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By Ryan Wynkoop

Entitled
The Integration and Use of Educational Technology in Indiana's Secondary Agricultural Education Classrooms

For the degree of Master of Science

Is approved by the final examining committee:

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THE INTEGRATION AND USE OF EDUCATIONAL TECHNOLOGY IN INDIANA'S SECONDARY AGRICULTURAL EDUCATION CLASSROOMS

A Thesis

Submitted to the Faculty

of

Purdue University

by

Ryan D. Wynkoop

In Partial Fulfillment of the

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of

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ABSTRACT

Wynkoop, Ryan D. M.S., Purdue University, May 2011. The Integration and Use of Educational Technology in Indiana's Secondary Agricultural Education Classrooms. Major Professor: Jerry L. Peters.

Educational technology such as computers, the internet, and other peripherals such as SMARTboards and MP3 players can improve how students perform in the classroom. However, the amount of time and knowledge required to integrate these technologies into a classroom is sometimes difficult for the teacher. The purpose of this study was to determine what educational technologies are being integrated and used in Indiana agriculture classrooms, how these technologies are acquired, and what factors influence agriculture teachers to use the technologies.

The findings revealed that the technologies most commonly used in Indiana's secondary agricultural classrooms are the desktop and/or laptop computer, LCD projector, and DVD player/TV. However, some teachers are using newer technologies such as iPods, video cameras, and SMARTboards. These technologies were most commonly acquired through the school's general fund or with funds from their FFA chapter. The findings indicated that funding is a significant barrier to educational technology integration.

Influencers such as enthusiasm, anxiety, productivity, productivity in the classroom and gender bias were studied. There was evidence to suggest that the teachers’ enthusiasm influenced how they view the productivity of technology. It was found that gender, professional development, and degree earned did not have a significant impact on the influencers. Funding and lack of knowledge about educational technology were the primary reasons for a lack of technology integration in Indiana’s agriculture classrooms.

CHAPTER 1. INTRODUCTION

Our world has been forever changed by technology (Fraze, Fraze, Kieth, & Baker, 2002). Technology has permeated nearly every aspect of American society – from cell phones to refrigerators - but its incorporation into our nation's schools has been slow (Bauer & Kenton, 2005). A great change has been created by technology and as Murphy and Terry (1998) pointed out "education, and more specifically, agricultural education, is not immune to the effects of change" (p. 28). Agriculture teachers and their classrooms are no different academically than other courses in schools in that "moderate barriers exist that prevent teachers from integrating technology into the teaching/learning process" (Douglas, Kotrlik, & Redmann, 2003, p. 78). It is important that agriculture teachers know how to use educational technology such as the computer, as it has shown to be effective in providing more educational opportunities (Bauer & Kenton, 2005).

New technologies are being produced, and older technologies improved, at increasingly faster rates, according to "the law of accelerating returns," a term coined by Ray Kurzweil, a futurist and inventor (Lomas, 2008, para. 3). Technologies that were available for use in classrooms in 2000 are vastly different from those available for use in 2010, and the trend does not appear to be slowing. According to Kurzweil, “the computer in your cell phone today is a million times cheaper and a thousand times more powerful and about a hundred times smaller (than the one computer at MIT in 1965)…” (Lomas, 2008, para. 4). Studies which described the use of educational technology in agriculture classrooms referred to computers as “micro-computers” and treated e-mail as a new innovation. These technologies are no longer new and, according to Kurzweil, will continue to change at an exponential pace (Lomas, 2008, para. 9). The rate at which technology is changing adds necessity to updated studies of educational technology use in Indiana’s agriculture classrooms. If Kurzweil is correct, studies describing technology use could be obsolete just as quickly as they are conducted.

1.1. Problem Statement

Studies concerning the integration of technology into agriculture classrooms have been conducted in other states such as North Carolina, Virginia, and Kansas (Alston, Miller, & Williams, 2003; Raven & Welton, 1989), but a formal survey of the educational technologies being used in Indiana secondary agriculture classrooms has not yet been conducted. In addition to the topic of technology use, numerous studies have been conducted to determine the factors preventing teachers from integrating technology into their classroom (Bauer & Kenton, 2005; Fletcher & Deeds, 1994; Hardy, 1998; Vannatta & Fordham, 2004). Therefore, this study is needed to determine baseline data about technology use that will provide information for Indiana’s agricultural educators to improve their technology use. It will also provide data for support and evidence that the teachers can use when applying for grants to acquire new technology.

1.2. Need for Study

This study will allow Indiana agriculture teachers to understand how they and their peers can better utilize educational technology in their classrooms. Understanding what technologies agriculture teachers are comfortable using and which they struggle to use will allow for more focused professional development of current agriculture teachers. Students being trained to become agriculture teachers will benefit from the data as well. Discovering what educational technologies current agriculture teachers have difficulty using will give teacher educators an idea of what needs to be discussed in the preparation of pre-service teachers. The findings of this study can also be used when applying for technology grants.

1.3. Purpose

The purpose of this study was to determine what educational technologies are being integrated and used in Indiana agriculture classrooms, how these technologies are acquired, and what factors influence agriculture teachers to use the technologies.

1.4. Objectives

There were six main objectives in this study. They were to:

(1) Describe the characteristics of current Agricultural Science and Business teachers in Indiana's secondary classrooms.

(2) Determine the educational technologies being used in Indiana's secondary agriculture classrooms.

(3) Identify types and frequencies of use for educational technologies used in agriculture classrooms.

(4) Identify the factors that influence agriculture teachers use of educational technology.

(5) Determine how educational technology is acquired in the classrooms and where the funding for the technology comes from.

(6) Identify the general issues and concerns existing in acquiring educational technology.

1.5. Limitations and Delimitations

This study had the following limitations:

1. This study was limited to Agricultural Science and Business teachers in the State of Indiana who were teaching at least one of the 14 approved Agricultural Science and Business courses in the Fall semester of 2010. Therefore, the results are not generalizable to other states.

2. Each teacher and their school district have different factors impacting the acquisition and use of educational technology in their classroom, so each teacher will not have similar technologies.

3. At the time of this study, Indiana was experiencing funding reductions for all levels of education which resulted in budget reductions for nearly every school corporation (State of Indiana, 2009). These cuts resulted in the loss of teachers and support staff, including media specialists, along with a reduction in new material purchases. This might have impacted the availability of technology in the classrooms surveyed in this study.

4. The time of year in which this study was conducted could have also been a limitation. This study was conducted from mid-September to the beginning of October, therefore, some classes, such as Horticultural Science, could have still been completing activities outside, which would not necessarily require technology. A survey administration near the end of the semester may have detected more use of technology.

5. Technology is advancing rapidly. Just as the “law of accelerating returns” (Lomas, 2008) suggested, the technology investigated in this study could be replaced by something newer in just a few years.

1.6. Definitions

Advanced Life Science Courses

Three courses – Advanced Life Sciences: Animals, Advanced Life Sciences: Plants and Soils, and Advanced Life Sciences: Foods – count towards Core 40 Science and Academic Honors Diploma Credit in Indiana's secondary schools (Balschweid, 2008)

Agricultural Education

Agricultural Education prepares students for successful careers and a lifetime of informed choices in the global agriculture, food, fiber and natural resources systems (National FFA Organization website, 2010).

CAERT.net

Center for Agricultural and Environmental Research and Training provides curriculum and resources for agricultural educators. "Its mission is to develop materials and provide training that support a sustainable future. Its emphasis lies in assisting local, state, and national institutions in developing materials that promote the integration of science and technology into the agriculture classroom" (CAERT Inc., 2002).

CSA Tracker

Custom Standards Assessment Tracker allows agricultural educators to assess students based on state educational standards in an online setting (CAERT, Inc., n.d.).

Educational technology

“Any type of product technology (hardware and software) that aids the instructor in preparing or presenting curriculum” (Hooper & Rieber, 1999, p. 252).

EZ Records

EZ Records is a supervised agricultural experience (SAE) record-keeping system designed to keep SAE program records, FFA participation, leadership activities, skills learned, and enterprise efficiencies. The program may be used at school, home, or wherever the user has access to the Internet (University of Illinois, n.d.).

Indiana Association of Agricultural Educators (IAAE)

The professional organization that provides support and professional development opportunities to all licensed Agriculture Science and Business teachers and supporters of Agricultural Education in Indiana.

Integration

A reliance on computer technology for regular lesson delivery (Bauer & Kenton, 2005, p. 522).

<u>Lesson Plan Library (LPL)</u>

A CD-ROM based collection of lesson plans for middle school, high school and Advanced Life Science Indiana agriculture courses, developed by CAERT, Inc. (CAERT.net, 2010).

<u>MyCAERT.com</u>

“MYcaert provides teachers with an integrated online system to Plan, Document, Deliver, and Assess Career and Technical Education instruction. It not only allows access to a complete selection of instructional components, but also serves as a classroom organizational and management tool” (CAERT, Inc., 2007).

<u>TaskStream</u>

An online application where “students are able to build media-rich online portfolios showcasing their learning achievements that they can share with peers, instructors, parents and employers; submit documents, projects and other assignments to instructors for feedback and assessment; and maintain portable samples of work products and accomplishments even after they graduate.” (TaskStream, n.d.).

CHAPTER 2. LITERATURE REVIEW

2.1. Introduction

A review of literature was conducted to search for related literature dealing with educational technology in the area of agricultural education but also in the broader sense of educational technology as a field of study. A search for related literature regarding the use of educational technology in agriculture classrooms began with the *Journal of Agricultural Education*. Ten articles in the *Journal of Agricultural Education* between the years of 1980-2010 specifically studied the use of technology in the agriculture classroom. Of these ten, only three were from the 2000s (Alston, Miller, & Williams, 2003; Boyd & Murphey, 2002; Kotrlik, Redmann, & Douglas, 2003) four were from the 1990s (Birkenholz & Stewart, 1999; Camp & Sutphin, 1991;Fletcher & Deeds, 1994; McCaslin & Torres, 1992) and three were from the 1980s (Birkenholtz, Stewart, McCaskey, Ogle, & Lindhart, 1989; Raven & Welton, 1989; Kotrlik & Smith, 1989). Aside from the relatively low number of articles found, only one of these studies was conducted in Indiana and it was at the post-secondary level.

