confirmed that subjective norm is significantly related to perceived usefulness towards Web 2.0 technologies. The results indicated there was a significant positive correlation for subjective norm with the variable perceived usefulness, as it relates to the use of Web 2.0 technologies in Extension education. Therefore, data showed increases in subjective norm were correlated with increases in perceived usefulness.

Table 22

Correlation of Subjective Norm and Perceived Usefulness Scores

	SN	PU
SN	1	.290*
PU	.290*	1

N = 62

Research Question 5

What is the relationship between subjective norm and intention to use technology?

Correlational analysis performed on the variables to assess the relationship between perceived usefulness and behavioral intention. There was a correlation between subjective norm ($M = 21.61$, $SD = 5.23$) and behavioral intention ($M = 9.55$, $SD = 2.46$), $r = .418$, $p < .001$. The data, illustrated in Table 23, indicated a significant and moderate relationship between subjective norm and behavioral intention towards Web 2.0 technologies.

Table 23

Correlation of Subjective Norm and Behavioral Intention Scores

	SN	BI
SN	1	.418*
BI	.418*	1

N = 62

Research Question 6

What is the relationship between perceived usefulness and intention to use technology?

Correlational analysis performed on the variables to assess the relationship between perceived usefulness and behavioral intention. There was a correlation between perceived usefulness (M = 16.84, SD = 6.03) and behavioral intention (*M* = 9.55, *SD* = 2.46), $r = .503$, $p < .001$. Table 24 illustrates that perceived usefulness is significantly related to behavioral intention towards Web 2.0 technologies. The results indicated there was a significant strong positive correlation for perceived usefulness with the dependent variable behavioral intention, as it relates to the use of Web 2.0 technologies in Extension education.

Table 24

Correlation Perceived Usefulness and Behavioral Intention Scores

	PU	BI
PU	1	.503*
BI	.503*	1

N = 62

Research Question 7

What is the relationship of age and scores, as measured by Technology Acceptance Model, of Extension educators?

To determine whether there was any difference between respondents' scores of variables measuring the perception of Web 2.0 technologies in the Technology Acceptance Model based on their ages, a one-way analysis of variance was used. Data analysis revealed there was no significant variance in how different age groups view the use of Web 2.0 technologies. The

ANOVA results (Table 25) show no significant variance in how different age groups view Web 2.0 technologies. This is indicated by p values greater than 0.05.

Table 25

One-way Analysis of Variance of TAM Constructs by Age

	Sum of Squares	df	Mean Square	F	Sig.
PU	40.792	3	13.597	.362	.781
PEOU	52.476	3	17.492	.647	.588
PBC	47.167	3	15.722	.739	.533
SN	89.088	3	29.696	1.090	.360
VOL	6.027	3	2.009	.282	.838
BI	13.032	3	4.344	.707	.552

N = 62

A bivariate correlation was conducted. Data analysis revealed that there was no correlation between the age of respondents and the scores of all TAM subscales The data yielded there was not a significant correlation between the age of respondents and the scores of all TAM subscales (PU, PEOU, PBC, SN, V, and BI). Table 26 displays the correlation of respondent's age to the technology scores measured by TAM2.

Table 26

Correlation of Age and the Technology Scores

	PU	PEOU	PBC	SN	V	BI	Age
Age	.132	.099	-.123	-.116	-.052	-.044	1

N= 62

A simple regression was conducted to discover whether age could predicate the

perceptions of Web 2.0 technologies. With perceived usefulness (PU), an *r* of .132 indicated a weak correlation between perceived usefulness and age. For subjective norm (SN), an *r* of -.116 also indicated a weak correlation between subjective norm and age. There was no significant relationship between age and the perceptions of Web 2.0 technologies measured by TAM2.

An ANOVA was conducted to determine if there was a difference in total TAM2 scores between Extension educators with different levels of education. Data analysis concluded that level of education had a significant effect on Extension personnel's subjective norm perceptions of Web 2.0 technologies. An analysis of variance showed that the effect of Extension educators' level of education on subjective norm was significant, F (2, 59) = 4.094, p = .022. Post hoc comparisons using the Tukey HSD test indicated that the total score for respondents with bachelor's degrees (M = 26.83, SD = 2.14) was significantly different than the total score for respondents with master's degrees (M =21.54, SD = 5.64) and the total score for respondents with doctoral degrees (M = 20.24, SD = 4.24). However, the total score of respondents with master's degrees did not significantly differ from the total score of respondents with doctorate degrees. Taken together, these results suggest that respondents education level does have an effect on the respondent's subjective norm.

A one-way ANOVA was also conducted to determine any difference in Web 2.0 technology perceptions among respondents based on their years of service with Extension. Data analysis concluded the years of Extension service had no significant effect on Web 2.0 technology perceptions.

In addition, an ANOVA was conducted to determine if there was a difference in total TAM2 scores between Extension educators with different positions. Data analysis concluded that position type had a significant effect on Extension personnel's perceived usefulness and

voluntariness perceptions of Web 2.0 technologies. An analysis of variance showed that the effect of Extension educators' position on perceived usefulness was significant, F (3, 58) = 11.183, $p < .001$. Post hoc comparisons using the Tukey HSD test indicated that the total score for respondents with in other positions as opposed to the ones listed as choices (M = 2.31, SD = 2.31) was significantly different than the total score for Regional Extension Agent respondents (M =20.00, SD = 4.88); the total score for County Extension Coordinator respondents (M = 17.06, SD = 4.58); and the total score for State Specialists respondents (M = 15.91, SD = 5.35) . Data analysis indicated that the effect of Extension educators' position on voluntariness was significant, F (3, 58) = 11.353, $p < .001$. Post hoc comparisons using the Tukey HSD test indicated that the total score for respondents with in other positions as opposed to the ones listed as choices (M = 1.67, SD = .578) was significantly different than the total score for Regional Extension Agent respondents (M =9.00, SD = 2.47); the total score for County Extension Coordinator respondents (M = 7.82, SD =1.81); and the total score for State Specialists respondents (M = 8.96, SD = 2.14). Taken together, these results suggest that respondent's position does have an effect on the respondent's perception of perceived usefulness and voluntariness.

Research Question 8

What is the relationship of gender and scores, as measured Technology Acceptance Model, of Extension educators?

To examine any difference in Web 2.0 technology perception as measures by tAM2 technology scores of Extension educators based on their gender, the t-test of independent samples was performed. The results indicated the respondent's gender does not have any statistically significant effect on their technology scores. For PU scores, there was no difference

in male and female scores, males (M = 16.17, SD = 5.86) and females (M = 17.76, SD = 5.89), t = -1.046, p = .300. For PEOU scores, there was no difference in male and female scores, males (M = 19.75, SD = 4.47) and females (M = 20.76, SD = 5.62), t = -.764, p = .448. For PBC scores, there was no difference in means between males and females, with males (M = 23.39, SD = 3.74) and females (M = 23.36, SD = 5.31), t = .024, p =.981. For SN scores, there was no difference in means between males and females, with males (M = 21.54, SD = 4.21) and females (M = 21.73, SD = 6.09), t = -.140, p = .889. For VOL scores, there was no difference in means between males and females, with males (M = 11.57, SD = 2.27) and females (M = 12.00, SD = 2.86), t = -.640, p = .525. For BI scores, there was no difference in means between males and females, with males (M = 9.46, SD = 2.15) and females (M = 9.91, SD = 2.16), t = -.804, p = .425.

Summary

This chapter presented the required data analysis to address all the research questions. The 62 respondents were categorized according to age, gender, program area, years of service, educational background and attainment. There were eight research questions, and numerous analyses were performed to satisfy the research questions, such as summary statistics, descriptive, correlation, simple and stepwise regression, and t-test for independent samples. As a means to measure consistency between item responses, Cronbach's coefficient alpha was computed. The findings of this study indicated that the respondents of this study had a positive perception of Web 2.0 technology and a behavioral intention to continue using this technology in the future. Analysis of the six construct variables designed to reveal educators' perceptions in the use of Web 2.0 technologies in Extension educational programming was then conducted. The six constructs of the Technology Acceptance Model 2 (TAM2) were positively correlated with one another. The perceived ease of use (PEOU) and perceived usefulness (PU) both contribute to the

prediction of behavioral intention (BI) towards the use of Web 2.0 technologies in Extension educational programming in the future. There was no statistically significant correlation between age and technology scores. The level of education had a significant correlation with respondents' technology perceptions. Employees with bachelor's degrees had a higher perception of subjective norm towards Web 2.0 technologies than master's and doctorates. Data analysis found that the Extension educator's position type had a significant effect on the perceived usefulness and voluntariness perceptions of Web 2.0 technologies. The respondents' gender did not affect their perceptions of Web 2.0 technology use.

CHAPTER V

SUMMARY, DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

Introduction

This study was conducted to investigate the technology perceptions of Extension educators in the informal education setting and evaluate factors that may influence the acceptance and use of Web 2.0 technology tools within the Alabama Cooperative Extension System (ACES). The first chapter discussed the significance of the study, the purpose of the study, the research questions, the statement of the problem, the assumptions, the limitations, definition of terms, and the organization of the study.

The second chapter introduced the literature review related to the study. It presented a historical overview of adult education and adult learning. The literature related to Cooperative Extension Service as an adult education provider and the use of technology in Extension was also discussed. The integration of educational technology, an overview of Web 2.0 technologies, and types of Web 2.0 technologies studied. The literature review continued with a discussion of the technology acceptance model (TAM), the constructs of TAM, and the expanded technology acceptance model (TAM2).

The third chapter discussed the design of the research study, the instruments – TAM and TAM2 – reliability and validity, the demographic survey, the sample, data collection, data analysis, and concluded with a summary of the chapter.

The fourth chapter presented the findings of data analysis. It included description of the instruments TAM and TAM2. It discussed the results of all the research questions of this study. The results presented the demographic profile age, gender, education level, current position of

employment, and academic major. The descriptive analysis of the expanded technology acceptance model II and the results of correlation and multiple regression. This chapter presents the summary, discussion, implication and concludes with recommendation for future research.

Purpose of the Study

The purpose of this study was to examine Extension educators' adoption of Web 2.0 technology tools for non-formal educational program delivery within the Alabama Cooperative Extension System. Web 2.0 technology tools were considered to be emerging means for Extension program delivery. These technologies have the potential to enhance the communication between educators and learners and expand dissemination of information. The primary factors under investigation were perception, behavioral intention, and the implementation of Web 2.0 technologies in Cooperative Extension program delivery. Specific goals of the research were to assess the degree to which a relationship exists between subjective norm (perceived social pressure), perceived ease of use, and perceived usefulness on Extension educators' intention to use Web2.0 technology tools in educational programming. There were limited studies that examined the adoption of Web 2.0 technologies in Cooperative Extension.

Research Questions

The following research questions were used in this study:

1. What are the scores, as measured by Technology Acceptance Model, of Extension educators?
2. What is the relationship between perceived ease of use and perceived usefulness?
3. What is the relationship between perceived ease of use an intention to use technology?
4. What is the relationship between subjective norm and perceived usefulness?
5. What is the relationship between subjective norm and intention to use technology?

6. What is the relationship between perceived usefulness and intention to use technology?
7. What is the relationship of age and scores, as measured by Technology Acceptance Model, of Extension educators?
8. What is the relationship of gender and scores, as measured Technology Acceptance Model, of Extension educators?

Summary

This study included a sample consisting of 62 educators from the Alabama Cooperative Extension System. Invitation emails were sent to 250 perspective participants, 62 fully complete survey instruments were completed by the Alabama Cooperative Extension System educators. This gave a return rate of 25%. To examine the educators' perceptions of Web 2.0 technologies, the Expanded Technology Acceptance Model (TAM2) was used. To obtain demographic information, the researcher designed a nine-question demographic survey, which included age, gender, position, years employed, program area, highest degree earned, and degree major. The TAM2 instrument consisted of 24 questions, the first section consisted of four items that measure the perceived usefulness (PU), the second section consisted of five items that measure perceived ease of use (PEOU), the third section consisted of five items that measure perceived behavioral control (PBC), the fourth section consisted of five items that measure subjective norm (SN), the next section consisted of three items that measure voluntariness (V), and the last section consisted of two items that measure behavioral intention (BI). For the purpose of this study age and gender were considered independent variables that may affect the dependent variable, the total scores of the TAM2 – perceived usefulness (PU); perceived ease of use (PEOU); perceived behavioral control (PBC); subjective norm (SN); voluntariness (V); and behavioral intention (BI).