Searches for related literature were completed in a general search in Purdue's library system with the following keywords and phrases being used: educational technology, integration, factors influencing, gender and technology.

Numerous scholarly, peer-reviewed articles outside of the Agricultural Education profession exist regarding the use and integration of educational technology into classrooms; however, much of it was outdated. Entire journals, notably the *Journal of Research on Technology in Education*, discussed educational technology.

When searching for relevant literature, articles from the previous five to ten years prior to this study were preferred, but articles published ten or more years prior to this study were also useful. Reading the about the history of educational technology, and studying the predictions these studies made about how educational technology would impact America's schools, provided an insight into how educational technology was viewed when it first became a useful tool in America's schools. For example, Hasselbring, Goin, Taylor, Bottge and Daley (1997) discussed the importance of the Internet as a tool, "…like it or not, it will affect you and those around you at home and on the job, from the merging of your television set's images with network data to the emergence of communities of users whose activities will change the shape of commerce and education" (p. 216). Even in 1997, when the Internet was relatively new and beginning to take shape in America, people were recognizing its usefulness and ubiquity.

2.2. Theoretical Framework

The theoretical framework for this study comes from Everett Rogers' Theory of Diffusion of Innovations which was originally proposed in 1962. The

Theory of Diffusion of Innovations has two parts – the diffusion and the innovation. Diffusion "is the process in which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003, p. 5). Rogers defined an innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 12). The complexity of an innovation will impact the rate of adoption, so determining how complex an agriculture teacher views a technology to be will impact its adoption. Using the Theory of Diffusion of Innovations to guide this study could help identify how technology is diffused through Indiana agriculture classrooms and explain why agriculture teachers use or do not use educational technology.

Many studies regarding educational technology integration used the Theory of Diffusion of Innovations to guide the research. Fraze, Fraze, Kieth, and Baker (2002) used the Theory of Diffusion of Innovations to guide their research regarding Texas agriculture teachers' attitudes towards the internet. The findings of their study indicated Texas Agri-Science teachers have a high level of adoption of the internet. Fraze et al. also found that the Texas Agri-Science teachers' level of adoption could be predicted by their computer anxiety and attitude toward the internet. Straub (2009) used Rogers' Theory of Diffusion of Innovations along with other theories and suggested that "technology adopting is a complex, inherently social, developmental process" (p. 625). The Theory of Diffusion of Innovations will be used in this study to determine which stage of adoption agriculture teachers generally fit into and determine what is influencing them to adopt educational technology in their classroom.

Adopters of an innovation travel through a process to adopt a new innovation called the innovation-decision process. The innovation-decision process “is the process through which an individual (or other decision-making unit) passes from gaining initial knowledge of an innovation, to forming an attitude toward the innovation, to making a decision to adopt or reject, to implementation of the new ideas, and to confirmation of this decision” (Rogers, 2003, p. 20). Rogers’ model consists of five stages:

1. *Knowledge* occurs when an individual is exposed to an innovation’s existence and gains an understanding of how it functions.
2. *Persuasion* occurs when an individual (or other decision-making unit) forms a favorable or an unfavorable attitude towards the innovation.
3. *Decision* takes place when an individual (or other decision-making unit) engages in activities that lead to a choice to adopt or reject the innovation.
4. *Implementation* occurs when an individual (or other decision-making unit) puts a new idea into use.
5. *Confirmation* takes place when an individual seeks reinforcement of an innovation-decision already made, but he or she may reverse this previous decision if exposed to conflicting messages about the innovation (p. 169).

These stages perfectly describe what is occurring when an agriculture teacher is introduced to a new technology. For example, if at a professional development workshop an agriculture teacher is exposed to a new technology, they have *knowledge* about the technology but now must be *persuaded* to use it in their classroom. Once persuaded, they must make a *decision* to use it by requesting their administration purchase it for their room. After acquiring the technology, *implementation* must occur. If the technology works for the teacher they will seek *confirmation* that it did work perhaps in the form of student achievement of academic standards or success at an FFA activity.

2.2.1. Categories of Adopters

Rogers (2003) pointed out that a person adopting a new innovation generally fits into one of five categories and holds a certain value regarding an innovation. The five groups into which the adopters are categorized are innovators, early adopters, early majority, late majority, and laggards (Rogers, 2003). "The criterion for adopter categorization is *innovativeness*, the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system" (p. 22). The Diffusion of Innovations Theory depends heavily upon the idea of innovativeness. In fact, every category of the theory is based upon how a person views and adopts a specific innovation. Along with these categories are a number of generalizations and values that describe why a person would adopt an innovation. These generalizations and values help describe the use of educational technology by Indiana’s agriculture teachers.

Innovators

Rogers (2003) determined that innovators are venturesome. Because innovators are the first of a group of people to adopt a new innovation they must have a certain sense of adventure, and indeed Rogers stated that “venturesomeness is almost an obsession with innovators” (p. 282). Along with adventure, Rogers stated that innovators must possess a certain level “of financial resources in order to afford the possible losses acquired when adopting a new innovation” (p. 282). For example, when an agriculture teacher sees a new technology that could be effectively used in an agriculture classroom they must first have the sense of adventure and desire to acquire the new technology. Secondly, they must possess the resources to acquire the technology, whether that is funding from a grant or from the school corporation itself.

Early Adopters

Early adopters, Rogers determined, must have a certain level of respect because they look towards the innovators in order to form opinions about an innovation. After the early adopter forms an opinion of the innovation they “put their stamp of approval on a new idea by adopting it” (Rogers, 2003, p. 283) and, therefore, hold a certain level of respect for being the first of a group to do so. Also by giving an innovation their stamp of approval, Rogers said that early adopters trigger the critical mass or, “the point after which further diffusion becomes self-sustaining” (p. 343). Early adopters are not too far ahead of the general population when adopting a new innovation but they still serve as a respected role model to the other people about to adopt the innovation.

Early Majority

Early majority adopters will generally adopt a new technology just before the general population. Making up one-third of all the members of a system, early majority adopters are the link between those who adopt early and the rest of the population. Early majority adopters “may deliberate for some time before completely adopting a new idea” (Rogers, 2003, p. 284) and deliberation is the value associated with this adopter category. Before making a decision regarding an innovation, early majority adopters will deliberate for quite some time – much longer than would an innovator or early adopter.

Late Majority

The Theory of Diffusion of Innovations states that the late majority adopters are the skeptics of the group and make up another one-third of the population. The reasons for late majority adopters waiting to adopt an innovation could either be economic necessity or peer pressure. Skepticism is an important characteristic of late majority adopters because they generally wait until all of the other groups have adopted and used a technology before they will follow. Rogers (2003) also said of the late majority that “the pressure of peers is necessary to motivate adoption" (p. 284). For example, an agriculture teacher might wait to use a new technology in their classroom because they are not convinced it will work. Once they see their peers successfully using the technology and receive peer pressure, they will adopt the technology.

<u>Laggards</u>

"Laggards are the last in a social system to adopt an innovation" (Rogers, 2003, p. 284). Laggards are very traditional and often look to what was done in the past to make decisions. The traditional characteristic of laggards is very important because they "tend to be suspicious of innovations and of change agents" (p. 284). The decision making process of a laggard is largely based on economic factors, therefore "they must be certain that a new idea will not fail before they can adopt" (p. 284). Laggards do not see non-adoption as a problem because they are aware of the resources and means they possess and what resources would be needed to acquire a new innovation.

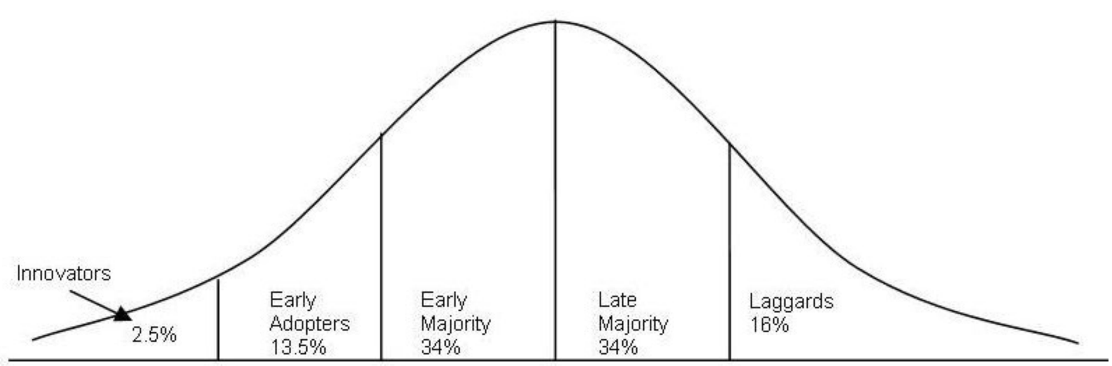

Figure 2.1 Innovation Adoption Curve

Figure 2.1 shows a graphic representation of the percentage of individuals in a population who choose to adopt an innovation (Rogers, 2003, p. 281). In the case of this study, the agriculture teachers who are adventurous and want to try new technologies to improve their classroom would be in the 2.5% of the population who are innovators. The agriculture teachers who are hesitant or not willing to use or adopt a new technology fall into the 16% of the population considered laggards.

Rogers (2003) discussed that the adoption of innovations is impacted by economic factors and status aspects (p. 230). Economic factors, mainly price, have an effect on whether an innovation is adopted. For example, SMARTboards have an average cost of about $2,100 (Whisenhunt, Blackburn, & Ramsey, 2010). What if a teacher wants to adopt this technology but cannot afford to purchase it? It seems the best way for an innovation to reach rapid adoption is for the cost to decrease. “When the price of a new product decreases so dramatically during its diffusion process, a rapid rate of adoption is encouraged” (Rogers, 2003, p. 230).

Another factor Rogers (2003) discussed which can impact innovation adoption is status of the adopter. “One motivation for many individuals to adopt an innovation is the desire to gain social status” (p. 230). However, not all members of a population are motivated by social status. Innovators, early adopters and early majority seem to be more concerned with status because they want the newest and best technologies. Status can be an important factor in the adoption of a new technology but as Rogers pointed out "participants may be reluctant to admit that they adopted a new idea for status conferral" (p. 231).

When discussing the Theory of Diffusion of Innovations, there comes a certain level of bias known as pro-innovation bias (Rogers, 2003). This bias "is the implication in diffusion research that an innovation should be diffused and adopted by all members of a social system, that it should be diffused more rapidly, and that the innovation should be neither re-invented nor rejected" (p. 106). For example, the nature of this study has a pro-innovation bias in that it assumes all of the agriculture teachers in the state of Indiana should adopt certain educational technologies in their classrooms.

2.3. History of Educational Technology

Determining how long educational technology has been used in America depends upon one's definition of technology. If a person considers paper as educational technology, then educational technology began in ancient Egypt. If educational technology is considered electric equipment, like the radio, then educational technology has been used for over 80 years. Radio became one of the first methods of electronic equipment used to educate. According to their website, in 1923 Purdue University's radio station, WBAA, began an "expanded schedule that included lectures on farm problems, science, and industry as well as accounts of athletic events" (Purdue University, 2010). The radio was used to informally educate the public about significant scientific findings of the day.

According to Alston, Miller, and Williams (2003), using technology in order to formally teach began in the 1940s as a way to train military personnel. Due to the importance of technology to the war effort, many new technologies were developed in the 1940s and 1950s. Everett Murdock (2004), Emeritus professor of Educational Technology at California State University, Long Beach reported that very little technology was used in schools as early as 1951. It was not until the 1960s that federal funding came through for the purpose of placing technology into America's classrooms. In 1971, Intel developed its first microprocessor and the first personal computer (PC) was developed.

Computers finally began to make their presence known in America's classrooms by the 1980s. In 1981, "drill and practice CAI (computer assisted instruction) gained acceptance in schools" (Murdock, 2004) and drill and practice programs began to be developed for PCs. Murdock showed that by 1986 nearly "25% of high schools used PCs for college and career guidance" and K-8 schools began buying Apple II and Macintosh computers for their classrooms. Whelan (2005) reported that by about 1980 nearly 40% of America's elementary schools and 75% of secondary schools had a PC present.

Beginning in the 1990s, educational technology as we view it today began to emerge. Murdock (2004) stated that in 1990 multimedia PCs were developed, schools began to use videodiscs, and simulations and CAI programs began to be distributed on CD-ROM disks. Digital video, virtual reality and 3-D systems entered schools in 1994, and at this time nearly every US classroom had at least one PC available for instructional use. The Internet took hold of America in 1995 and businesses, schools and individuals began creating web pages. Because of the proliferation of the Internet, many schools began wiring for the Internet in 1996 and a few schools installed web servers thus giving faculty a way to create their own educational websites.

From 1997 on, Murdock (2004) reported, “the growth of the Internet expands far faster than most predicted.” Along with the proliferation of the Internet, many educational applications and games became available on CD-ROM and DVD. Szep (2008), stated “that 50 percent of high school courses will be taught online by 2019” and that currently only about one percent of high school courses are taught online. Alston et al. (2003) noted that schools today have computer laboratories that are fully equipped and even departments within schools have fully equipped laboratories. These examples provide evidence that the advancement of technology is occurring rapidly and is ever-changing.

2.4. Barriers to the Integration of Educational Technology

The discussion of the integration and use of educational technology in the classroom is one that involves many variables, some of which include a lack of hardware, the teacher’s knowledge, student knowledge and skill, and administrative support. These variables, along with many others, influence the use of technology in the classroom. Factors that influenced a teacher to use technologies included: gender, students, time, hardware and software, technical difficulties, administrative support, general teacher issues, personal beliefs, fear and anxiety, and a lack of training.

The literature highlighted several diverse factors influencing the integration and use of educational technology into the classroom. Hardy (1998) found that having access to equipment, the support of administrators, and having the time to learn how to use technology or even integrate it into the lesson, did not impact the use of technology so much as the teacher's confidence in using the technology (p. 131). Findings also indicated a relationship between teacher self-efficacy and the use of technology in the classroom (Fletcher & Deeds, 1994).

Factors such as the government, academia, and educational politicians all support the idea that educational technology can positively impact the educational system but could also serve as barriers (Marcinkiewicz, 1994). Regardless of how much or how often technology has been integrated into classrooms, Ertmer and Ottenbreit-Leftwich (2010) referenced studies that said "recent research, resulting from both large- and small-scale efforts [Bauer & Kenton, 2005; Project Tomorrow, 2008], suggest that we have yet not achieved high levels of effective technology use, either in the United States or internationally" (p. 256).

Fletcher and Deeds (1994) conducted a study to investigate how many factors, including computer anxiety, prevent agriculture teachers from using technology. The population for the study was every licensed secondary agriculture teacher employed in a secondary school in the United States during the 1989-1990 school year. They found that teachers did not view themselves as experts of technology and also felt they were lacking in typing skills. The authors found that the agriculture teachers had taken at least one course that dealt with microcomputers and reported using a computer one to three hours per week on average. While this study was conducted eleven years ago, teachers today experience similar issues as technology continues to advance nearly every day (Anderson & Maninger, 2007; Ertmer & Ottenbreit-Leftwich, 2010).

Much of the research conducted within the past ten years show the usefulness of integrating technology into the classroom, “but most teachers neither use technology as an instruction delivery system nor integrate technology into their curriculum” (Bauer & Kenton, 2005, p. 519). One reason for the lack of technology integration into America’s classrooms was poor planning. “The integration of computer technology into the curriculum was poorly planned, and the teachers were generally poorly trained” (Bauer & Kenton, 2005, p. 521). Fletcher and Deeds (1994) suggested that “while a lack of training may be one reason that agricultural education teachers fail to extensively utilize computers, another reason may well be computer anxiety or fear of computers” (p. 16). Following are a number of factors which impact the integration of technology into the classroom.

2.4.1. Gender

Gender was found to be a factor which influenced how educational technology was integrated into a classroom. In a study by Yuen and Ma (2002), 186 pre-service teachers were surveyed to establish any significant differences between male and female computer acceptance by looking at the perceived usefulness versus the perceived ease of use of the computer. They found that if females see a computer to have a perceived usefulness they will use it regardless of its perceived ease of use. Males, however, will look at a computer's ease of use before its perceived usefulness when they use computers (p. 365).

In their study, Snyder, Tan and Hoffman (2004) found that boys have more computer experience than girls. The study further cites that "with some exceptions, many studies and in many countries find that boys have more positive feelings about the computer than girls – boys tend to like computers more and are more interested in them" (p. 10).

However, Sanders (2005) found that there are a number of conflicting studies regarding the attitudes of males and females toward technology. Whereas Snyder et al. found that boys have more experience than girls in computer technology, Sanders (2005) pointed out that "by and large, studies find that females' comfort level with computers increases (and anxiety decreases) with experience" (p. 10). Throughout the review of related literature regarding gender and technology use, there is at times no definite cause for each gender's attitudes and feelings toward technology. Gender influence on technology use seems to be impacted by a number of factors and dependent upon the situation and variable of study.

2.4.2. Time

In conjunction with the skill levels of the students, time had just as much of an impact on technology use in the classroom. Bauer and Kenton's (2005) study showed that while teachers may have computers in their classroom, they preferred to use a computer lab where each student can have their own computer to work. In some schools this becomes a difficulty because only one class at a time can utilize the computer lab, of which there may only be one in the entire school. This causes scheduling conflicts and may leave the students with limited time to be in the computer lab to work on projects for class.

Along with a lack of time for the students, teachers pointed out that they required more time to plan lessons that use educational technology (Bauer & Kenton, 2005). All of the teachers in Bauer and Kenton's study delivered their lessons in a traditional manner and then delivered the lesson while integrating technology. "They reported a dramatic increase in the amount of time it took to prepare a class to use some form of CT [computer technology]" (Bauer & Kenton, 2005, p. 536), and the teachers also had to prepare back-up plans in case the lesson was completely dependent upon the technology and it happened to fail.

One factor of time, which is mostly beyond the teacher's control, is the schedule of the school. Indiana recognizes five types of class schedules: Traditional is six or seven periods per day every day (semester length is 18 weeks), Block 4 is four classes per day and classes meet every day for 9 weeks, Block 8 is eight class periods and students take up to 4 classes per day on an alternating day basis (semester length is 18 weeks), Modified Block is a mix of Block and Traditional scheduling, a Trimester is five periods per day every day (semester length is 12 weeks). In a block schedule, the class periods could be 90 minutes long which leaves ample time for instruction (Indiana State Department of Education, 2010). Moore, Kirby, and Becton (1997) conducted a study about the impact of block scheduling on agriculture classes in North Carolina and found that "the teachers did not believe block scheduling had much impact on the quality of their instructional program" (p. 5). Will this study show that class schedules impact technology use in Indiana's agriculture programs?

2.4.3. Availability of Technology

Another factor influencing teachers to use educational technology is the availability of technology. One would assume that if technology is readily available and present in the teacher's classroom that it would be used, but "simply having more technology did not in itself persuade teachers to begin to use it" (Marcinkiewicz, 1993, p. 220).

The hardware and software used in a classroom can also influence the teacher. Ertmer and Ottenbreit-Leftwich (2010) found that teachers are using the same tools in the 21st century that were used in generations before. The advancement of technology and the cost can cause some schools to avoid updating technology frequently. Alston, Miller, and Williams (2003) studied agriculture teachers from North Carolina and Virginia to determine the future role of educational technology in those states. They identified the greatest barriers to technology integration were the cost of software and the cost of the equipment.