Participants were the 62 Extension educators. The demographic profile revealed that the percentage of females was slightly higher than males; females 33 (53.2%) and 28 (45.2%) males. The age of participants ranged from 26 and 65, with the largest group 24 (39%) are in the 51-65 category, and the next group 19 (31%) fell within 41 to 50 age category. Out of the 62 respondents, 23 (37.1%) identified their program area Agriculture represented the highest percentage of participants. The next largest program area 4H and Youth Development with 16 (25.8%) respondents. The fewest respondents were the Economic and Community Development and Information Technology program area, with 3 (4.8%) respondents in each category. Participants current professional position was also recorded, the highest percentage consisted of State Specialists were the highest percentage of with 23 participants (37.1%), next Regional Extension Agents 19 (31%). For measuring technology perceptions, the TAM2 is considered reliable and valid with a Cronbach's Alpha of .926. For the educator's perceptions of Web 2.0 technology tools, results showed good perception of Web 2.0 technologies for the five sub scales PU (M= 4.21), PEOU (M = 4.04), PBC (M = 4.68), SN (M = 4.32), VOL (M = 3.90), ands BI (M = 4.77). The result indicate that ACES educators understood Web 2.0 technologies to be useful in educational programming, and they had opportunities and resources to use Web 2.0 technologies.

Correlation analysis reported there was no significant correlation between gender or age of participants and technology scores including perceived usefulness, perceived ease of use, perceived behavioral control, subjective norm, voluntariness, and behavioral intention. As revealed by data analysis, there were negative correlations between years or employment and perceived ease of use. The t-test of independent samples was conducted to examine any differences in Web 2.0 technology perceptions among Extension personnel based on age. Data

analysis revealed that age had a significant effect on some levels of Web 2.0 perceptions. There was a statistical significance for subjective norm (SN) scores of participant's age 26-30 years of age and 41-50 years of age. For PEOU scores the statistical significance was for age 26-30 years of age and 51-65 age group.

T-test for independent samples were conducted to examine if there were any differences in Web 2.0 technologies perceptions among Extension educators based on their level of education. Data analysis concluded that level of education had a significant effect on Extension personnel's subjective norm perceptions of Web 2.0 technologies. For subjective norm scores, there was a statistical significance of participants with bachelor's degrees and participants with master's degrees. Also, the subjective norm scores of participants with bachelor's degrees in comparison to Ph.D. participants.

The t-test for independent samples was also conducted to determine any difference in Web 2.0 technology perceptions among respondents based on their years of employment with Extension. Data analysis concluded the years of Extension service had a significant effect on Web 2.0 technology perceptions of the perceived ease of use and voluntariness constructs. For VOL scores, there was a statistically significant difference between the participants employed between 4-7 years with Extension and participants employed between 8-10 years. Also, the VOL scores difference of participants employed between 4-7 years was statistically significant as compared to the participants employed between 11-15 years. For PEOU scores, the score means difference was statistically significant for participants employed between 4-7 years and participants employed 15 years or more.

Limitations

One limitation of this study was that the study was limited to Alabama Cooperative Extension System educators. The results may not be representative of all Extension personnel. As such, the results may not be generalizable to Extension professionals in other states. Thus, it will be necessary to exercise care in interpreting the findings, as the generalizability of the findings are limited to the study population. The results of this study may offer insight to those organizations.

One limitation in the study was the adequacy of the sample. A large number of participants provide more confident estimates of population proportion (Anderson & Vingrys, 2001). Ross (2004) suggested a sample size between 30-500 subjects when conducting parametric test. It was determined for this study using Qualtrics' sample size calculator the ideal sample size needed was 152 for 95% confidence level, 5% margin of error, and a 50% population proportion. At the conclusion of the data collection, there were only sixty-two participants, or 24.8%, in the study. This may be a result of potential participants may not be interested in participating. The sample size of a research study is important, as it has an effect on the statistical power of the study. Given the size of the sample of the Alabama Cooperative Extension System participants, $N = 62$, the researcher was unable to generalize the findings to different Cooperative Extension settings. As with this sample size there is a 10.8% margin of error, and lower margin of error requires a larger sample size. The more participants that are used in the study's reliability, as larger studies produce narrower confidence intervals yielding more precision in results (Hackshaw, 2008). The researcher performed a power analysis, and the result suggested the sample should be increased as a higher sample size would help to make the conclusion more general for different settings. Therefore, in future studies that use Extension

personnel as a sample population consider providing questionnaires, or collect data from a much larger group, or choose more than one Cooperative Extension organization for the collection of data.

Another limitation of this study was the variety of additional independent or exogenous variables affecting perceived usefulness, perceived ease of use, and subjective norm that were not incorporated into this theoretical model. A review of literature suggested that attitude, job relevance, image, managerial and environmental resources, and training could be important factors relative to the perceived usefulness, perceived ease of use, and subjective norm.

As with most survey research, another limitation of this study may be there was self-reporting bias, as this study used an online survey to measure variables. Self-reporting is generally used in technology adoption models (Venkatesh and Morris, 2000; Venkatesh and Davis, 2000), but other researchers proposed the use of behavior-oriented measures, or both subjective and objective measures (Szajna, 1994; Thompson et al., 1994).

Lastly, the Behavioral Intention construct was measured with only two items. There are reliability and validity risk associated with two-item scales. In this study this construct met the criteria for adequate reliability and validity.

Discussion

The Internet has greatly impacted the functions of the Cooperative Extension Service. Web 2.0 technologies offer tremendous opportunities for Cooperative Extension (CE). The use of Web 2.0 technologies has significant potential to advance Extension programming and impact, by supporting and enhancing the teaching and learning in extension education. Extension educational programs differ from traditional student classroom settings, as Extension clients are self-directed learners. Extension program recipients have previous learning and professional

experience that enhances their level of expertise. They are aware of their needs and learn to acquire new knowledge through problem-solving experience. Generally, Extension clients seek Extension personnel to facilitate learning skills through direct contacts, which require cost and time for travel for staff and clients, to meet clients' demand educators often offer the same workshop opportunities a number of times in the same area repeat programs. This limits the amount of time and funding available to provide additional programming. Though the use of technology in extension education has evolved over recent years, there are many opportunities that can be added by utilizing Web 2.0 technologies. Other educational organizations and industries are using Web 2.0 technologies, such as internal blogs and wikis, to facilitate personnel collaboration and knowledge sharing. In higher education, faculty utilize technology for course content delivery, basic communication, and assignment and grade delivery (Maloney, 2007). An effective learning environment will foster collaboration with Extension educators and clientele, allowing clients to share new knowledge and resources. Web 2.0 technologies allow learners a medium to participate in their engagement with extension-provided information or extension educators in a user-friendly, inexpensive environment (Fischer & Reuber, 2011). As most Extension clientele do not have access to research-based information or literature, utilizing Web 2.0 technologies in conjunction with Extension programming will eliminate the obstacles and provide information in a sharable format, and facilitate learning (Schnitzler et al., 2016).

Studies have addressed various factors that may affect educators' usage of Web 2.0 technologies, they include beliefs, age, gender, educational background, and fear of losing clientele (Guenthner & Swan, 2011; Gebhard, Shin & Seger, 2011; Toelle & Harris, 2014). The Internet has been a resource for clientele so that they access and benefit from work or learning opportunities. The Internet is an educational medium; a form of educational delivery as it is

interactive and responsive. Web 2.0 technologies allow individuals to collaborate, communicate, interact, and engage despite geographic locations. The collaborative nature of Web 2.0 resonates with adult educational theories, as theories provide foundation for self-directed learning, andragogy, transformative learning, and constructivist learning (Brookfield, 2001; Knowles, 1984; Merriam & Caffarella, 1999; Mezirow, J., 1997). Examining the root cause of why Web 2.0 technologies use in Extension is low and how to increase use is an important issue that can assist Cooperative Extension leadership in integrating these tools into programming to remain relevant to contemporary audiences and clientele.

The purpose of this study was to examine the technology perceptions among adult educators employed with the Alabama Cooperative Extension System, as it pertains to Web 2.0 technologies. Professional position, age, and gender were external variables that were thought to conceivably affect the perceptions of Web 2.0 technology tools. Analysis techniques were used to respond to the research questions that included correlation, multiple and stepwise regression, and t-test for independent samples.

The findings of this study demonstrate that perceived ease of use plays a significant role in persuading Extension educators' intention to use Web 2.0 technologies. This result was supported by previous studies on perceived ease of use and intention. Majority of the studies found that perceived ease of use was a vital factor that can lead to intention to use technology (Davis, 1986; Davis et al., 1989; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000). Also, perceived ease of use was posited to not only directly influence behavioral intention, but it indirectly influenced behavioral intention via the mediating variable of perceived usefulness (Venkatesh & Davis, 2000; Venkatesh & Morris, 2000). Specifically, when a technology is easy to use, individuals will form stronger behavioral intentions to use the technology (Venkatesh &

Davis, 2000).

Data analysis revealed that Extension educators at the Alabama Cooperative Extension had a positive perception of Web 2.0 technologies and a behavioral intention to use in the future. There was no statistically significant correlation between age as an independent variable and perception of Web 2.0 technology tools among the educators. Gender did not affect the perception of Web 2.0 technologies use. The level of education had a significant correlation with respondents' technology perceptions. Data analysis concluded the years of Extension service had a significant affect on the voluntariness and perceived ease of use perceptions of Web 2.0 technologies.

Implications

The purpose of this study was to examine the technology perceptions of Extension educators in the Alabama Cooperative Extension System, specifically the perceptions of Web 2.0 technologies. It may be beneficial to replicate the study and measure the technology perceptions of other personnel within a Cooperative Extension System in another part of the country and compare the results.

There are three key area in which to conduct future research on technology adoption and more specifically technology adoption in Cooperative Extension. First, researchers should consider including other individual (e.g., IT knowledge, self-efficacy, job relevance, image), organizational (e.g., training, technical support), device (e.g., operating system, size, cost) characteristics as predictors of perceived usefulness and perceived ease of use. Additional constructs may be added to expand the Technology Acceptance Model 2 (TAM2) in an effort to identify factors that significantly influence TAM2 and its constructs. Differences among Extension educators in prior experience and goals may be moderating influences upon the social

influences on attitudes toward Web 2.0 technology tools.

While Extension educators are knowledgeable in their subject matter area, it is Extension educators' use of technology to develop and deliver educational programs that may need attention. Cooperative Extension leadership should develop incentives for educators to integrate modern technology in their programming. This would encourage educators to invest time into using Web 2.0 technologies.

Employee training in various technologies and goals to adopt technology into programming, should occur to improve educators' knowledge and their understanding of the benefits of Web 2.0 technologies to the teaching and learning environment. Work with technology experts at the university on use of Web 2 tools. This would allow Extension personnel the ability to gain confidence and enhance their skill set in Web 2.0 technologies.

Allow Extension educators who are currently utilizing Web 2.0 technologies in their programming to conduct professional development for colleagues or serve as a subject matter expert for colleagues. Provide a list to staff or form a learning community such as a users' group. This would allow employees to work to together on strengthening skills and educational methodologies by applying Web 2.0 technologies to programs.

Cooperative Extension has long since been a substantial provider of adult education and has historically disseminated research-based information to the public. However, as society changes the needs and methods of engaging clientele must also adapt. As technology continues to evolve, so will opportunities for technological choices in extension education. Extension educators will be able to engage a wider audience, especially the millennial generation. Technology will become a pivotal aspect of extension education, with the use of Web 2.0 technologies such as social media, blogs, and podcasts extension educators will be able to

broaden their range and effectively carry out the organization's mission of facilitating the gain of knowledge and change of life of its clients. Extension administration and staff must increase the institutional use of Web 2.0 technologies to carry out its mission.

Recommendations

This study focused on the perceptions of Web 2.0 technologies in Extension programming of Extension educators in the Alabama Cooperative Extension System. This study sought to examine the relationship between perceived usefulness, perceived ease of use, perceived behavioral control, subjective norm, and behavioral intention towards using Web 2.0 technology tools in Extension education. Results showed that Extension educators' intention to use Web 2.0 technologies was determined by their perception of their usefulness and the convenience of access to Web 2.0 technologies. Also, the results proposed the importance of perceived ease of use towards Web 2.0 technologies. After conducting this study, there were some recommendations for future research:

1. Whereas this study only included Extension personnel from the Alabama Cooperative Extension System, future research should develop a study to include other southeastern Extension organizations or in other parts of the country. This would involve a larger number of Extension educators. The study should be replicated with a larger number of Extension personnel surveyed in order to establish generalizable results about their perceptions of Web 2.0 technologies as educational tools.
2. Whereas this study included Web 2.0 technologies (blogs, wikis, podcasts, Twitter, YouTube, Facebook, and Instagram), future research should develop a study of other emergent technologies such as Prezi, Moodle, and Skype.
3. Whereas this study included Web 2.0 technologies (blogs, wikis, podcasts, Twitter,

YouTube, Facebook, and Instagram), future research should be conducted to examine the perceived usefulness of each of technologies individually.

4. Whereas this study measured a specific point time and attitudes and beliefs may change, future research should be a longitudinal study. During which data can be collected periodically so more reliable information about Extension Educators' Web 2.0 use can be gathered.
5. This study included any level of Web 2.0 technology use, future research should develop a study to compare an Extension Service that has an organizational requirement to use Web 2.0 technologies within the educational programming with an organization that does not have the requirement.
6. This study focused on Extension educators' perceptions, future research should involve clientele and explore clients' perceptions about Web 2.0 in Extension education. This may offer insight into the successful integration of Web 2.0 technologies in educational programming.
7. The study could be designed to consider the technology perception as a factor and the affect on the measurement of client behavior change and examine if there is any correlation between the technology perception and client behavior change.
8. Whereas this study only examined perceived usefulness, perceived ease of use, perceived behavioral control, subjective norm, and voluntariness, future research should include a variety of additional independent or exogenous variables affecting perceived usefulness, perceived ease of use, and subjective norm that were not incorporated into this theoretical model. A study to examine the effect of attitude, job relevance, image, managerial and environmental resources, and training could be important factors relative to the perceived

usefulness, perceived ease of use, and subjective norm as they relate to Web 2.0 technology use.

9. A study that would examine Extension educators' motivations regarding modern technology use and their impact on technology perceptions and behavioral intention.
10. A study that would examine the information technology support available to Extension personnel and its impact on the Extension educators' perceptions and behavioral intention.

REFERENCES

Adams, D., Nelson, R.., and Todd, P. (2008). Perceived Usefulness, Ease of Use, and Usage of Information Technology: A Replication, *MIS Quarterly,* (16: 2).

Adams, N. B. (2002). Educational Computing Concerns of Postsecondary Faculty, *Journal of Research on Technology in Education*, 34:3, 285 303, DOI: 10.1080/15391523.2002.10782350

Adya, M., & Mascha, M. (2011). Can Extended Exposure to New Technology Undermine Its Acceptance? Evidence from System Trials of an Enterprise Implementation. *Communications of the Association for Information Systems*, 29, https://doi.org/10.17705/1CAIS.02914

Ajjan, H., & Hartshorne, R. (2008). Investigating faculty decisions to adopt Web 2.0 technologies: Theory and empirical tests. *Internet and Higher Education, 11,* 71–80. DOI: 10.1016/j.iheduc.2008.05.002.

Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.

Albright, B. B. (2000). Cooperative Extension and the information technology era: An assessment of current competencies and future training needs of county Extension agents. (Doctoral dissertation, Texas A&M University, 2000). Dissertation Abstracts International, 61, 2668.

Alexander, B. (2006). Web 2.0: A New Wave of Innovation for Teaching and Learning? *Educause Review*, 41, 32.

Alsaady, A. (2007). Planning strategy and the use of information technology in higher education: A comparative analysis of two universities in Michigan. Doctoral Dissertation, Minneapolis.

Anderson, A., & Vingrys, A. (2001). Small samples: Does Size Matter?, *Investigative Ophthalmology & Visual Science*, 42(7), 1411-1413.

Astroth, K. A. (1990). Information technology: Extension's future. *Journal of Extension*, 28(1). Retrieved from: http://www.joe.org/joe/1990spring/f1.html

Bagozzi, R. (2007). The Legacy of the Technology Acceptance Model and a Proposal for a Paradigm Shift. *Journal of the Association for Information Systems*, *8*(4), 244–254.

Bailey, J.E. and Pearson, S.W. (1983). Development of a Tool for Measuring and Analyzing Computer User Satisfaction. *Management Science*, 29, 530-545. https://doi.org/10.1287/mnsc.29.5.530.

Bandura, A. (1983). The Assessment and Predictive Generality of Self-Percepts of Efficacy. *Journal of Behavior Therapy an Experimental Psychiatry*, 13, 195-199.

Barki, H., & Hartwick, J. (1994). Measuring User Participation, User Involvement, and User Attitude. *MIS Quarterly*. 18. 59-82.DOI: 10.2307/249610.

Barton, E. T., Barton, E. A., Barton, S., Boyer, C. R., Brosnan, J., Hill, P., Hoyle, J., Reid, J. Seger, J., Stafne, E. (2017). Using Technology to Enhance Extension Education and Outreach. *Hort Technology*, *27*(2), 177–186. DOI: 10.21273/HORTTECH03608-16.

Beer, D., & Burrows, R. (2007). Sociology and, of and in Web 2.0: Some Initial Considerations. *Sociological Research Online*, *12*(5), 1-13. https://doi.org/10.5153/sro.1560.

Berg, S. (2011). "Web 2.0 Technologies in Higher Education Teaching: A Practical Introduction," *Kentucky Journal of Excellence in College Teaching and Learning*: Vol. 8, Article 2. Available at: https://encompass.eku.edu/kjectl/vol8/iss1/2.

Best, J., & Kahn, J. (1998). Research in Education.8th Edition. Boston: Allyn & Bacon.

Birch, D.T., & Volkov, M. (2007). Assessment of online reflections: engaging English second language (ESL) students. *Australasian Journal of Educational Technology*, v23 n3 p291 306.

Boulos, M., Maramba, I. & Wheeler, S. (2006). Wikis, Blogs and Podcasts: A New Generation of Web-based Tools for Virtual Collaborative Clinical Practice and Education. BMC medical education. 6. 41. DOI: 10.1186/1472-6920-6-41.

Bowns, I., Rotherham, G., & Paisley, S. (1999). Factors associated with success in the implementation of information management and technology in the NHS. *Health Informatics Journal*, 5(3), 136-145.

Boyd, D., & Ellison, N. (2007). Social Network Sites: Definition, History, and Scholarship, *Journal of Computer-Mediated Communication*, Volume 13, 1(1), October 2007, 210–230. https://doi.org/10.1111/j.1083-6101.2007.00393.x

Brandon, D., & Hollingshead, A. B. (1999). Collaborative learning and computer supported groups. *Communication Education*, 48(2), 109-126.

Brookfield, S. (2001). Repositioning ideology critique in a critical theory of adult learning. *Adult Education Quarterly*, 51(1), 7-22.

Brookfield, S. (2005). *The power of critical theory: Liberating adult learning and teaching*. San Francisco: Jossey-Bass.

Brookfield, S. & Holst, J. (2014). A critical theory perspective on program development. In V. C.X. Wang, & V.C. Bryan (Eds.), Andragogical and pedagogical methods for curriculum and program development (pp. 1-21). Hershey, PA: IGI-Global.

Brown, S., Massey, A., Montoya-Weiss, M., & Burkman, J. (2002). Do I really have to? User acceptance of mandated technology. *European Journal of Information Systems*, 11, 283-295.

Buffington, M. (2010). Podcasting Possibilities for Art Education. Art Education. 63. 11-16. 10.1080/00043125.2010.11519048.

Burkman, E. (1987a). Factors affecting utilization. In R.M. Gagné (Ed.), Instructional Technology: Foundations (pp. 429–456). Hillsdale, NJ: Lawrence Erlbaum.

Caffarella, R., & Merriam, S. (1999). "Perspectives on Adult Learning: Framing Our Research," Adult Education Research Conference. http://newprairiepress.org/aerc/1999/papers/10.

Caffarella, R., & O'Donnell, J. (1987). Self-directed adult learning: A critical paradigm revisited. *Adult Education Quarterly*, 37, 199 – 211.

Cantrell, M. (1982). An assessment of attitudes, needs and delivery system for microcomputer applications by agricultural and extension educators in Mississippi. (Doctoral dissertation, Mississippi State University, 1982). Dissertation Abstracts International, 43, 3488.

Carlson, R.. (1970). Cooperative Extension: A Historical Assessment. *Journal of Extension*, (Fall), 10–15. Retrieved from http://www.joe.org.

Caruth, D. (2014). Participatory Educational Research (PER), 1(2), pp. 21-35, December, Retrieved from: http://www.partedres.com ISSN: 2148-6123.

Cater, M., Davis, D., Leger, B., Machtmes, K., & Arcemont, L. (2013). A Study of Extension Professionals Preferences of Usefulness and Level of Comfort with Blogs as an Informal Professional Development Tool. *Journal of Extension*, 51(4), Retrieved from: https://joe.org/joe/2013august/a6.php

Cercone, K. (2008). Characteristics of adult learners with implications for online learning design, *AACE Journal*, 16(2), 137-159.

Chan, S. (2010). Applications of Andragogy in Multi-Disciplined Teaching and Learning. *Journal of Adult Education*, v39 n2 p25-35.

Cheney, P., Mann, R., & Guha, S. (1986). Organizational Factors Affecting the Success of End-User Computing. *Journal of Management Information Systems*. 3. 65-80. 10.1080/07421222.1986.11517755.

Chen, N., Huang, H., & Shih, Y. (2002). Factors affecting usage of Web-based teachers' training in elementary and high school. In Kinshuk, R. Lewis, K. Akahori, R. Kemp, T. Okamoto, L. Henderson, & C.-H. Lee (Eds), Proceedings of the International Conference on Computers in Education (pp. 589–592). Washington DC: IEEE Computing Society Press.

Chuang, T., & Chen, W. (2009). Effect of computer-based video games on children: an experimental study. *Educational Technology & Society*, 12 (2), 1–10.

Churchill, D. (2009), Educational applications of Web 2.0: Using blogs to support teaching and learning. *British Journal of Educational Technology*, 40: 179-183. DOI:10.1111/j.1467-8535.2008.00865.x.

Chuttur M. (2009). "Overview of the Technology Acceptance Model: Origins, Developments and Future Directions," Indiana University, USA. Sprouts: Working Papers on Information Systems, 9(37). http://sprouts.aisnet.org/9-37.

Clark, R. & Salomon, G., (2001) “Why Should We Expect Media to Teach Anyone Anything?” in *Learning from Media: Arguments, Analysis, and Evidence*, R. E. Clark, ed. (Greenwich, Conn.: Information Age Publishing, 2001), pp. 37–70.

Collins, A. & Halverson, R. (2009). Rethinking education in the age of technology: the digital revolution and the schools.

Comer, M., Campbell, T., Edwards, K., Hillison, J. (2006). Cooperative Extension and the 1890 Land-Grant Institution: The Real Story. *Journal of Extension*, 44(3). Retrieved from http://www.joe.org.

Cook, S. & Campbell, D. (2001). *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*, Boston: Houghton Mifflin.

Cormode, G. & Krishnamurthy, B. (2008). Key Differences Between Web 1.0 and Web 2.0. *First Monday*. 13(6). https://doi.org/10.5210/fm.v13i6.2125.

Cornelisse, S., Hyde, J., Raines, C., Kelley, K., Ollendyke, D. & Remcheck, J. (2011). Entrepreneurial Extension conducted via social media. *Journal of Extension*, 49(6) Article 6TOT1. Retrieved from:: http://www.joe.org/joe/2011december/tt1.php

Cradler, J. & R. Cradler (1995, *Prior Studies for Technology Insertion* (San Francisco, Calif.: Far West Laboratory, 1995).

Cresswell, K., Bates, D., & Sheikh, A. (2013). Ten key considerations for the successful implementation and adoption of large-scale health information technology, *Journal of the American Medical Informatics Association*, Volume 20, Issue e1, June 2013, Pages e9–e13, https://doi.org/10.1136/amiajnl-2013-001684

Crook, C., Fisher, T., Harrison, C., Logan, K., Luckin, R., Oliver, M., & Sharples, M. (2008). Web 2.0 technologies for learning: the current landscape – opportunities, challenges and tensions. Retrieved from http://partners.becta.org.uk/ upload dir/downloads/page_documents/ research/web2_technologies_learning.pdf

Cross, K. P. (1981). *Adults as learners*. San Francisco: Jossey-Bass.

Dadashzadeh, M. (2010). Social Media in Government: From eGovernment to eGovernance. *Journal of Business & Economics Research (JBER), 8*(11). https://doi.org/10.19030/jber.v8i11.51

Darkenwald, G., & Merriam, S. (1982). *Adult Education: Foundations of Practice*. New York, NY: Harper & Row.