2.4.4. Administrative Support

Support from school administrators was another factor mentioned that impacted teachers' use of technology. Hardy (1998) stated "educational administrators need to recognize and understand the feelings of fear and anxiety that some of their staff may begin to experience [when using technology] (p. 125)." Fletcher and Deeds (1994) more specifically studied administrative support in agricultural education. "If secondary agricultural education teachers were supported in their use of the computer by their principal, vocational supervisor/director, superintendent, school board, state staff, teacher educators, and administrators on the local and state levels, more computers would be found in agricultural education departments" (p. 18). Researchers saw a need to have strong administrative support if educational technologies are to be used in agricultural classrooms. For example, Vannatta and Fordham (2004) noted that school administration realized that simply training the teachers to use educational technology does not directly relate to a teacher using technology.

2.4.5. Teachers

The teacher is the person responsible for the integration of technology in the classroom and is the primary decision maker regarding teaching methods. Vannatta and Fordham (2004) found that the teacher's philosophy can dramatically impact technology use in the classroom. "Research has found that the personal beliefs and dispositions of teachers may relate to or predict successful technology integration" (Vannatta & Fordham, 2004). Those teachers with a student-centered teaching philosophy were more likely to successfully integrate technology into the classroom as opposed to a teacher-centered teaching philosophy.

Teachers' personal beliefs may be a reason they do not adopt technology in their classrooms. One specific reason, as reported by Hardy (1998), may be that computers suggest change and some teachers simply do not accept or welcome change. Even though some teachers may be unwilling to accept change, Straub (2009) determined that "although feelings towards technology are individually constructed they are still malleable and can be changed" (p. 626). The question is, then, what can be done to help these teachers change their opinions about technology?

Professional development seems to be one way to impact teachers' beliefs and attitudes toward technology. According to a 2003 report from the United States Department of Education, the more professional development activities a teacher attends the more likely they were to be a frequent user of technology in an instructional setting. Even after the study controlled for teacher age, computer availability, and their individual school characteristics, the study still found that professional development can impact technology use. Most of the teachers in this study reported that professional development courses indeed helped them to become a user of educational technology in their classrooms.

Fletcher and Deeds (1994) found that "teachers who have taught 10 years or fewer need instruction regarding computer usage that differs from those teachers having taught more than 10 years" (p. 18). The teachers in this study who had taught 10 years or fewer were familiar with technologies but were unsure how to use them in the classroom, whereas the teachers who had been teaching longer than 10 years had not been introduced to the emerging technologies as a student or a teacher and would need more training.

Fletcher and Deeds (1994) support this when they stated "teachers having taught 10 years or fewer are more likely to be computer literate" (p. 18). At the time Fletcher and Deeds' completed their 1994 study, the literature showed that technology was beginning to advance and take hold in America's schools (Murdock, 2004; Alston, Miller, & Williams, 2003; and Whelan, 2005) which could explain why these teachers were more computer literate. Bennett, Maton, and

Kervin (2008) confirmed the findings of Fletcher and Deeds study when they spoke of “digital natives.” Digital natives are those students who were born between 1980 and 1994 and, since their birth, have been constantly surrounded by technology (p. 775). These children are now students who are just beginning to enter teaching as a career and are transitioning from user of technology to integrator. Because they are so familiar with technology, will these digital natives be able to integrate technology into their classroom more easily?

Regardless of age “innovation characteristics are specific to the particular innovation – how easy an innovation is to use, how the use of an innovation is compatible with the lifestyle of an individual” (Straub, 2009, p. 628). No matter the physical age of the teacher or the years of experience teaching, if a technology is complicated the teacher will not adopt and use it in their classroom.

2.5. Reasons to Use Educational Technology

Even with all of the barriers preventing technology integration in classrooms, there are as many reasons to support the integration of technology. Many reasons to integrate technology surfaced from related literature, some of which included: technology prepared students for the workplace, improving standardized test scores, fostering education reform, and providing a wider range of teaching methods for a more diverse audience.

Alston et al. (2003) proposed that some people see technology as a way to prepare students for the workforce, which is a central theme of agricultural education, while others see technology as a way to improve standardized test scores, a popular topic in educational discussions today. Murphy and Terry (1998) concluded that "electronic communication, information, and imaging technologies will improve how we teach in agricultural education settings" (p. 34). Murphy and Terry suggested that using these new technologies and information would allow agricultural education the ability to reach a wider variety of students with more and better information.

Educational technology fits very well with the central tenets and mission of agricultural education in America. In their study of agriculture teachers in Virginia and North Carolina, Alston et al. (2003) supported the idea of integrating educational technology into agricultural education by focusing on its central tenets. According to the National FFA Organization's website (2010), "agricultural education instruction is delivered through three major components: 1) classroom/laboratory instruction (contextual learning); 2) supervised agricultural experience programs (work-based learning); 3) student leadership organizations (National FFA Organization, National Young Farmer Educational Association, and National Postsecondary Agricultural Student Organization)." Educational technology can be used to promote and enhance these components. Alston et al. (2003) said "For example, goals to use instructional technology to enhance learning by doing, individualized learning, career guidance, leadership development, and other processes commonly valued in agricultural education could help integrate instructional technology in agricultural education programs"

(p. 48). Alston et al. and Murphy and Terry showed that educational technology can be integrated into all aspects of agricultural education and that it is necessary to keep the profession relevant to today's changing educational standards and beliefs.

2.6. Strategies to Integrate Educational Technology

There are many reasons why educational technology is or is not used in classrooms. This section covers strategies that can be used to help in the integration of technology in the classroom.

2.6.1. State Technology Plan

States should take the initiative to work towards technology integration. Indiana completed a K-12 technology strategic plan in 1998 which set forth seven strategies to improve education via technology. The seven strategies include:

1. Provide ongoing professional development
2. Ensure hardware access for all learners
3. Ensure connectivity for all learners
4. Provide high quality content and teaching resources
5. Plan for technology
6. Evaluate plans, measure progress, and report
7. Coordinate programs, ensure funding, and involve partners

Providing ongoing professional development, ensuring hardware access and ensuring connectivity for all learners were three factors which influenced how a teacher, administrator and school integrated technology into the classrooms. The State of Indiana set forth these guidelines but strategy five "Plan for technology" placed the responsibility of technology integration on the schools. "Schools will have three-year technology plans that are part of, or guided by, the collective school improvement plans of the corporation or the strategic plan of the school corporation" (Indiana State Department of Education, 1998, p. 3). Each school is different in their beliefs of technology and one state-wide plan would not suit every school due to the various barriers to the integration of educational technology presented earlier in this chapter.

2.6.2. Post-secondary Teacher Education

Post-secondary education of agricultural educators is one way to impact technology integration in agriculture classrooms. In Indiana, all students wishing to become licensed in Agricultural Education must attend Purdue University. This gives the teacher preparation program at Purdue a unique opportunity to incorporate educational technology integration into their training curriculum. Hardy (1998) said "recent college graduates of pre-service teacher training programs should have had coursework that exposed them to computer-related technology and its uses in education to facilitate the learning/teaching process" (pg. 129). As Fletcher and Deeds (1994) pointed out, younger teachers are more familiar with technology and know how to use it, therefore, since they already know how to use it they would benefit from learning how to integrate the technology into their classroom.

Purdue University teacher education programs require their students to integrate technology into their coursework. Requiring the students to use technology in their training while in college will familiarize them with the possibilities of technology in their classrooms. Every education student must use a portfolio system in order to receive their license (Purdue Education IT, n.d.). TaskStream is an online portfolio program which allows students to upload assignments for assessment and allows the students to maintain the portfolio to show potential employers. Each teacher preparation course in Agricultural Education requires its students to upload at least one artifact to TaskStream.

Along with TaskStream, pre-professional agriculture teachers at Purdue are given two more resources that are dependent upon technology and require the agriculture teacher to have basic computer and internet skills. The Center for Agricultural and Environmental Research and Training, Inc. compiled compact discs containing lesson plans and units for each of the 14 approved Indiana agriculture courses called the Lesson Plan Library. These CD-ROMs contain lesson plans with content, quizzes, exams, transparency masters and suggestions for many other resources. If the agriculture teacher chooses to use these lesson plans, they can then create student assessments online using MyCAERT.com. The quizzes created on MyCAERT.com align with Indiana's standards and also the objectives of the lessons found in Lesson Plan Library.

Complete course descriptions and standards of the 14 approved courses can be found on the internet at the Indiana Department of Education's website: http://dc.doe.in.gov/Standards/AcademicStandards/PrintLibrary/agriculture.shtml.

Three teacher preparation courses at Purdue - YDAE 31800 "Coordination of Supervised Agricultural Experience Programs," YDAE 31900 "Program Planning in Agricultural Science and Business Programs," and YDAE 44000 "Methods of Teaching Agricultural Education" - require students to upload an artifact from the class to document their achievement of state and national teaching standards. In addition to these assignments, YDAE 31800 also requires students to use EZRecords to fill out a proficiency application (Talbert, 2010; Theobald, 2009; Peters, 2010). Fletcher and Deeds (1994) said "increasing knowledge about computers is one way to overcome computer anxiety. The more coursework or knowledge a person has about the computer, the less computer anxiety is exhibited" (p. 18). Therefore, requiring pre-service teachers to use technology should help decrease anxiety when they begin teaching.

2.7. Summary

The reviewed literature highlighted several factors that influence a teacher's use of technology in the agriculture classroom. It is clear that the integration of technology into the classroom is a widely studied issue that affects all academic areas of education. Agriculture teachers are no different than other teachers in technology integration as they experience the same influences and barriers as teachers in other academic areas.

Teachers unfamiliar with technology require a different form and method of education. Vannatta and Fordham (2004) discussed other research which found that simply providing teachers with the opportunity to “play” with technology and experience it on their own increases interest in educational technology. For many of the older teachers, having the ability to “play” with the technology in a low stress situation could provide them the motivation to continue training with educational technologies.

Fletcher and Deeds (1994) made recommendations from their study of agriculture teachers in the United States. First, they suggested that current teacher education programs need to integrate more technology in their curriculum. Along with teacher preparation programs, Hardy (1998) said that schools should provide professional development opportunities during the regular work day.

Since computer anxiety was a common barrier to technology integration, Fletcher and Deeds (1994) stated “increasing knowledge about computers is one way to overcome computer anxiety. The more course work or knowledge a person has about the computer, the less computer anxiety is exhibited” (p 18). The discussion of computer anxiety was a common theme found throughout numerous articles and appeared to be one of the biggest barriers to the integration of educational technology.

Determining how Indiana’s agriculture teachers adopt technology and eventually integrate it into their classrooms can provide valuable information for the teacher education program at Purdue University and also the professional development workshops offered to the agriculture teachers of Indiana. Just as Kurzweil theorized, technology will continue to advance at exponential rates making the education about technology for current and future agriculture teachers more important than ever before.

CHAPTER 3. METHODOLOGY

3.1. Purpose

The purpose of this study was to determine what educational technologies are being integrated and used in Indiana agriculture classrooms, how these technologies are acquired, and what factors influence agriculture teachers to use the technologies.

3.2. Objectives

There were six main objectives in this study. The objectives were to:

(1) Describe the characteristics of current Agricultural Science and Business teachers in Indiana's secondary classrooms.

(2) Determine the educational technologies being used in Indiana's secondary agriculture classrooms.

(3) Identify types and frequencies of use for educational technologies used in agriculture classrooms.

(4) Identify the factors that influence agriculture teachers use of educational technology.

(5) Determine how educational technology is acquired in the classrooms and where the funding for the technology comes from.

(6) Identify the general issues and concerns existing in acquiring educational technology.

3.3. Research Design

This descriptive research study used a mixed-method survey design. A mixed method survey "is conducted by more than one method, allowing the strengths of one survey design to compensate for the weaknesses of another and maximizing the likelihood of securing data from different types of respondents" (Schutt, 2009, p. 300). The research was conducted using a researcher developed survey and the Qualtrics online survey system available through Purdue University. The survey attempted to gather both quantitative and qualitative data about educational technologies being used in the agriculture classrooms of Indiana. The survey also aimed to gather feelings and attitudes towards specific educational technologies that could be used in an agriculture classroom as well as educational technologies in general.

3.4. Participants

The population for this study consisted of all licensed secondary agriculture teachers who were teaching agriculture during the 2010-2011 school year (N=243). A list of the current agriculture teachers was obtained from the Department of Youth Development and Agricultural Education at Purdue University. The list also included teachers located at Career Centers, the Indiana

School for the Blind, correctional centers, and also administrative personnel at the Indiana Department of Education. These locations and people were removed from the population because this study was only concerned with traditional secondary agriculture programs. A Family and Consumer Sciences teacher was included in the list so they were removed since they were not a licensed Agriculture Science & Business teacher. Once these persons were removed, the total population came to 229 licensed Agricultural Education teachers currently teaching in Indiana.

After e-mailing a pre-notice letter to notify the teachers of the survey, seven were undeliverable or were considered SPAM by the schools' e-mail filters. Some e-mails that were returned had to be sent out separate from the mail-merge in order for the recipient to receive the e-mail. Three participants had to be sent a fax of the notification letter and survey link. A total of 148 participants began the survey but only 128 completed for a final response rate of 56%. Specifically, 148 participants answered the demographic questions, 130 participants responded to the attitudes toward technology questions, and 128 participants answered the open-ended questions.

Due to the nature of some questions, not all participants needed to provide an answer to all of the questions. For example, if a teacher was not teaching a particular course that semester they did not need to answer questions about their technology use in the class. Likewise, if a technology was not present in their classroom, they did not have to answer questions about that specific technology.

3.5. Instrument

The researcher developed survey instrument (Appendix A) included questions from studies found through a review of related literature. The instrument collected both quantitative and qualitative data. Quantitative data focused on the amount of technology present in the classrooms as well as the frequency of their use. Five-point Likert-type scales provided a measure of the teachers' attitudes regarding educational technology. Five sets of questions asked participants to indicate their attitudes regarding statements about educational technology (Enthusiasm, Anxiety, Productivity, Gender Bias, and Classroom Productivity). The number of questions differed within each category, and some of the questions were reversed to ensure the participants were actually reading the questions and responding truthfully. For example, participants were asked to indicate their level of agreement to the following questions about educational technology and anxiety: "Working with educational technology makes me feel tense and uncomfortable," and, "I feel at ease when I am around educational technologies." On questions which were reversed (those with negative connotations), the scale was reverse coded for analysis with a 5 indicating "Strongly Disagree".

Qualitative data were provided in the form of five open-ended questions. Determining how technology is acquired and where funding for the technology comes from in the schools is different in each school corporation. Open-ended questions provided the population with an opportunity to respond on an individual basis.

The first section of the survey asked for demographic data. Participants were asked the number of years they have taught, how much professional development they have participated in related to educational technology, how many educational technology classes they have taken at the college level, their highest level of education completed, their gender and what class schedule their school utilizes.

When asking how many years the participants have taught, the range went from 1-3 years, 4-7 years, 8-12 years, and 13 years or more. The range was determined based on the research found. Incredible technologies, such as the internet, began mainstream introduction in schools by about 1997. So, if the Internet took hold in 1997, a teacher who has been teaching for 13 years or more as of the 2010 school year would have had to learn about the Internet on their own or through professional development. It is hoped that this survey will indicate these teachers' feelings towards technology in the classroom.

The second section of the survey asked the teachers to identify which of the 14 approved agriculture courses they were teaching in the semester that the survey was distributed. The 14 courses were titles approved by the Indiana Department of Education so all of the teachers should have been familiar with the titles.

The third section of the survey asked which technologies were used in the courses being taught. All of the technologies were picked by the researcher to reflect the most commonly used technologies of the day and also those that are considered innovative and not commonly used but could very well be used in a classroom. Participants were asked what technologies were used in each of the classes they were teaching. A five-point scale was used with zero meaning the technology was not used in that particular class in that semester and four meaning the technology was extensively used in that particular class that semester.

The scale used was:

0 = Never - you have not used this technology in this class this semester

1 = Rarely - on average, in this class, you use this technology about once per week

2 = Occasionally - on average, in this class, you use this technology about twice per week

3 = Frequently - on average, in this class, you use this technology 3-4 times per week

4 = Extensively - you use this technology every day in this class.

The fourth section of the survey asked teachers to identify which educational technologies were present in their classroom. Table 3.1 shows the complete list of technologies included in the study. After the teachers identified which technologies were present in their room they were asked questions about each of the technologies in order to determine their knowledge and attitudes towards each of the technologies present.

Table 3.1

Technologies Investigated in this Study

Hardware	
Desktop computer	MP3 Player/iPod
Laptop computer	Camcorder (any type)
LCD projector	Digital camera
Overhead projector	Webcam
TV	Computer with wired access (connected to a network/internet via a cable)
SMARTboard	Computer with wireless access ("Wi-Fi")
DVD Player	
VCR	

The final section of the survey used items from the Teachers' Attitudes Toward Computers Questionnaire (TAC). TAC was developed by Christensen and Knezek (1996). The survey compiled 14 other surveys that measured educators' technology usage and combined these 14 into one survey that would contain common constructs (Christensen & Knezek, 1996, p. 1). The TAC Questionnaire has many versions that may contain a mixture of the 16 common constructs, or factors.

Only parts of the TAC Questionnaire were used as not all parts were necessary for the objectives of this study. This study used questions measuring Enthusiasm/Enjoyment, Anxiety, Productivity, Teacher Productivity, and Gender

Bias to create five influence factors for this study: Enthusiasm, Anxiety, Productivity, Classroom Productivity, and Gender Bias.

The survey instrument was reviewed by the researcher's graduate committee to establish content validity. Institutional Review Board approval for this study was received on September 8, 2010 from Purdue University under IRB Protocol number 1009009627 (Appendix B). Pilot testing was conducted with four of the researcher's graduate program colleagues to check for ease of use in the Qualtrics system, grammar, and survey design. After this, a meeting was conducted with the Statistical Consulting Service at Purdue University's Department of Statistics to discuss various statistical principles and issues that could occur with the survey.

Post-hoc Cronbach's reliability was conducted on the five common constructs of the administered survey and reliability coefficients ranging from .81 to .89 were found for each, as show in Table 3.2.

Table 3.2

Reliability Coefficients for the Five Influence Factors

Construct	Cronbach's α
Enthusiasm	.84
Anxiety	.81
Productivity	.85
Classroom Productivity	.89
Gender Bias	.80

3.6. Data Collection

Schaefer and Dillman (1998) suggested making multiple contacts to survey participants in order to increase the response rate. They also found that addressing the e-mail to the individual participant and not a group list increases the response rate. The letters for this study were personalized, since this was shown to increase the response rate. The original delivery system for the survey was going to be via the Indiana Association of Agricultural Educators e-mail listserv, however, a personal message could not be sent directly to the individual participants with this system. Therefore, the surveys were sent using a mail-merge so that each e-mail was individually addressed to the participants.

A letter was sent to the President of the Indiana Association of Agricultural Educators (IAAE) to ask him to send a letter of support for this study to the participants of the study (Appendix C). Notification of the participants began with a pre-notice to the population to inform them that they would be asked to participate in a study (Appendix C). The first e-mail notification and invitation were then sent out four days later. One week after the initial contact a reminder e-mail was sent to encourage non-participants to participate. Due to the anonymity of the Qualtrics system, the entire population was notified because the researcher did not know who had or had not completed the survey. One week after this reminder, and two weeks after the initial mailing, a final reminder e-mail was sent to thank the population who had participated and to encourage the non-participants to participate one last time (Appendix C). The survey was then closed one week after the final reminder. Data collection began on September 22, 2010 and ended on October 13, 2010.