Darwish, A. & Lakhtaria, K. (2011). The Impact of the New Web 2.0 Technologies in Communication, Development, and Revolutions of Societies. *Journal of Advances in Information Technology*. 2. 10.4304/jait.2.4.204-216.

Davenport, J., & Davenport, J. A. (1985). A chronology and analysis of the andragogy debate. *Adult Education Quarterly*, 35, 152-159.

David, J.C. (2010). New Friend Request: The Relationship between Web 2.0 and Higher Education. In *Journal of Student Affairs*, vol. XIX. pp. 37-42, http://www.sahe.colstate.edu/Data/Sites/1/documents/journal/2010_Journal_of_Student_Affairs.pdf#page=39.

Davis, F. D. (1985). *A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results* (dissertation).

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly, 13*, 319–339.

Davis, F.D. (1993). User acceptance of information technology: System characteristics, user acceptance of information technology. *International Journal of Man-Machine Studies*, 38(3), 475-487.

Davis, F., Bagozzi, R., & Warshaw, P. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*. 35. 982-1003. 10.1287/mnsc.35.8.982.

Davis, F., Bagozzi, R., & Warshaw, P. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology*. 22(14), 1111-1132.

Davis, F., Venkatesh, V. (1996). A critical assessment of potential measurement biases in the technology acceptance model: Three experiments. *International Journal of Human-Computer Studies.*45(1).19-45.

Dede, C. (2000) Emerging influences of information technology on school curriculum, *Journal of Curriculum Studies*,32:2, 281-303, DOI: 10.1080/002202700182763

DeLone, W., & McLean, E. (2002). Information systems success revisited. *Proceedings of the 35th Annual Hawaii International Conference on System Sciences*, 2966-2976.

Dillman, D. (2000). Mail and Internet surveys, the tailored design method (2nd ed.). New York, NY: John Wiley & Sons, Inc. Dillman, D. A., & Bowker, D. K, (2001). The Web questionnaire challenge to survey methodologists. Retrieved from: http://survey.sesrc.wsu.edu/dillman/zuma_paper_dillman_bowker.pdf

diSessa, A. (2000). *Changing minds – computers, learning and literacy*. Cambridge, MA: The MIT Press.

Ditsa G., MacGregor, R. (1997). Our mousetrap's 4ne: so why aren't people beating a path to our door? *Information Resources Management Journal*,10(3):28–39.

Douce, G. K. "A Blue-Sky Perspective," Journal of Extension, XVII (May/June 1979), 11-16.

Doulani, A., (2018)., An Assessment of Effective Factors in Technology Acceptance Model: A Meta- Analysis Study, *Journal of Scientometric Research*, vol. 7(3), pp. 153-166.

Dunlap, J. & Lowenthal, P. (2011). Learning, unlearning, and relearning: Using Web 2.0 technologies to support the development of lifelong learning skills. DOI: 10.4018/978-1-61520-983-5.ch012.

Elbert, C., & Alston, A. (2005). An evaluative study of the United States Cooperative Extension Service's role in bridging the digital divide. *Journal of Extension*, 43(5) Article 5RIB1. http://www.joe.org/joe/2005october/rb1.php

Ellison, N., Steinfield, C., & Lampe, C. (2007), The Benefits of Facebook "Friends:" Social Capital and College Students' Use of Online Social Network Sites. Journal of Computer Mediated Communication, 12: 1143-1168. doi:10.1111/j.1083-6101.2007.00367.x

Englund, C., Olofsson, A., & Price, L. (2017) Teaching with technology in higher education: understanding conceptual change and development in practice, *Higher Education Research & Development*, 36:1, 73-87, DOI: 10.1080/07294360.2016.1171300

Ensminger, D., Surry, D., Porter, B., & Wright, D. (2004). Factors Contributing to the Successful Implementation of Technology Innovations. *Journal of Educational Technology & Society, 7*(3), 61-72. Retrieved from http://www.jstor.org/stable/jeductechsoci.7.3.61

Ertmer, P., & Ottenbreit-Leftwich, A. (2010) Teacher Technology Change, *Journal of Research on Technology in Education*, 42:3, 255-284, DOI: 10.1080/15391523.2010.10782551.

Ferguson, L. (2004). External Validity, Generalizability, and Knowledge Utilization. *Journal of Nursing Scholarship*, 36(1), 16-22.

Feldman, J. M., & Lynch, J. G. (1988). Self-generated validity and other effects of measurement on belief, attitude, intention, and behavior. *Journal of Applied Psychology, 73*(3), 421-435. http://dx.doi.org/10.1037/0021-9010.73.3.421

Ferreira, D. (2016) Bridging the cultural divide in online learning: Implications and strategies, *Language Research Bulletin, 31*, 8-15.

Ferreira, A., & Kuniyoshi, M. (2015). Critical factors in the implementation process of integrated

management systems. *Journal of Information Systems and Technology Management*. 12. 10.4301/S1807-17752015000100008.

Feng, M., Heffernan, N.T., & Koedinger, K.R. (2006). Addressing the Testing Challenge with a Web-Based eAssessment System that Tutors as it Assesses. In Leslie A. Carr, David C. De Roure, Arun Iyengar, Carole A. Goble, Michael Dahlin (Ed.), Proceedings of the Fifteenth International World Wide Web Conference. New York, NY: ACM Press. pp. 307-316. Edinburgh, UK.

Fincham J. E. (2008). Response Rates and Responsiveness for Surveys, Standards, and the Journal. *American journal of pharmaceutical education, 72*(2), 43. doi:10.5688/aj720243

Fischer, G., & Konomi, S. (2005). Innovative media in support of distributed intelligence and lifelong learning. In *Proceedings - IEEE International Workshop on Wireless and Mobile Technologies in Education, WMTE 2005* (pp. 3-10). [1579223] (Proceedings – IEEE International Workshop on Wireless and Mobile Technologies in Education, WMTE 2005; Vol. 2005). https://doi.org/10.1109/WMTE.2005.35.

Fischer, E., & Reuber, A. (2011). Social interaction via new social media: (How) can interactions on Twitter affect effectual thinking and behavior?. *Journal of Business Venturing*. 26. 1-18. 10.1016/j.jbusvent.2010.09.002.

Fishbein, M. & Ajzen, Icek. (1975). *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*. Reading, Addison-Wesley, MA.

Fornell, C., & Larcker, D. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research, 18*(1), 39–50. https://doi.org/10.1177/002224378101800104.

Forrest, S. & Peterson, T. (2006). It's Called Andragogy. *Academy of Management Learning & Education*, 5(1), 113-122.

Fox, J., Leeds, R., & Barrett, E. (2014). Maps & apps: Mobile media marketing education for food and farm entrepreneurs. *Journal of Extension,* 52(3) Article 3TOT3. Retrieved from: http://www.joe.org/joe/2014june/tt3.php

Francis, J., Eccles, M. P., Johnston, M., Walker, A., Grimshaw, J. Foy, R. (2004). Constructing questionnaires based on the theory of planned behavior. A Manual for Health Services Researchers. 2004. 2-12.

Frey, W. H. (2018). The Millennial Generation: A demographic bridge to America's diverse future. Metropolitan Policy Program, *Brookings*. January. https://www.brookings.edu/wp-content/uploads/2018/01/2018-jan_brookings-metro_millennials-a-demographic-bridge-to-americas-diverse-future.pdf

Frydenberg, M. (2008). Principles and pedagogy: The two P's of podcasting in the information technology classroom. *Information Systems Education Journal*. 6(6). http://isedj.org/6/6/

Galbraith, M. W. (1990), The nature of community and adult education. *New Directions for Adult and Continuing Education,* 1990: 3-11. doi:10.1002/ace.36719904703.

Garrison, D. R., & Anderson, T. (2003). E-Learning in the 21st century: A framework for research and practice. London: Routledge/Falmer. doi:10.4324/9780203166093

Gebhard, M., Shin, D., & Seger, W. (2011). Blogging and emergent L2 literacy development in an urban elementary school: A functional perspective. *CALICO Journal*, 27(2), 278–307.

Gharis, L., Bardon, R., Evans, J., Hubbard, W., & Taylor, E. (2013). Expanding the reach of Extension through social media. *Journal of Extension,* 52(3) Article 3FEA3. Retrieved from: http://www.joe.org/joe/2014june/a3.php

Gibson, S. & Harris, M. & Colaric, S. (2008). Technology Acceptance in an Academic Context: Faculty Acceptance of Online Education. *The Journal of Education for Business*. 83. 355-359. DOI: 10.3200/JOEB.83.6.355-359.

Gikas, J. & Grant, M. (2013). Mobile Computing Devices in Higher Education: Student Perspectives on Learning with Cellphones, Smartphones & Social Media. *The Internet and Higher Education*. 19. 18–26. DOI: 10.1016/j.iheduc.2013.06.002.

Gottwald, W. D. (2005). A Comparison of student perceptions regarding online courses & traditional courses: A Case Study. (Doctoral Dissertation, Wayne State University, 2005).

Greenhow, Christine. (2011). Online Social Networking and Learning: What are the Interesting Research Questions. International Journal of Cyber Behavior, Psychology and Learning, 1(1), 36-50.

Gregg, J. A. (2002). Use of Information Technology by County Extension Agents of the Florida Cooperative Extension Service. (Doctoral Dissertation, University of Florida, 2002).

Gregg, J. A. & Irani, T. A. (2004). Use of Information Technology by County Extension Agents of the Florida Cooperative Extension Service. *Journal of Extension*, 42(3). Retrieved from: https://www.joe.org/joe/2004june/rb2.php

Griffith, W. (1991). The impact of intellectual leadership. In J. Peters & P. Jarvis (Eds.), Adult education: Evolution and achievements in a developing field of study (pp. 97–120). San Francisco, CA: Jossey-Bass.

Greenhow, C., Robelia, B., & Hughes, J. (2009). Web 2.0 and Classroom Research: What Path Should We Take Now? *Educational Researcher, 38*(4), 246–259. DOI: 10.3102/0013189X09336671.

Grogan, S. (1991). Targeting Audiences for the 21st Century. *Journal of Extension, 29*(4). Retrieved from https://www.joe.org/joe/1991winter/fut1.php.

Grosseck, G. (2009). To use or not to use web 2.0 in higher education?. *Procedia - Social and Behavioral Sciences*. 1. 478-482. 10.1016/j.sbspro.2009.01.087.

Groves, M. & Zemel, P. (2000). Instructional Technology Adoption in Higher Education: An Action Research Case Study. *International Journal of Instructional Media*. 27.

Godin, G., Valois, P., & Lepage, L. (1993). The Pattern of Influence of Perceived Behavioral Control Upon Exercising Behavior. *Journal of Behavioral Medicine*, 16, 81-102. 10.1007/BF00844756.

Gould, F.I. & Steele, D. & Woodrum, W. J. (2014). Cooperative extension: A century of innovation. 52.

Guenthner, J. F. & Swan, B. G. (2011). Extension Learners' Use of Electronic Technology. *Journal of Extension*, 49(1). Retrieved from: https://joe.org/joe/2011february/a2.php

Hackshaw, A. (2008). Small studies: strengths and limitations. *European Respiratory Journal*, 32(5), 1141-1143.

Hall, G. E., & Hord, S. M. (2006). Implementing change: Patterns, principles, and potholes (2nd ed.). Boston: Allyn and Bacon.

Hall, R. (2009). Towards a fusion of formal and informal learning environments: The impact of the read/write web. *Electronic Journal of e-Learning*, 7(1), 29–40.

Hammond, S. V. (2004). Guidebook for Marketing Cooperative Extension. *Journal of Extension*, 42(2). Retrieved from: https://www.joe.org/joe/2004april/tt5.php

Hammond, S. V. (2003). Marketing Cooperative Extension at the local level. Monterey County, CA: University of California Cooperative Extension. Retrieved from http://ucce.ucdavis.edu/files/filelibrary/5605/12441.pdf.

Harder, A., Lamm, A., & Strong, R. (2009). An Analysis of the Priority Needs of Cooperative Extension at the County Level. *Journal of Agricultural Education, 5*(3), 11–21.

Harder, A., Mashburn, D., & Benge, M. (2009). An assessment of extension education curriculum at land–grant universities. *Journal of Agricultural Education*, 50(3), 22–32. doi: 10.5032/jae.2009.03022.

Harris, A., & Rea, A. (2009). Web 2.0 and Virtual World Technologies: A Growing Impact on IS Education. *Journal of Information Systems Education, 20*(2).

Hartree, A. (1984). Malcolm Knowles' theory of andragogy: A critique. *International Journal of Lifelong Education*, 3(3), 203-210.

Hartung, D. & Touchette, D. (2009). Overview of Clinical Research Design. *American Journal of Health-System Pharmacy*. 66(4), 398-408.

Hartwick, J. and Barki, H. (1994) Explaining the role of user participation in information system use, *Management Science*, 40, 440-465. doi:10.1287/mnsc.40.4.440

Hatch Act. (1887). *Hatch Act of 1887.* Retrieved from: http://www.highered.org/resources/hatch.htm

Hendrickson, A., Massey, P., & Cronan, T. (1993). "On the Test-Retest Reliability of Perceived Ease of Use Scales," *MIS Quarterly*, (17: 2).

Henschke, J. A. (2016). A History of Andragogy and its Documents as they Pertain to Adult Basic and Literacy Education. *Pennsylvania Association for Adult Continuing Education (PAACE) Journal of Lifelong Learning*, 25, 1-28.

Hew, K., & Brush, T. (2006). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. Educational Technology Research and Development. 55. 223-252. 10.1007/s11423-006-9022-5.

Hewitt, A., & Forte, A. (2006). *Crossing boundaries: Identity management and student/faculty relationships on the Facebook*. Paper presented at CSCW, Banff, Alberta, Canada.

Higdon, J. & Topaz, C. (2009) Blogs and Wikis as Instructional Tools: A Social Software Adaptation of Just-in-Time Teaching, *College Teaching*, 57:2, 105-110, DOI: 10.3200/CTCH.57.2.105-110.

Hoban, G. & Herrington, A. J. (2005). Why teachers are reluctant to use new technologies: Supporting teachers' action learning within a web environment. In P. Kommers & G. Richards (Eds.), Proceedings of EdMedeia 2005: World Conference on Educational Multimedia, Hypermedia & Telecommunications (pp. 2581-2588). Norfolk, VA: AACE.

Hodson, P. B., & Kotrlik, J. W. (2002). Perceptions held by legislators toward the Louisiana Cooperative Extension service. *Journal of Agricultural Education*, 43(4), 56-66.

Holden, R. & Karsh, B. (2009). The Technology Acceptance Model: Its Past and Its Future in Health Care. *Journal of biomedical informatics*. 43(1), 159-72, 10.1016/j.jbi.2009.07.002.

Holmes, G., & Abington-Cooper, M. (2000). Pedagogy vs. Andragogy: A False Dichotomy?. *The Journal of Technology Studies*. 26. 10.21061/jots.v26i2.a.8.

Holton, E., Swanson, R., & Naquin, S. (2001). Andragogy in practice: Clarifying the andragogical model of adult learning. *Performance Improvement Quarterly*, 14(1), 118-143.

Holton, E., & Burnett, M. (1997) Quantitative research methods in Swanson, R. A. & Holton, E. F. III (Eds.) Human resource development research handbook: Linking research and practice (pp. 65-87). San Francisco: Berrett-Koehler.

Hooper, S., & Rieber, L. P. (1995). Teaching with technology. In A. C. Ornstein (Ed.), Teaching: Theory into practice, (pp. 154-170). Needham Heights, MA: Allyn and Bacon.

Houle, C. (1961). The inquiring mind. Madison: University of Wisconsin Press.

Houle, C. (1972). The Design of Education. San Francisco: Jossey-Bass, Inc.

Houle, C. (1984). Patterns of learning: New perspectives on life-span education. San Francisco: Jossey-Bass, Inc.

Howard, S. K. & Mozejko, A. (2015). Teachers: technology, change and resistance. In M. Henderson & G. Romeo (Eds.), Teaching and Digital Technologies: Big Issues and Critical Questions (pp. 307-317). Port Melbourne, Australia: Cambridge University Press.

Howe, J. (2006). Your Web, Your Way. *Time Magazine,* 168(26), 60–63.

Hsu, C., & Lin, J. C. (2008). Acceptance of blog usage: The roles of technology acceptance, social influence and knowledge sharing motivation. *Information & Management, 45,* 65–74.

Hu, P., Chau, P., Sheng, O., & Tam, K. (1999). Examining the technology acceptance model using physician acceptance of telemedicine technology. *Journal of Management Information Systems,*16(2), 91-112.

Hubona, G., & Burton-Jones, A. (2002). Modeling user acceptance of e-mail. In R. Sprague (Ed.), Proceedings of the 35th Hawaii International Conference of System Sciences (Vol. 1, pp. 25–35). Washington, DC: IEEE Computing Society Press.

Jarvis, P. (2001). Learning in later life. London: Kogan Page.

Jarvis, P. (2004). *Adult Education & Lifelong Learning.*3rd ed. New York, NY: RoutledgeFalmer.

Järvelä, S. (2001). Shifting research on motivation and cognition to an integrated approach on learning and motivation in context. In S. Volet and S. Järvelä (Eds.), Motivation in learning contexts: Theoretical advances and methodological implications (pp. 3-14). London: Pergamon/Elsevier.

Karahanna, E., and Straub, D. W. (1999). "The Psychological Origins of Perceived Usefulness and Ease of Use," *Information and Management,* 35(4), 237-250.

Karahanna, E., & Straub, D., & Chervany, N. (1999). Information Technology Adoption Across Time: A Cross-Sectional Comparison of Pre-Adoption and Post-Adoption Beliefs. *MIS Quarterly*. 23, 183-213. 10.2307/249751.

Kershaw, A. (1996). People, Planning, and Process: The Acceptance of Technological Innovation in Post-Secondary Organizations. *Educational Technology, 36*(5), 44-48. Retrieved from www.jstor.org/stable/44428362

Kim, S., & Garrison, G. (2009). Investigating mobile wireless technology adoption: An extension of the technology acceptance model. *Information System Frontiers*, *11*, 323–333. DOI: 10.1007/s10796-008-9073-8.

Kim, S. H., Mims, C., & Holmes, K. P. (2006). An introduction to current trends and benefits of mobile wireless technology use in higher education. *Association for the Advancement of Computing in Education Journal*, 14(1), 77-100.

King, D. (1993). Facing the image deficit. *Journal of Extension*, 31(3). Retrieved from: http://www.joe.org/joe/1993fall/tp1.html

King, W. & He, J. (2006). A meta-analysis of the technology acceptance model. *Information & Management*. 43, 740-755.

Kinsey, J. (2011). Defining an effective social media strategy for family and consumer sciences educators. *Journal of National Extension Association of Family and Consumer Sciences*, 6, 11-17. Retrieved from: http://www.neafcs.org/assets/documents/journal/neafcs-2011 journal.pdf

Kitsantas, A. & Dabbagh, N. (2011). The Role of Web 2.0 Technologies in Self-Regulated Learning, *New Directions for Teaching and Learning,* 126 (Summer 2011). DOI: 10.1002/tl.448

Klamma, R., Chatti, M.A., Duval, E., Hummel, H., Hvannberg, E.H., Kravcik, M., Law, E.,

Naeve, A., & Scott, P. (2007). Social software for life-long learning. *Journal of Educational Technology and Society*, 10(3), 72-83. http://www.ifets.info/journals/10_3/6.pdf.

Klopping, I. & McKinney, E. (2004). Extending the Technology Acceptance Model and the Task-Technology Fit Model to Consumer E-Commerce, Information Technology, *Learning, and Performance Journal*, 22(1), 35-48.

Kluchinski, D., Kinsey, J., Komar, S. J., & McDonnell, J. (2010). Use of Web 2.0 Technologies by Agricultural and Natural Resource Management Extension Professionals in New Jersey. *Journal of the National Association County Agricultural Agents, 3*(2).

Knowles, M. (1951). *Informal Adult Education.* New York, NY: Association Press.

Knowles, M. S. (1962). *The adult education movement in the United States*. New York: Holt, Rinehart and Winston Inc.

Knowles, M. (1968). Andragogy, not pedagogy. *Adult Leadership,* 16(10), 350-352, 386.

Knowles, M. (1969). Higher education in the United States: The current picture, trends, and issues. Washington D.C.: American Council on Education.

Knowles, M. (1970). *The modern practice of adult education; Andragogy versus pedagogy*. New York: Association Press.

Knowles, M. (1980). *The modern practice of adult education: From pedagogy to andragogy*. 2nd ed. New York: Cambridge Books.

Knowles, M. (1984). *The adult learner: A neglected species*. 3rd ed. Houston: Gulf

Knowles, M. S., Holton, E. F., & Swanson, R. A. (1998). *The adult learner: The definitive classic in adult education and human resource development.* 5th ed.. Houston, TX: Gulf.

Kop, R. (2008). Web 2.0 Technologies: Disruptive or Liberating for Adult Education? In *Adult Education Research Conference*. Retrieved from http://newprariepress.org/aerc/2008/papers/37

Kershaw, A. (1996). People, Planning, and Process: The Acceptance of Technological Innovation in Post-Secondary Organizations. *Educational Technology, 36*(5), 44-48. Retrieved from http://www.jstor.org/stable/44428362

Ladewig, H. W. (1999). Survey of computer technology skills and training needs. From: http://extensioneducation.tamu.edu/computer.

Lai, P. (2017). The Literature Review of Technology Adoption Models and Theories for the Novelty Technology. *JISTEM: Journal of Information Systems and Technology Management*. 14(1), Jan/Apr., 21-38. DOI: 10.4301/S1807-17752017000100002

Lampe, C., Ellison, N., & Steinfield, C. (2006). A Face(book) in the crowd: Social searching vs. social browsing. *Proceedings of the 2006 20th Anniversary Conference on Computer Supported Cooperative Work* (pp. 167– 170). New York: ACM Press.

Lederer, A. & Maupin, D. & Sena, M. & Zhuang, Y. (2000). Technology acceptance model and the World Wide Web. *Decision Support Systems*. 29. 269-282. DOI: 10.1016/S0167-9236(00)00076-2.

Lee, Y., Kozar, K., & Larsen, K. (2003). The Technology Acceptance Model: Past, Present, and Future. *Communications of the Association for Information Systems, 12*(1), 752–780. Retrieved from http://aisel.aisnet.org/cais/vol12/iss1/50

Legris, P., Ingham, J., & Collerette (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & Management*. 40, 191-204

LeNoue, M., Hall, T., & Eighmy, M. (2011). Adult Education and the Social Media Revolution. *Adult Learning*, *22*(2), 4–12.

Leuf, B. & Cunningham, W. (2001). The Wiki Way: Quick Collaboration on the Web / B. Leuf, W. Cunningham.

Lindhorst, F. A. (1951). *Teaching Adults*. New York, NY: Abingdon-Cokesbury Press.

Loughary, J. W. (1966). *Man-machine Systems in Education*. Harper and Row: New York, NY.

Loughran, J. (2013), Pedagogy. Curriculum Inquiry, 43: 118-141. doi:10.1111/curi.12003

Luarn, P., & Lin, H. (2005) Toward an Understanding of the Behavioral Intention to Use Mobile Banking. *Computers in Human Behavior*, 21, 873-891. http://dx.doi.org/10.1016/j.chb.2004.03.003

Ma, Q., & Liu, L. (2004). The Technology Acceptance Model: A Meta-Analysis of Empirical Findings. *Journal of Organizational and End User Computing*. 16, 59-72. 10.4018/978-1-59140-474-3.ch006.

Madge, C. & Meek, J. & Wellens, J. & Hooley, T. (2009). Facebook, social integration and informal learning at university: 'It is more for socializing and talking to friends about work than for actually doing work'. *Learning, Media and Technology*. 34. DOI: 10.1080/17439880902923606.

Maloney, E.J. (2007, January 5). Technology: What Web 2.0 can teach us about learning In Chronicle of Higher Education, (p. B26). Retrieved from http://chronicle.com/article/WhatWeb-20-Can-Teach-Us/8332

Martin, B. L. (1998). Computer Anxiety Levels of Virginia cooperative extension field personnel. Unpublished doctoral dissertation, Virginia Polytechnic Institute and State University.

Mathieson, K. (1991). Predicting User Intentions: Comparing the Technology Acceptance Model with the Theory of Planned Behavior. *Information Systems Research*. 2. 173-191. DOI: 10.1287/isre.2.3.173.