3.7. Data Analysis

The data were automatically compiled and organized in the Qualtrics system. From Qualtrics the researcher had the capability to export the data into PASW 18 (formerly Statistical Package for Social Sciences) and Microsoft Excel to run analyses on the data. The variables analyzed and analyses used to analyze them are shown in Table 3.3. Descriptive statistics including means and standard deviations were analyzed and reported for the demographic data. The data from the questions which asked the participants to indicate what technologies were present in their room and what classes they taught were reported directly from the Qualtrics system. For the open-ended questions the responses codified into common themes and responses and then enumerated to obtain a total.

Table 3.3

Summary of Research Objectives, Related Variables, Scale of Measurement, and Analysis Techniques

Objectives	Variables		Scale of Measurement	Statistical Analyses
	Independent	Dependent		
1. Demographics	Degree Gender Years Taught Professional Development Courses Taught Class Schedule Technology courses taken		Nominal Nominal Interval Nominal Nominal Nominal Nominal	Frequencies Means Standard Deviations
2. Educational Technologies Used	Technology Present		Interval	Frequencies Means
3. Frequency of Use of Educational Technologies	Technology used in one semester		Interval	Means Standard Deviation
4. Factors Influencing Technology Use	Gender Degree Years Taught Professional Development Class Schedule Technology Courses Taken	Anxiety Productivity Gender Bias Productivity in the Classroom Enthusiasm	Interval	Independent Samples T-test Pearson's Correlation
5. Educational Technology Acquisition				Coding Enumeration
6. General Issues in Technology Acquisition				Coding Enumeration

Independent samples t-tests were used to the means between gender, degree and professional development attendance and the five influence factors. Effect sizes for these mean differences were calculated using Cohen's d (1988) and can be found in Table 3.4. For the relationship between the number of years taught, class schedule type, and educational technology courses taken, Pearson's correlation coefficients were used. The effect sizes for relationships were calculated using Cohen's r^2 (1988) (Table 3.5) and the relationship strength was then described using Hopkin's (2000) conventions (Table 3.6).

Table 3.4

Effect Size for Differences between Two Independent Means

Effect Size Coefficient (d)	Interpretation
0.0-0.2	Trivial
0.2-0.5	Small
0.5-0.8	Moderate
>0.8	Strong

Table 3.5

Conventions for Effect Sizes of Relationships

Effect Size Coefficient (r^2)	Convention
0.01-0.08	Small
0.09-0.24	Medium
>0.25	Large

Table 3.6

Conventions for Relationships

Relationship Coefficient (*r*)	Convention
0.9-1.0	Nearly Perfect
0.7-0.9	Very Large
0.5-0.7	High
0.3-0.5	Moderate
0.1-0.3	Low
0.0-0.1	Trivial

Due to the length of time this survey was open, there was a possibility for differences in response time from the beginning to the end of the survey period. Hair, Anderson, Tatham, and Black (1998) noted "the researcher is also faced with understanding the extent and character of differences between two or more groups for one or more metric variables…" (p. 42). In this study, the responses were split into three categories by the week when the response was recorded in Qualtrics. Group 1 included responses received from September 22 to September 28, 2010, Group 2 included responses received from September 29 to October 5, 2010, and Group 3 included responses received from October 6 to October 13, 2010. A comparison of means between each of these three groups was conducted. It was determined there was no difference in means between the groups.

Certain assumptions were held in the analysis of the data. It was assumed that all teachers were familiar with the technologies presented to them. Along with knowing about the technology, every technology proposed to the teachers required either a desktop or laptop computer to operate so it was assumed that these two technologies would have a high mean. Also, this survey was dealing with only classes taught in the fall semester of 2010 so just because a technology was not used by a teacher this semester does not necessarily mean they have never used that specific technology.

CHAPTER 4. FINDINGS

This chapter presents the findings of the study. Data were analyzed and presented to address each of the six objectives set forth in this study.

4.1. Objective 1: Describe the characteristics of current Agricultural Science and Business teachers in Indiana's secondary classrooms.

Demographic questions revealed the following qualities about the participants. Table 4.1 shows the number of years the respondents have taught.

Table 4.1

Years Taught by Survey Participants (n = 148)

Years Taught	f	%
1-3 years	29	20
4-7 years	24	16
8-12 years	29	20
13 or more years	66	44
Total	148	100

Seventy three (49%) earned a Bachelor's degree, 74 (50%) earned a Master's degree and one respondent had a Doctorate but was removed from analysis. The population consisted of 95 (64%) males and 53 (36%) females which is proportionate to the total population gender of 143 (62%) male and 86

(38%) female agriculture science and business teachers in the State of Indiana (Indiana Agriculture Teachers' Directory, 2010).

Regarding class schedules, (Table 4.2) 92 (62%) teach a traditional schedule, 6 (4%) teach a Block 4 schedule, 15 (10%) teach a Block 8 schedule, 14 (9%) teach a Modified Block schedule and 21 (14%) teach a Trimester schedule.

Table 4.2

Type of Class Schedule in Participants' School (n = 148)

Schedule Type	f	%
Traditional	92	62
Block 4	6	4
Block 8	15	10
Modified Block	14	9
Trimester	21	14
Total	148	99

Note. Percentages may not equal 100% due to rounding

When asked how many college or university courses related to educational technology the participants have taken, Table 4.3 shows that 30 agriculture teachers (20%) took no courses, 36 (24%) took one course, 42 (28%) took two courses, and 40 (27%) took three or more courses related to educational technology.

Table 4.3

Number of Courses Taken Related to Educational Technology (n = 148)

Courses Taken	f	%
0	30	20
1	36	24
2	42	28
3 or more	40	27
Total	148	99*

Note. Percentages may not equal 100% due to rounding

One hundred and fourteen of the participants (77%) indicated that they had participated in professional development workshops related to educational technology. One hundred and forty seven participants indicated which courses they were teaching. Table 4.4 shows the breakdown of courses being taught by the agriculture teachers at the time of the survey.

Table 4.4

Courses Taught by Survey Participants (n = 147)

Class	f	%
Farm Management	5	3
Advanced Life Science, Foods	11	7
Advanced Life Science, Plants & Soils	15	10
Plant And Soil Science	16	11
Food Science	19	13
Agribusiness Management	29	20
Landscape Management	31	21
Natural Resource Management	36	24
Exploring Agricultural Science and Business	38	26
Advanced Life Science, Animals	44	30
Horticultural Science	48	33
Agricultural Mechanization	72	49
Animal Science	88	60
Fundamentals of Agricultural Science and Business	95	65

Note. Teachers could have taught multiple courses.

4.2. Objective 2: Determine the educational technologies being used in agriculture classrooms.

Teachers were asked to indicate what technologies were present in their classrooms. As was expected and noted in Table 4.5, the most common technologies are a VCR, desktop computer, DVD player, LCD projector and TV. Along with that, the desktop computers are connected to a network via a cable.

Table 4.5

Technology Present in Participants' Classrooms (n =143)

Technology	f	%
VCR	101	71
Desktop computer	98	69
DVD Player	98	69
Computers with wired network access	97	68
LCD projector	96	67
TV	94	66
Digital camera	91	64
Overhead projector	85	59
Laptop computer	75	52
Computers with wireless network access	54	38
SMARTboard	42	29
Camcorder (any type)	39	27
MP3 Player/iPod	23	16
Webcam	18	13

4.3. Objective 3: Identify types and frequencies of use for educational technologies used in agriculture classrooms.

Teachers were asked to rank the frequency with which they used the technologies in each of the classes they were teaching in the first semester of the 2010-2011 school year.

A total of 19 educational technologies were listed. These technologies were then split into two categories – hardware and software. Hardware included pieces of equipment – desktop computer, laptop computer, LCD projector, DVD player, TV, VCR, digital camera, overhead projector, SMARTboard, camcorder, MP3 player, and webcam. Software includes programs and online applications which require a piece of hardware to work such as online videos, CAERT.net, MyCAERT.com, classroom website, CSATracker, podcasts and EZ Records.

Table 4.6 shows the mean frequencies of educational technology hardware used in the agriculture classrooms. Findings indicate that nearly every class is using a desktop computer frequently or extensively (*M* = 3.03, *SD* = 1.21), a laptop computer occasionally (*M* = 1.59, *SD* = 1.60) and/or an LCD projector frequently (*M* = 2.45, *SD* = 1.41). The least used technologies were webcams (*M* = .17, *SD* = .51), MP3 players (*M* = .30, *SD* = .72) and camcorders (*M* = .32, *SD* = .68). The mean score of less than one indicates that these technologies are rarely used according to the scale used for this study.

Table 4.7 shows the mean frequencies of software. Online videos (*M* = 1.29, *SD* = 1.21), CAERT.net (*M* = 1.13, *SD* = 1.31), and MyCAERT.com (*M* = 1.02, *SD* = 1.29) were the most frequently used technologies and were used occasionally by the agriculture teachers. EZ Records (*M* = .10, *SD* = .40), Podcasts (*M* = .18, *SD* = .50) and CSA Tracker (*M* = .45, *SD* = .94) were all used rarely by the agriculture teachers. The majority of these technologies require internet access. For example, if MyCAERT.com is going to be used to give assessments to students in a class, each student would need a computer. This presents a problem as most schools do not have a 1:1 student to computer ratio and reserving a computer lab is necessary but not always possible.

The classes which most often used educational technology hardware for this sample were Exploring Agricultural Science & Business (*M* = 2.14, *SD* = 1.06), ALS Animals (*M* = 2.34, *SD* = 1.32), and ALS Foods (*M* = 2.23, *SD* = 1.29). According to the scale used, these classes are only occasionally using technology in class. The classes which most often used educational technology software for this sample were ALS Animals (*M* = 1.91, *SD* = 1.09), ALS Foods and ALS Plants & Soils (*M* = 1.85, *SD* = 1.21), and Farm Management (*M* = 1.63, *SD* = 1.11).

Table 4.6

Educational Technology Hardware Used in Indiana's Agriculture Classrooms (n = 147)

	Exploring Agricultural Science and Business (n=38)	ALS, Animals (n=42)	ALS, Foods (n=11)	ALS, Plants and Soils (n=14)	Agribusiness Management (n=28)	Agricultural Mechanization (n=70)	Animal Science (n=85)	Farm Management (n=5)	Food Science (n=18)	Fundamentals of Agricultural Science and Business (n=91)	Horticultural Science (n=46)	Landscape Management (n=31)	Natural resource Management (n=34)	Plant and Soil Science (n=15)	Mean
Camcorder	0.32	0.62	0.91	0.29	0.46	0.20	0.29	0.00	0.22	0.26	0.22	0.13	0.18	0.33	0.32
Desktop computer	3.34	3.07	3.82	2.86	3.11	2.37	2.99	4.00	2.44	2.89	2.87	2.68	2.71	3.33	3.03
Digital camera	1.26	1.36	2.00	1.00	1.04	0.86	0.75	0.00	0.83	0.92	0.96	1.23	0.68	0.93	0.99
DVD player	1.58	1.83	2.45	1.71	1.54	1.44	1.60	1.75	1.33	1.38	1.35	1.42	1.18	1.13	1.55
Laptop computer	1.55	2.02	3.00	1.71	1.75	1.03	1.65	0.75	1.44	1.44	1.41	1.45	1.29	1.80	1.59
LCD projector	2.74	2.71	2.82	2.71	2.43	1.90	2.61	2.25	2.50	2.36	2.24	2.29	2.21	2.47	2.45
MP3 Player	0.47	0.38	0.91	0.36	0.43	0.20	0.34	0.00	0.28	0.26	0.22	0.03	0.18	0.13	0.30
Overhead Projector	0.76	1.10	0.91	0.21	1.18	0.84	0.93	0.50	0.83	0.90	0.89	0.94	0.88	1.27	0.87
SMARTboard	1.08	1.02	1.09	0.79	0.86	0.61	0.69	1.00	0.44	0.74	0.80	0.61	0.56	1.40	0.84
TV	1.29	1.86	2.36	0.86	1.43	1.31	1.42	1.50	0.89	1.21	1.24	1.39	1.62	0.67	1.36
VCR	1.37	1.40	1.91	0.36	1.00	1.24	1.15	0.50	0.89	1.21	1.22	1.19	1.12	0.80	1.10
Webcam	0.08	0.45	0.64	0.29	0.18	0.04	0.24	0.00	0.17	0.04	0.09	0.00	0.09	0.07	0.17
Mean	2.14	2.34	2.73	1.94	2.12	1.88	2.06	1.75	1.89	1.97	1.97	1.97	1.91	2.00	-

Note. 0 = Never; 1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Extensively

Table 4.7

Educational Technology Software Used in Indiana's Agriculture Classrooms (n = 147)

	Exploring Agricultural Science and Business (n=38)	ALS, Animals (n=42)	ALS, Foods (n=11)	ALS, Plants and Soils (n=14)	Agribusiness Management (n=28)	Agricultural Mechanization (n=70)	Animal Science (n=85)	Farm Management (n=5)	Food Science (n=18)	Fundamentals of Ag Science and Business (n=91)	Horticultural Science (n=46)	Landscape Management (n=31)	Natural resource Management (n=34)	Plant and Soil Science (n=15)	Mean
CAERT.net	1.08	1.76	1.55	1.14	1.36	0.79	1.20	1.25	0.78	0.95	1.07	0.81	0.91	1.13	1.13
Classroom website	1.00	0.81	0.73	0.93	0.43	0.27	0.47	0.25	0.39	0.37	0.33	0.35	0.24	0.00	0.47
CSA Tracker	0.34	0.79	0.45	1.07	0.43	0.33	0.36	0.75	0.22	0.29	0.48	0.35	0.29	0.13	0.45
EZ Records	0.21	0.14	0.36	0.14	0.04	0.16	0.14	0.00	0.00	0.12	0.13	0.00	0.00	0.00	0.10
MyCAERT.com	0.84	1.69	0.45	1.50	1.29	0.63	0.95	0.75	0.78	0.85	0.89	0.87	0.59	1.13	1.02
Online video	0.42	1.57	2.09	1.43	0.96	0.94	1.42	1.50	1.11	1.03	0.91	0.87	1.15	1.60	1.29
Podcasts	0.13	0.24	0.55	0.29	0.07	0.04	0.08	0.75	0.17	0.01	0.02	0.00	0.03	0.07	0.18
Mean	1.60	1.91	1.85	1.85	1.60	1.37	1.53	1.63	1.39	1.43	1.49	1.40	1.34	1.41	-

Note. 0 = Never; 1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Extensively

4.4. Objective 4: Identify the factors that influence agriculture teachers use of educational technology.

The following tables present the five factors (anxiety, productivity, gender bias, productivity in the classroom and enthusiasm) to the demographics of the population to better understand how the various populations of Indiana Agriculture Science and Business teachers view educational technology.

4.4.1. Descriptive Statistics

This section includes descriptive statistics showing more detailed results for each of the five influence factors. The mean and standard deviation are presented for each of the questions related to the influence factors. Please note that the scores on the negative response items were reverse coded which are indicated by an asterisk.

4.4.1.1. Anxiety

Teachers do not appear to have high levels of anxiety toward educational technology (Table 4.8). Overall, the teachers indicated they disagree (*M* = 2.35, *SD* = .96) with the statement "Working with educational technology makes me feel tense and uncomfortable," and teachers generally agreed (*M* = 2.49, *SD* = .87) that they feel at ease when they are around educational technologies.

Table 4.8

Teachers' Attitudes of Anxiety Toward Educational Technology (n = 130)

Anxiety	n	*M*	*SD*
Working with educational technology makes me feel tense and uncomfortable.	130	2.35	.96
Educational technologies frustrate me.	130	2.86	1.02
I have avoided the use of educational technologies because they are unfamiliar and somewhat intimidating to me.	130	2.22	1.04
*I have a lot of self confidence when it comes to working with educational technologies.	130	2.70	1.00
*I feel at ease when I am around educational technologies.	130	2.49	.87

Note. 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree
*5=Strongly Disagree, 4=Disagree, 3=Undecided, 2=Agree, 1= Strongly Agree

4.4.1.2. Productivity

Regarding the productivity factor of educational technology, teachers indicated that they agree educational technology can increase productivity (*M* = 4.00, *SD* = .74), as shown in Table 4.9. Teachers agreed even more (*M* = 4.28, *SD* = .61) that knowing how to use educational technology is a worthwhile skill.

Table 4.9

Teachers' Attitudes of Productivity Toward Educational Technology (n = 130)

Productivity	n	*M*	*SD*
The use of educational technology would increase my productivity	130	4.00	.73
The use of educational technology would help me learn.	130	4.07	.58
Knowing how to use educational technology is a worthwhile skill.	130	4.28	.61
Educational technologies will improve education.	130	4.05	.81

Note. 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree

4.4.1.3. Gender Bias

The data in Table 4.10 suggests that teacher gender does not impact their views of educational technology use. Teachers agreed to strongly agreed (*M* = 4.42, *SD* = .73) that they would trust a woman just as much as a man to figure out how to operate educational technology. To support this, they indicated that they disagree (*M* = 2.93, *SD* = .95) with the statement, “In general, boys are better than girls at using educational technology.”

Table 4.10

Teachers' Attitudes of Gender Bias Toward Educational Technology (n = 130)

Gender Bias	n	*M*	*SD*
I would trust a woman just as much as a man to figure out how to operate educational technology.	130	4.42	.73
I would be just as likely to ask a woman for help with educational technology as a man.	130	4.43	.70
*In general, boys are better than girls at using educational technology.	130	2.93	.95

Note. 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree
*1=Strongly Agree, 2=Agree, 3=Undecided, 4=Disagree, 5=Strongly Disagree

4.4.1.4. Productivity In The Classroom

Table 4.11 presents statements regarding educational technology use as it relates to productivity in the classroom. Three of the four mean scores of the Productivity in the Classroom statements were at least 4.00 or above on a scale of five. This indicates that these teachers believe educational technology can increase productivity in the classroom.

Table 4.11

Teachers' Attitudes of Productivity in the Classroom Toward Educational Technology (n = 130)

Productivity In The Classroom	n	*M*	*SD*
Educational technology stimulates creativity in students.	130	4.07	.72
Educational technology would significantly improve the overall quality of my students- education.	130	3.90	.83
Educational technology motivates students.	130	4.00	.77
Educational technology should be used in agricultural education.	130	4.35	.62

Note. 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree

4.4.1.5. Enthusiasm

Table 4.12 presents data regarding the teachers' enthusiasm toward education technology. The data indicate that teachers are somewhat enthusiastic in dealing with educational technology. Teachers agreed (*M* = 3.93, *SD* = .68) that they enjoy working with educational technology, and disagreed (*M* = 2.09, *SD* = .77) that educational technologies are not exciting.

Table 4.12

Teachers' Attitudes of Enthusiasm Toward Educational Technology (n = 130)

Enthusiasm	n	*M*	*SD*
Figuring out problems with educational technology does not appeal to me.	130	2.62	1.07
I think that working with computers would be enjoyable and stimulating.	130	3.87	.76
Educational technologies are not exciting.	130	2.09	.77
I enjoy working with educational technology.	130	3.93	.68
Learning about educational technology is boring to me.	130	2.28	.90

Note. 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree

Table 4.13 reports information about how teachers felt regarding specific technologies. Of the technologies listed, the SMARTboard and webcam were ranked as "Undecided" (*M* = 3.12 for both) with regards to their ease of use. Undecided could mean that teachers are familiar with using these technologies but they are still unsure as to how to operate them or use them to their full extent. The desktop computer and TV were ranked as "Strongly Agree" with regards to ease of use (*M* = 4.39 and *M* = 4.38 respectively). The teachers indicated that LCD projectors (*M* = 4.52), wired networks (*M* = 4.40), desktop computers (*M* = 4.35) and DVD players (*M* = 4.35), laptop computers (*M* = 4.22), and wireless networks (*M* = 4.14) to be the most useful instructional aide in their classroom. When posed with the statement "Teacher training should include instructional applications of this technology" teachers indicated they would like to see training on the following items: laptop computers (*M* = 4.17), LCD projectors (*M* = 4.14), and wired and wireless networks (*M* = 4.16 and *M* = 4.10, respectively).