Mazer, J., Murphy, R., & Simonds, C. (2007). I'll See You On "Facebook": The Effects of Computer-Mediated Teacher Self-Disclosure on Student Motivation, Affective Learning, and Classroom Climate, *Communication Education*, 56:1, 1-17, DOI: 10.1080/03634520601009710

McCord, M. (2007). Technology acceptance model. In Reynolds, Woods, & Baker (Eds.), *Handbook of Research on Electronic Surveys and Measurements* (pp. 306-308). Hershey, PA: IGI Global. doi:10.4018/978-1-59140-792-8.

McLoughlin, C. & Lee, M. (2007). Social Software and Participatory Learning: Pedagogical Choices with Technology Affordances in the Web 2.0 Era. ICT: Providing choices for learners and learning. Proceedings Ascilite Singapore.664-675.

McKenzie,J. (1999). "Reaching the Reluctant Teacher," *From Now On*, Retrieve from http://www.fno.org/sum99/reluctant.html

McNierney,D. (2004). "One Teacher's Odyssey through Resistance and Fear," *TechTrends*, (48)5, pp. 64–68.

Merriam, S. B. (2001), Andragogy and Self-Directed Learning: Pillars of Adult Learning Theory. *New Directions for Adult and Continuing Education*, 2001: 3-14. doi:10.1002/ace.3

Merriam, S.B. (2001) Qualitative Research and Case Study Applications in Education. Jossey Bass Publishers, San Francisco.

Merriam, S. B. (2011). Adult Learning. In K. Rubenson (Ed.), Adult Learning and Education (pp. 29-34). Oxford, UK: Elsevier.

Merriam, S. B. & Bierema, L.L. (2014). Adult learning: Linking theory and practice. San Francisco: Jossey-Bass.

Merriam, S. B., & Brockett, R. G. (2007). The Profession and Practice of Adult Education. San Francisco: Jossey-Bass.

Merriam, S., & Caffarella, R. (1999). Learning in Adulthood. San Francisco: Jossey-Bass.

Merriam, S. B., Caffarella, R.S., & Baumgartner, L. (2007). *Learning in adulthood*. San Francisco, Jossey-Bass.

Merriam, S. B. & Kim, Y.S. (2011). Non-western perspectives on learning and knowing. In S. Merriam & A. Grace (Eds.), The JosseyBass reader on contemporary issues in adult education, (pp. 378- 389). San Francisco: Jossey-Bass.

Mezirow, J. (1978). Education for perspective transformation: Women's re-entry programs in community colleges. New York: Teachers College, Columbia University.

Mezirow, J. (2000). Learning to think like an adult: Core concepts of transformation theory. In J.Mezirow & Associates, Learning as transformation: Critical perspectives on a theory in process (pp. 3-33), San Francisco: Jossey-Bass.

Miniard, P. & Cohen, J. (1979). Isolating Attitudinal and Normative Influences in Behavioral Intentions Models. *Journal of Marketing Research*. 16. 102. DOI: 10.2307/3150881.

Momani, A., & Jamous, M. (2017). The Evolution of Technology Acceptance Theories, *International Journal of Contemporary Computer Research*, 1(1), 51–58, https://ssrn.com/abstract=2971454

Moon, J., & Kim, Y. (2001). Extending the TAM for a World-Wide-Web context. *Information & Management*. 38, 217-230.

Moore, G. C., & Benbasat, I. (1991). "Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation," *Information Systems Research*, 2(3), 192-222.

Morrill Act. (1862). Retrieved from: http://www.higher-ed.org/resources/morrill1.htm

Morrill Act. (1890). Retrieved from: http://www.ifas.ufl.edu/ls_grant/morrill2.htm

Morris, M., & Venkatesh, V. (2000). Age Differences in Technology Adoption Decisions: Implications for a Changing Work Force. *Personnel Psychology*, *53*(2), 375–403. DOI: https://doi.org/10.1111/j.1744-6570.2000.tb00206.x

Murphrey, T. P., & Coppernoll, S. (2006). Facilitating the adoption of an online conferencing system A recipe for success. Journal of Extension, 44(3) Article 3IAW1. http://www.joe.org/joe/2006june/iw1.php.

Murugesan, S. (2007). Understanding Web 2.0. *IT Professional*. 9, 34 - 41. DOI: 10.1109/MITP.2007.78.

Napitupulu, D., Kadar, J., & Jati, R. (2017). Validity Testing if Technology Acceptance Model on Factor Analysis Approach. *Indonesian Journal of Electrical Engineering and Computer Science*, *5*(3), 697–704. DOI: 10.11591/ijeecs.v5.i3.pp697-704.

Nardi, P. M. (2014). *Doing survey research: A guide to quantitative methods.*

National Research Council. (1995). *Colleges of Agriculture at the Land Grant Universities: A Profile.* Washington, D.C.: The National Academies Press. https://doi.org/10.17226/4980.

Nordby, A. (2014). Using Twitter to deliver 4-H show announcements. *Journal of Extension,* 52(3) Article 3TOT1. Retrieved from: http://www.joe.org/joe/2014june/tt1.php

Nysveen, H., Pedersen, P., & Thorbjornsen, H. (2005). Intentions to Use Model Services: Antecedents and Cross-Service Comparisons. *Journal of the Academy of Marketing Science,*33, 330-346. 10.1177/0092070305276149.

O'Neill, B., Zumwalt, A., Ravenscraft, M., Swanson, P., & Seiling, S. B. (2011). Using social networking in Extension education: Working smarter and evaluating impact. *Journal of National Extension Association of Family and Consumer Sciences,* 6. 28-38. Retrieved from: http://www.neafcs.org/assets/documents/journal/neafcs-2011-journal.pdf

O'Banion, Terry. (1995). "A Learning College for the 21st Century," *Community College Journal*,66(3), p18-23.

O'Reilly, T. (2006). Web 2.0: Stuck on a name or hooked on value? *Dr. Dobbs Journal*, *31*(7), 10–10.

Park, S. Y. (2009). An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use e-Learning. *Educational Technology & Society, 12*(3), 150–162.

Parker, K. & Chao, J. (2007). Wiki as a Teaching Tool. *Interdisciplinary Journal of E-Learning and Learning Objects, 3*(1), 57-72. Informing Science Institute. Retrieved from https://www.learntechlib.org/p/44798/.

Parker, S., Powell, L., Hermann, J., Phelps, J., & Brown, B. (2011). Preferred educational delivery strategies among limited income older adults enrolled in community nutrition education programs. *Journal of Extension*, 49(1), Article 1FEA8. Available at: http://www.joe.org/joe/2011february/a8.php

Paroutis, S., & Saleh, A. (2009). Determinants of knowledge sharing using Web 2.0 technologies. *Journal of Knowledge Management, 13*(4), 52–63. doi: 10.1108/13673270910971824.

Pankow, D.L. & Porter, N.M. & Schuchardt, J. (2006). Training educators and community collaborators using a satellite videoconference format, 44, 313-320.

Pea, Roy. (2004). The Social and Technological Dimensions of Scaffolding and Related Theoretical Concepts for Learning, Education, and Human Activity. *Journal of the Learning Sciences*. 13. 10.1207/s15327809jls1303_6.

Pew Research Center Internet/Broadband Fact Sheet, 2019 https://www.pewinternet.org/fact sheet/internet-broadband/

Pew Research Center Fact Sheet 2019 Social Media https://www.pewinternet.org/fact sheet/social-media/

Pratt, D. D. (1993), Andragogy after twenty-five years. *New Directions for Adult and Continuing Education*, 1993: 15-23. doi:10.1002/ace.36719935704

Preece, J. (2011). Research in adult education and lifelong learning in the era of CONFINTEA VI. *International Journal of Lifelong Education*. 30. 99-117. 10.1080/02601370.2011.538180.

Price, L. & Kirkwood, A. (2014). Using technology for teaching and learning in higher education: a critical review of the role of evidence in informing practice, *Higher Education Research & Development*, 33:3, 549-564, DOI: 10.1080/07294360.2013.841643

Rachal, J, R. (2002). Andragogy's Detectives: A Critique of the Present and a Proposal for the Future. *Adult Education Quarterly*, 52(3), May, 210-227.

Rader, H. B. (2011). Extension is Unpopular – On the Internet. *Journal of Extension*, 49(6), Retrieved from: https://joe.org/joe/2011december/comm1.php

Rasmussen, W. D. (1989). *Taking the university to the people*. Ames, IA: Iowa State University Press.

Ravenscroft, A., Schmidt, A., Cook, J., & Bradley, C. (2012). Media for informal learning. J. Comp. Assist. Learn. 28, 3 (June 2012), 235-249. DOI: http://dx.doi.org/10.1111/j.1365-2729.2012.00485.x

Rawstorne, P., Jayasuriya, R., & Caputi, P. (2000). Issues in predicting and explaining usage behaviors with the technology acceptance model and the theory of planned behavior when usage is mandatory. 35-44.

Rennekamp, Roger & Engle, Molly. (2008). A case study in organizational change: Evaluation in Cooperative Extension. *New Directions for Evaluation*. 2008. 15 - 26. 10.1002/ev.273.

Rennekamp, R.A., Warner, P.D., Nall, M.A., Jacobs, C., & Maurer, R.C. (2001). An examination of customer satisfaction in the Kentucky Cooperative Extension Service. J*ournal of Extension*, 39(2). Retrieved from: http://www.joe.org/joe/2001april/rb5.html.

Rhoades, E., Friedel, C., & Irani, T. (2008). Classroom 2.0: Student's feelings on new technology in the classroom. *NACTA Journal,* 52(4) 32- 38.

Richardson, W. (2006). *Blogs, Wikis, Podcasts, and other powerful tools for classrooms*. Thousand Oaks, CA: Sage.

Richardson, W. (2009). Blogs, wikis, podcasts, and other powerful web tools for classrooms (2nd ed). Thousand Oaks, CA: Corwin Press.

Roblyer, M. D., McDaniel, M., Webb, M., Herman, J., & Witty, J. V. (2010). Findings on Facebook in higher education: A comparison of college faculty and student uses and perceptions of social networking sites. *Internet and Higher Education, 13*, 134–140. DOI: 10.1016/j.iheduc.2010.03.002.

Robey, D. (1979). User Attitudes and Management Information System Use. *The Academy of Management Journal, 22*(3), 527-538. Retrieved from www.jstor.org/stable/255742

Rogers, D. (2000). A Paradigm Shift: Technology Integration for Higher Education in the New Millennium. *Educational Technology Review*, 19–33.

Rogers, E. (1995). Diffusion of Innovations. New York: Free Press. 4th ed

Ross, M. R. (2004). *Introduction to Probability and Statistics for Engineers and Scientists*. San Diego: Elsevier Academic Press.

Rubenson, K. (2011). The Field of Adult Education: An Overview. In K. Rubenson (Ed.), *Adult Learning and Education* (pp. 3-13). Oxford, UK: Elsevier.

Rudestam, K., & Schoenholtz-Read, J. (2010). The flourishing of adult online education: An overview. In K. E. Rudestam, & J. Schoenholtz-Read (Ed.), Handbook of online learning (pp. 1–18). Los Angeles, CA: Sage.

Ruppert, K. C. (1992). Factors affecting the utilization of computers by county Extension agents in Florida. (Doctoral dissertation, University of Florida, 1992). Dissertation Abstracts International, 54, 2915.

Saadé, R., & Bahli, B. (2005). The impact of cognitive absorption on perceived usefulness and perceived ease of use in on-line learning: An extension of the technology acceptance model. *Information & Management*, 42(2), 261-386.

Sambamurthy, V., W. Chin. 1994. The effects of group attitudes toward GDSS designs on the decision-making performance of computer-supported groups. *Decision Sciences*. 25(2) 215–242.

Schaffert, S., Bischof, D., Bürger, T., Gruber, A., Hilzensauer, W., & Schön, S. (2006). Learning with Semantic Wikis.

Schnitzler, K., Davies, N., Ross, F., Harris, R. (2016). Using Twitter to drive research impact: A discussion of strategies, opportunities, and challenges, *International Journal of Nursing Studies,* 59,15-26.

Seevers, B., Graham, D., Gamon, J., & Conklin, N. (1953). *Education through Cooperative Extension.* New York, NY: The Dryden Press.

Seevers, B., Graham, D., Gamon, J., & Conklin, N. (1997). *Education through Cooperative Extension*. Albany, N.Y.: Delmar Publishers.

Seevers, B., & Graham, D. (2012). *Education through cooperative extension*. Fayetteville, AR: University of Arkansas.

Seger, J. (2011). The New Digital Stage: Barriers to the Adoption and Adaptation of New Technologies to Deliver Extension Programming and How to Address Them. *Journal of Extension*, 49(1), Retrieved from: https://joe.org/joe/2011february/a2.php

Selwyn, N. (2007). The use of computer technology in university teaching and learning: A critical perspective. Journal of Computer Assisted Learning, 23, 83-94. doi:10.1111/j.1365-2729.2006.00204.x

Sharp, J. (2007). Development, extension, and application: A review of the technology acceptance model. *Information Systems Education Journal.* 5(9).

Shen, D., Laffey, J., Lin, Y., & Huang, X. (2006). Social Influence for Perceived Usefulness and Ease-of-Use of Course of Delivery Systems. *Journal of Interactive Online Learning, 5*(3), 270–282.

Sheppard, B. H., Hartwick, J., & Warshaw, P. R. (1988). The Theory of Reasoned Action: A Meta-Analysis of Past Research with Recommendations for Modifications and Future Research. *Journal of Consumer Research, 15,* 325–343.

Shih, R.C. (2011). Can Web 2.0 technology assist college students in learning English writing? Integrating Facebook and peer assessment with blended learning. *Australasian Journal of Educational Technology*, 27(5), 829 - 845. http://www.ascilite.org.au/ajet/ajet27/shih.html.

Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning*, *2*(1), 3-10.

Smith, S., Salaway, G., & Caruso, J. (2009). The ECAR Study of Undergraduate Students and Information Technology. EDUCAUSE Center for Applied Research. Available from: www.educause.edu/ecar

Snow, R. H. (1955). *Community Adult Education.* New York City, NY: G.P. Putnam's Sons.

Spotts, T.H., & Bowman, M.A. (1995). Faculty Use of Instructional Technologies in Higher Education. *Educational Technology Archive, 35,* 56-64.

Stahl, S. A. (2005). Four problems with teaching word meanings (and what to do to make vocabulary an integral part of instruction). In E. H. Hiebert and M. L. Kamil (Eds.), Teaching and learning vocabulary: Bringing research to practice (pp. 95-114). Mahwah, NJ: Lawrence Erlbaum.

Subramanian, G. H. 1994. A replication of perceived usefulness and perceived ease of use measurement. *Decision Sciences*. 25(5/6) 863– 874.

Surry, D. W., Ensminger, D. C., & Haab, M. (2005). A model for integrating instructional technology into higher education. *British Journal of Educational Technology*. *36*(2), 327-329.

Szajna, B. (1996). Empirical Evaluation of the Revised Technology Acceptance Model. *Management Science*, *42*(1), 85–92.

Tan, M., & Teo, T. (2000). Factors Influencing the Adoption of Internet Banking. *Journal of Electronic Commerce*, 1(3),0-. 10.1080/10864415.1998.11518312.

Tapscott, D., & Williams, A. (2010). Innovating the 21st-Century University: It's Time!.. EDUCAUSE Review. 45.

Taylor, S., & Todd, P. (1995). Understanding Information Technology Usage: A Test of Competing Models. *Information Systems Research, 6*(2), 144-176. Retrieved from http://www.jstor.org/stable/23011007

Taylor, S., & Todd, P. A. (1995). Assessing IT Usage: The Role of Prior Experience, *MIS Quarterly*, Vol. 19, No. 4., Dec, pp. 561-570.

Telg, R., Irani, T., Hurst, A., & Kistler, M. (2007). Local marketing and promotional efforts of Florida Extension agents. *Journal of Extension*, 45(2). Retrieved from: http://www.joe.org/joe /2007april/a5.shtml

Tennessen, D. J., PonTell, S., Romine, V., & Motheral, S. W. (1997). Opportunities for Cooperative Extension and local communities in the information age. *Journal of Extension*, 35(5). Retrieved from http://www.joe.org/joe/1997october/comm1.html.

Thompson, R., Higgins, C., & Howell, J. (1994). "Influence of Experience on Personal Computer Utilization: Testing a Conceptual Model," Journal of Management Information Systems (11:1), 167-187.

Toelle, S., & Harris, V. (2014). Prevalence and Effectiveness of Technology Use Among Family and Consumer Sciences Agents. *Journal of Extension*, 52(5). Retrieved from: https://joe.org/joe/2014october/rb1.php

Typhina, E., Bardon, R., & Gharis, L. (2015). Collaborating with Your Clients Using Social Media & Mobile Communications. *Journal of Extension*, 53(1), ARTICLE # 1TOT2, Retrieved from: https://www.joe.org/joe/2015february/tt2.php

Usoro, A., Echeng, R., & Majewski, G. (2014). A Model of Acceptance of Web 2.0 in Learning in Higher Education: A Case Study of Two Cultures. E-Learning and Digital Media, 11(6), 644–653. https://doi.org/10.2304/elea.2014.11.6.644

Venkatesh, V. (2000). Determinants of Perceived Ease of Use. *Information Systems Research*, 11(4), Dec., 342-365.

Venkatesh, V., & Davis, F. (1996). A Model of the Antecedents of Perceived Ease of Use: Development and Test. *Decision Sciences*, *27*(3), 451–481.

Venkatesh, V. & Davis, F. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science*, Vol. 46, No. 2 (Feb. 2000), pp. 186-204 Stable URL: http://www.jstor.org/stable/2634758.

Vygotsky, L. S. (1978) Mind in Society: The Development of Higher Psychological Processes (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, transl.) Cambridge, MA: Harvard University Press.

Wang, V., & Kania-Gosche, B. (2011). Assessing adult learners using Web 2.0 technologies. *International Journal of Technology in Teaching and Learning*. 7(1), 61-78.

Wankel, C., & DeFillippi, B. (2003). Educating Managers with Tomorrow's Technologies. Information Age Publishing, Incorporated.

Westa, S., Broderick, S., & Tyson, B. (2005). Getting the work out in the Last Green Valley: Integrating digital video, direct mail, and Web-based information for specific target audiences. *Journal of Extension*, 43(1). http://www.joe.org/joe/2005february/a7.shtml

White, B., & Burnham, B. (1995). *The Cooperative Extension System: A Facilitator of Access for Community-Based Education.* Paper presented at the “Public Libraries and Community-Based Education: Making the Connection for Life Long Learning”. Washington, D.C.

Williams, J. & Chinn, S. (2009). "Using Web 2.0 to Support the Active Learning Experience", *Journal of Information Systems Education*, 20(2),165-174.

Winship, J. (1989) Information Technology in Education: The Quest for Quality Software. Paris: Organization for Economic Co-operation and Development.

Woods, K., & Langcuster, J. (2014). The Use of Digital Technology in Extension. *Journal of Extension*. 52(5), Retrieved from: https://joe.org/joe/2014october/comm3.php

Wrenn, J., & Wrenn, B. (2009). Enhancing Learning by Integrating Theory and Practice. *International Journal of Teaching and Learning in Higher Education*. 21(2), 258-265.

Wu, J., & Lederer, A. (2009). A Meta-Analysis of the Role of Environment-Based Voluntariness in Information Technology Acceptance. *MIS Quarterly*, 33, 419-432. 10.1201/9781420074086-b2.

Wu, Tim. (2011). *The Master Switch: The Rise and Fall of Information Empires*. New York: Atlantic Books.

Yadav, A. & Patwardhan, A. (2016). Use and Impact of Web 2.0 Tools in Higher Education: A Literature Review. DOI: 10.13140/RG.2.1.2748.6965/1.

Yousafzai, S., Foxall, G., & Pallister, J. (2007). Technology acceptance: a meta-analysis of the TAM: Part 2. *Journal of Modelling in Management*. 2(3). 10.1108/17465660710834462.

Zacharakis, J. (2008), Extension and community: The practice of popular and progressive education. New Directions for Adult and Continuing Education, 2008: 13-23. doi:10.1002/ace.282

Zemke, R. & Zemke, S. (1995). Adult learning: What do we know for sure? Training, 32(6), 31-38. Retrieved October 1, 2016, from EBSCO database

Zyl, A. (2009). The Impact of Social Networking 2.0 on Organizations. *The Electronic Library*. 27. 906-918. 10.1108/02640470911004020.

APPENDICES

Appendix A

Institutional Research Board Approval

AUBURN UNIVERSITY INSTITUTIONAL REVIEW BOARD for RESEARCH INVOLVING HUMAN SUBJECTS

REQUEST FOR EXEMPT CATEGORY RESEARCH

For Information or help completing this form, contact: **THE OFFICE OF RESEARCH COMPLIANCE**, 115 Ramsay Hall
Phone: 334-844-5966 **e-mail:** IRBAdmin@auburn.edu **Web Address:** http://www.auburn.edu/research/vpr/ohs/index.htm

Revised 2/1/2014 **Submit completed form to IRBsubmit@auburn.edu or 115 Ramsay Hall, Auburn University 36849.**

Form must be populated using Adobe Acrobat / Pro 9 or greater standalone program (do not fill out in browser). Hand written forms will not be accepted.

Project activities may not begin until you have received approval from the Auburn University IRB.

1. **PROJECT PERSONNEL & TRAINING**

PRINCIPAL INVESTIGATOR (PI):

Name Latresha Brady-Pinkston Title Doctoral Student Dept./School Education - EFLT

Address _____ AU Email bradylm@auburn.edu

Phone _____ Dept. Head Dr. Sherida Downer

FACULTY ADVISOR (if applicable):

Name Dr. Maria Witte Title Professor Dept./School Education - EFLT

Address 4036 Haley Center, Auburn University, Alabama 36849

Phone 334-844-3078 AU Email wittemm@auburn.edu

KEY PERSONNEL: **List Key Personnel (other than PI and FA).** Additional personnel may be listed in an attachment.

Name	Title	Institution	Responsibilities

KEY PERSONNEL TRAINING: **Have all Key Personnel completed CITI Human Research Training (including elective modules related to this research) within the last 3 years?** ☑ YES ☐ NO

TRAINING CERTIFICATES: **Please attach CITI completion certificates for all Key Personnel.**

2. **PROJECT INFORMATION**

Title: An Examination of the Adoption of Web 2.0 Technologies in Program Delivery in Cooperative Extension

Source of Funding: ☐ Investigator ☐ Internal ☐ External

List External Agency & Grant Number: _____

List any contractors, sub-contractors, or other entities associate with this project.

List any other IRBs associated with this project (including those involved with reviewing, deferring, or determinations).

FOR ORC OFFICE USE ONLY

DATE RECEIVED IN ORC: _____ by _____
DATE OF IRB REVIEW: _____ by _____
DATE OF ORC REVIEW: _____ by _____
DATE OF APPROVAL: _____ by _____
COMMENTS:

APPROVAL #
APPROVAL CATEGOI
INTERVAL FOR CONT

The Auburn University Institutional Review Board has approved this Document for use from 11/18/2015 to 11/17/2018
Protocol # 15-462 EX 1511

1 of 3

Appendix B

Participant Email Invitation

FW: Request for Permission to Conduct Research

Andrea Musso
on behalf of
Gary Lemme
Wed 3/9/2016 4:05 PM

To: aces-rea@aces.edu <aces-rea@aces.edu>; aces-cec@aces.edu <aces-cec@aces.edu>; aces-specialists@aces.edu <aces-specialists@aces.edu>; acesag-it-unit@aces.edu <acesag-it-unit@aces.edu>
Cc: Latresha Brady-pinkston <bradylm@auburn.edu>; Maria Witte <wittemm@auburn.edu>; Gary Lemme <gdl0003@auburn.edu>

1 attachments (314 KB)
Information Letter with Link.pdf;

ACES Colleagues,

Ms. Latresha Brady-Pinkston is a doctoral candidate in the Adult Education Program at Auburn University. She is studying the integration of technology in Extension education and would like to include you in her dissertation research by completing a survey. Ms. Brady-Pinkston is working under the mentorship of Dr. M. Witte. The survey has been approved by the Auburn University Review Board. Thanks in advance for taking time to share your perceptions on technology in Extension. Latresha's research is addressing the following aspects of adult and extension education:

> The need for the integration and use of technology in the learning environment has been recognized. There is an increased demand for utilizing the Internet as a means of disseminating Extension information to the public. This exploratory study seeks to provide knowledge pertaining to factors that may influence the implementation of online instructional technology for non-formal educational program delivery. Specifically, assessing factors that may influence Extension educators' perception, behavioral intention, and the implementation of Web 2.0 technology tools (such as Facebook, YouTube, Pinterest, Twitter, Instagram, Periscope, Vine, blogs, wikis, and podcasting) in educational programming.

You may help Latresha with her research by following this link:
https://auburn.qualtrics.com/SE/?SID=SV_4SktGn5w2kc4eDr

Gary

Gary Lemme,Ph.D.; Director
Alabama Cooperative Extension System
109D Duncan Hall; Auburn University
Auburn, AL 36849-5612
Office: 334-844-5546
Cell: 334-707-6832
glemme@aces.edu

"The Auburn University Institutional Review Board has approved this document for use from November 11, 2015 to November 10, 2018. Protocol #15-462 EX 1511"

INFORMATION LETTER
For a Research Study entitled
"An Examination of the Adoption of Web 2.0 Technologies for Program Delivery in Cooperative Extension"

You are invited to participate in a research study to examine factors that may influence Extension educators' perception, behavioral intention, and the implementation of Web 2.0 technology tools in educational program delivery. The study is being conducted by Latresha Brady-Pinkston, a Doctoral Candidate in Adult Education at Auburn University under the supervision of Dr. Maria Witte, Associate Professor of Educational Foundations, Leadership and Technology. You were selected as a possible participant because you were identified as an adult educator with the Alabama Cooperative Extension System and are age 19 or older.

What will be involved if you participate? Your participation is completely voluntary. If you decide to participate in this research study, your participation is completely voluntary. If you decide to participate in this research study, you will be asked to complete a brief online survey. Your total time commitment will be approximately 30 minutes.

Are there any risks or discomforts? There are no identifiable risks or discomforts connected with participating in this study.

Are there any benefits to yourself or others? Your participation in this study will help to facilitate the completion of my doctoral degree as well as provide valuable information to Cooperative Extension administrators about the professional development needs of Extension educators. Your participation may contribute to improving the training of Extension adult educators.

Will you receive compensation for participating? No compensation will be given for participating in this study.
Are there any costs? There are no costs associated with participating in this study.

If you change your mind about participating, you can withdraw at any time during the study. Your participation is completely voluntary. If you choose to withdraw, you can close the browser window. Once you have submitted anonymous data, you will be unable to withdraw that data after participation since there will be no way to identify individual information.

Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the Department of Educational Foundations, Leadership, and Technology, or the Alabama Cooperative Extension System.

Any data obtained in connection with this study will remain anonymous. We will protect your privacy and the data you provide by making sure no individual will be identified in the data analysis and no email or IP addresses are collected by the web server. Information collected through your participation will be used to fulfill an educational requirement and may be published in a professional journal.

If you have questions about this study contact Latresha Brady-Pinkston at (334)521-2107 or via email bradylm@auburn.edu. You may also contact Dr. Maria Witte at (334)844-3078.

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

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY. IF YOU DECIDE TO PARTICIPATE, PLEASE CLICK ON THE LINK BELOW.

Latresha Brady-Pinkston

YOU MAY PRINT A COPY OF THIS LETTER TO KEEP.

9/9/2015

Latresha Brady-Pinkston

Doctoral Candidate, Adult Education

Auburn University

Follow this link to take the survey:
https://auburn.qualtrics.com/SE/?SID=SV_4SktGn5w2kc4eDr

Appendix C

Information Letter

AUBURN UNIVERSITY

COLLEGE OF EDUCATION

EDUCATIONAL FOUNDATIONS, LEADERSHIP AND TECHNOLOGY

The Auburn University Institutional Review Board has approved this Document for use from 11/18/2015 to 11/17/2018 Protocol # 15-462 EX 1511

Add this approval information in sentence form to your electronic information letter!

INFORMATION LETTER
for a Research Study entitled
"An Examination of the Adoption of Web 2.0 Technologies in Program Delivery in Cooperative Extension"

You are invited to participate in a research study to examine factors that may influence Extension educators' perception, behavioral intention, and the implementation of Web 2.0 technology tools in educational program delivery. The study is being conducted by Latresha Brady-Pinkston, a Doctoral Candidate in Adult Education at Auburn University under the supervision of Dr. Maria Witte, Associate Professor of Educational Foundations, Leadership and Technology. You were selected as a possible participant because you were identified as an adult educator with the Alabama Cooperative Extension System and are age 19 or older.

What will be involved if you participate? Your participation is completely voluntary. If you decide to participate in this research study, your participation is completely voluntary. If you decide to participate in this research study, you will be asked to complete a brief online survey. Your total time commitment will be approximately 10-15 minutes.

Are there any risks or discomforts? There are no identifiable risks or discomforts connected with participating in this study.

Are there any benefits to yourself or others? Your participation in this study will help to facilitate the completion of my doctoral degree as well as provide valuable information to Cooperative Extension administrators about the professional development needs of Extension educators. Your participation may contribute to improving the training of Extension adult educators.

Will you receive compensation for participating? No compensation will be given for participating in this study.

Are there any costs? There are no costs associated with participating in this study.

If you change your mind about participating, you can withdraw at any time during the study. Your participation is completely voluntary. If you choose to withdraw, you can close the browser window. Once you have submitted anonymous data, you will be unable to withdraw that data after participation since there will be no way to identify individual information.

4036 Haley Center, Auburn, AL 3684-5221; Telephone: 334-844-4460: Fax: 334-844-3072

www.auburn.edu

Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the Department of Educational Foundations, Leadership, and Technology, or the Alabama Cooperative Extension System.

Any data obtained in connection with this study will remain anonymous. We will protect your privacy and the data you provide by making sure no individual will be identified in the data analysis and no email or IP addresses are collected by the web server. Information collected through your participation will be used to fulfill an educational requirement and may be published in a professional journal.

If you have questions about this study contact Latresha Brady-Pinkston at (334)521-2107 or via email bradylm@auburn.edu. You may also contact Dr. Maria Witte at (334)844-3078.

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

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY. IF YOU DECIDE TO PARTICIPATE, PLEASE CLICK ON THE LINK BELOW.

YOU MAY PRINT A COPY OF THIS LETTER TO KEEP.

Latresha Brady-Pinkston 9/9/2015

Latresha Brady-Pinkston

Doctoral Candidate, Adult Education

Auburn University

Add this approval information in sentence form to your electronic information letter!

The Auburn University Institutional Review Board has approved this Document for use from 11/18/2015 to 11/17/2018

Protocol # 15-462 EX 1511

Appendix D

An Examination of the Adoption of Web 2.0 Technologies in Program Delivery in Cooperative Extension

Start of Block: Default Question Block

Q1 The following questions ask about Web 2.0 technology tools, Internet based instructional technologies, used in educational programming. Web 2.0 applications allow users to read, write, interact, and collaborate with each other. Web 2.0 applications include Facebook, YouTube, Pinterest, Twitter, Instagram, Flickr, Periscope, Vine, blogs, wikis, and podcasting.

Answer as accurately as possible. Remember there are no right or wrong answers.

Q2 Perceived Usefulness

	Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	Slightly Agree (4)	Agree (5)	Strongly Agree (6)	N/A (7)
Web 2.0 technology tools enable me to accomplish tasks more quickly. (1)	O	O	O	O	O	O	O
Web 2.0 technology tools have improved my quality of work. (2)	O	O	O	O	O	O	O
Web 2.0 technology tools make it easier to do my job. (3)	O	O	O	O	O	O	O
Web 2.0 technology tools enhance my effectiveness on the job. (4)	O	O	O	O	O	O	O

Q3 Perceived Ease of Use

	Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	Slightly Agree (4)	Agree (5)	Strongly Agree (6)	N/A (7)
My interaction with Web2.0 technology tools has been clear and understandable. (1)	O	O	O	O	O	O	O
Overall, Web 2.0 technology tools are easy to use. (2)	O	O	O	O	O	O	O
Leaning to operate Web 2.0 technology tools was easy for me. (3)	O	O	O	O	O	O	O
I rarely make errors when using Web 2.0 technology tools. (4)	O	O	O	O	O	O	O
I am rarely frustrated when using Web 2.0 technology tools. (5)	O	O	O	O	O	O	O

Q4 Perceived Behavioral Control

	Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	Slightly Agree (4)	Agree (5)	Strongly Agree (6)	N/A (7)
I am able to confidently use Web 2.0 technology tools. (1)	O	O	O	O	O	O	O
I have the knowledge to use Web 2.0 technology tools. (2)	O	O	O	O	O	O	O
I have the resources to use Web 2.0 technology tools. (3)	O	O	O	O	O	O	O
I have the ability to use Web 2.0 technology tools. (4)	O	O	O	O	O	O	O
I have control over using Web 2.0 technology tools. (5)	O	O	O	O	O	O	O

Q5 Subjective Norm

	Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	Slightly Agree (4)	Agree (5)	Strongly Agree (6)	N/A (7)
People who influence my behavior think I should use Web 2.0 technology tools. (1)	O	O	O	O	O	O	O
People who are important to me think I should use Web 2.0 technology tools. (2)	O	O	O	O	O	O	O
My immediate supervisor thinks I should use Web 2.0 technology tools. (3)	O	O	O	O	O	O	O
My peers think I should use Web 2.0 technology tools. (4)	O	O	O	O	O	O	O
People whose opinions I value prefer that I use Web 2.0 technology tools in my work. (5)	O	O	O	O	O	O	O

Q6 Voluntariness

	Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	Slightly Agree (4)	Agree (5)	Strongly Agree (6)	N/A (7)
My use of Web 2.0 technology tools is voluntary. (1)	O	O	O	O	O	O	O
My supervisor requires me to use Web 2.0 technology tools. (2)	O	O	O	O	O	O	O
Although it might be helpful, using Web 2.0 technology tools is not compulsory in my job. (3)	O	O	O	O	O	O	O

Q7 Behavioral Intention

	Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	Slightly Agree (4)	Agree (5)	Strongly Agree (6)	N/A (7)
I intend to continue using Web 2.0 technology tools. (1)	O	O	O	O	O	O	O
I intend to frequently use Web 2.0 technology tools. (2)	O	O	O	O	O	O	O

Appendix E

Demographic Questionnaire

Q8 In what Extension program area do you spend the greatest portion of your time.

- O Agriculture (1)
- O Family and Consumer Sciences (2)
- O 4-H and Youth Development (3)
- O Economic and Community Development (4)
- O Urban Affairs and New Nontraditional Programs (5)
- O Forestry, Wildlife and Natural Resources (6)
- O Other (Please Specify.) (7) _____

Q9 Professional Position

- O EFNEP Staff (1)
- O NEP Staff (2)
- O Agent Assistant (3)
- O Regional Extension Agent (4)
- O County Extension Coordinator (5)
- O State Specialist (6)
- O State Administrator (7)
- O Other (Please Specify.) (8) _____

Q10 Please indicate the total number of years you have been employed by the Cooperative Extension Service.

- O Less than 1 Year (1)
- O 1-3 Years (2)
- O 4-7 Years (3)
- O 8-10 Years (4)
- O 11-15 Years (5)
- O More than 15 Years (6)

Q11 What is the highest educational degree you have achieved?

O High School/GED (1)

O Associate Degree (2)

O Bachelor's Degree (3)

O Master's Degree (4)

O Ph.D. (5)

Q12 What was your academic major in your highest degree?

O Education (including Extension Education, Agricultural Education, Environmental Education, Adult and Continuing Education or General Education). (1)

O Family and Consumer Sciences (including Nutrition, Family Resource Management, Clothing and Textiles, Family Relations and Human Development). (2)

O Agriculture (including Animal Science, Dairy Science, Poultry Science, Agronomy, Horticulture, Agricultural Engineering, or Agricultural Economics). (3)

O Natural Resources or Biology (including Entomology, Biochemistry, Plant Pathology, Forestry or Ecology). (4)

O Social Science, Rural Sociology, Sociology, Psychology, Community Development, or Youth Studies. (5)

O Other (Please Specify.) (6) _____

Q13 Please indicate the number of formal classes in adult education you have completed in the following areas:

☐ Philosophy of Adult Education (1) _____

☐ Teaching Methods Related to the Adult Learner (2) _____

☐ Adult Characteristics and Learning Theory (3) _____

☐ Organization and Administration of Adult Education Programs (4) _____

☐ Program Planning in Adult Education (5) _____

☐ Other (6) _____

Q14 Do you have professional teaching experience outside of the Cooperative Extension Service?

O No (If no, continue to next question). (1)

O Yes (If yes, please indicate the number of years). (2) _____

Q16 Gender

O Male (1)

O Female (2)

Q17 Age

- O 20-25 Years (1)
- O 26-30 Years (2)
- O 31-40 Years (3)
- O 41-50 Years (4)
- O 51 and Over (5)

End of Block: Default Question Block