Table 4.13

Means of Attitudes Toward Specific Educational Technologies

Statements	Desktop Computer n=127)	Laptop Computer (n=104)	LCD Projector (n=115)	Overhead Projector (n=107)	MP3 Player (n=72)	VCR (n=126)	TV (n=122)	DVD (n=124)	SMARTboard (n=81)	Digital Camera (n=109)	Webcam (n=68)	Wired Network (n=119)	Wireless Network (n=90)	Camcorder (n=75)
*1	4.60	4.45	4.29	4.52	3.44	4.62	4.62	4.60	3.00	4.20	3.18	4.36	4.07	3.92
2	4.35	4.22	4.52	3.53	3.25	3.94	4.02	4.35	3.77	4.08	3.24	4.40	4.14	3.77
3	4.25	4.33	4.43	3.58	3.54	3.84	3.88	4.26	3.91	4.26	3.46	4.40	4.17	3.91
4	4.39	4.21	4.30	4.29	3.50	4.43	4.38	4.35	3.12	4.06	3.12	4.33	4.06	3.81
5	4.49	4.38	4.44	3.28	3.50	3.58	3.58	4.04	3.98	4.17	3.60	4.41	4.19	3.85
6	4.06	4.17	4.14	2.81	3.46	3.01	3.06	3.48	3.99	3.94	3.63	4.16	4.10	3.80
7	4.31	4.22	4.37	3.15	3.39	3.86	3.89	4.15	3.70	4.08	3.40	4.39	4.10	3.81
M	4.35	4.28	4.36	3.59	3.44	3.89	3.92	4.18	3.64	4.11	3.38	4.35	4.12	3.84

Note. *5=Strongly Disagree, 4=Disagree, 3=Undecided, 2=Agree, 1=Strongly Agree
1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree

1. It is confusing to use.
2. It is a useful instructional aide in my classroom.
3. It can be used successfully with courses which demand creative activities.
4. It is easy to use.
5. It is important for me to learn how to use this technology.
6. Teacher training should include instructional applications of this technology.
7. Using this technology in my classroom is enjoyable.

4.4.2. Comparison of Means among Gender, Degree, Professional Development and the Five Influence Factors

The results of an independent samples t-test (Table 4.14) showed no significant difference between gender and the influence factors of: Gender Bias (male mean = 2.01, *SD* = .39, female mean = 2.06, *SD* = .36, *t* = -0.133, p > .05); Enthusiasm (male mean = 2.20, *SD* = .68, female mean = 2.32, *SD* = .63, *t* = -0.202, p > .05); Anxiety (male mean = 2.52, *SD* = .79, female mean = 2.53, *SD* = .68, *t* = -0.013, p > .05); Productivity (male mean = 4.03, *SD* = .58, female mean = 4.23, *SD* = .56, *t* = -1.966, p > .05); Classroom productivity (male mean = 4.01, *SD* = .62, female mean = 4.21, *SD* = .68, *t* = -1.723, p > .05). Effect sizes were trivial for the mean differences between male and female agricultural educators, gender bias and anxiety, and small between enthusiasm, productivity, and classroom productivity according to Cohen's (1988) criteria.

Table 4.14

Comparison of Means of Gender and Influence Factors (n=130)

Influence Factor	Gender	n	*M*	*SD*	*t*	*d*
Gender Bias	Male	85	2.01	.39	-.68	.13
	Female	45	2.06	.36		
Enthusiasm	Male	85	2.20	.68	-1.01	.20
	Female	45	2.32	.63		
Anxiety	Male	85	2.52	.79	-.11	.01
	Female	45	2.53	.68		
Productivity	Male	85	4.03	.58	-1.97	.35
	Female	45	4.23	.56		
Classroom Productivity	Male	85	4.01	.62	-1.72	.31
	Female	45	4.21	.68		

Table 4.15 compares the degree level of the participants to the influence factors. The original data included one respondent who indicated they earned a Doctorate. This one response was removed from the sample. An independent samples t-test showed no significant difference between degree and: Gender Bias (Bachelor's mean = 2.10, *SD* =.35, Master's mean = 1.96, *SD* = .39, *t* = 2.150, p > .05); Enthusiasm (Bachelor's mean = 2.42, *SD* = .67, Master's mean = 2.07, *SD* = .63, *t* = 0.539, p > .05); Anxiety (Bachelor's mean = 2.49, *SD* = .74, Master's mean = 2.56, *SD* = .77, *t* = -0.093, p > .05); Productivity (Bachelor's mean = 3.94, *SD* = .52, Master's mean = 4.23, *SD* = .59, *t* = -2.919, p > .05); Classroom Productivity (Bachelor's mean = 3.93, *SD* = .65, Master's mean = 4.21, *SD* = .61, *t* = -2.519, p > .05). Effect sizes were moderate for the mean differences between degree earned, enthusiasm, and productivity; they were

small for gender bias and classroom productivity according to Cohen's (1988) criteria.

Table 4.15

Comparison of Means of Degree and Influence Factors (n=129)

Influence Factor	Degree	n	*M*	*SD*	*t*	*d*
Gender Bias	Bachelor's	63	2.10	.35	2.15	.38
	Master's	66	1.96	.39		
Enthusiasm	Bachelor's	63	2.42	.67	3.00	.54
	Master's	66	2.07	.63		
Anxiety	Bachelor's	63	2.49	.74	-.56	.09
	Master's	66	2.56	.77		
Productivity	Bachelor's	63	3.94	.52	-2.92	.52
	Master's	66	4.23	.59		
Classroom Productivity	Bachelor's	63	3.93	.65	-2.52	.44
	Master's	66	4.21	.61		

A comparison of means between attending professional development events and the influencers (Table 4.16) showed no significant difference between professional development and: Gender Bias (yes mean = 2.03, *SD* =.35, no mean = 2.02, *SD* = .40, *t* = .099, p > .05); Enthusiasm (yes mean = 2.16, *SD* = .63, no mean = 2.49, *SD* = .74, *t* = -2.432, p > .05); Anxiety (yes mean = 2.47, *SD* = .71, no mean = 2.70, *SD* = .86, *t* = -1.483, p > .05); Productivity (yes mean = 4.13, *SD* = .55, no mean = 3.98, *SD* = .67, *t* = 1.245, p > .05); Classroom Productivity (yes mean = 4.14, *SD* = .63, no mean = 3.87, *SD* = .64, *t* = 2.092, p > .05). Effect sizes for the mean differences between professional development attendance and enthusiasm were moderate, and were small between anxiety, productivity and classroom productivity according to Cohen's (1988) criteria.

Table 4.16

Comparison of Means of Professional Development Attendance and Influence Factors (n = 130)

Influence Factor	Professional Development	n	*M*	*SD*	*t*	*d*
Gender Bias	Yes	100	2.03	.37	.099	.23
	No	30	2.02	.40		
Enthusiasm	Yes	100	2.16	.63	-2.43	.50
	No	30	2.49	.74		
Anxiety	Yes	100	2.47	.71	-1.48	.31
	No	30	2.70	.86		
Productivity	Yes	100	4.13	.55	1.26	.26
	No	30	3.98	.67		
Classroom Productivity	Yes	100	4.14	.63	2.09	.43
	No	30	3.87	.64		

4.4.3. Pearson's Correlations Results

Pearson's correlations were used to describe relationships between the five influence factors and the number of college courses taken dealing with educational technology, the number of years a teacher has taught, and their schedule type (Table 4.17).

A very large and significant relationship was found between the influence factors and classroom productivity (r = .75) with a large effect size (r^2 = .56).

A high and significant relationship was found between productivity and enthusiasm (r = -.53) with a large effect size (r^2 = .28) and classroom productivity and enthusiasm (r = -.58) with a large effect size (r^2 = .34).

A moderate and significant relationship was found between the number of years taught and educational technology courses taken (r = -.34) with a medium effect size (r^2 = .12), the number of educational technology courses taken and anxiety (r = -.36) with a medium effect size (r^2= .13), enthusiasm and anxiety (r = .48) with a medium effect size (r^2 = .23), anxiety and productivity (r = -.31) with a medium effect size (r^2 = .10), and anxiety and classroom productivity (r = -.36) with a medium effect size (r^2 = .13).

A low and nonsignificant relationship was found between years taught and enthusiasm (r = -.11) with a small effect size (r^2 = .01) and years taught and gender bias (r = -.15) with a small effect size (r^2 = .02).

Table 4.17

Pearson's Correlations among Number of Courses Taken, Number of Years Taught, Schedule Type and the Influence Factors (n = 130)

	1	2	3	4	5	6	7	8
1. Courses Taken	-							
2. Years Taught	-.34**	-						
3. Schedule Type	.13	-.02	-					
4. Enthusiasm	-.01	-.11	-.11	-				
5. Anxiety	-.36**	.29	-.07	.48**	-			
6. Productivity	.04	.003	-.03	-.53**	-.31**	-		
7. Gender Bias	.08	-.15	-.02	-.002	-.17	-.09	-	
8. Classroom Productivity	.04	-.05	.06	-.58**	-.36**	.75**	.01	-

**p < .01

4.5. Objective 5: Determine how educational technology is acquired in the classrooms and where the funding for the technology comes from.

One hundred and twenty-eight participants answered the question "Where does the funding for educational technology in your room come from?" Thirty-eight participants indicated they receive their funding from the school corporation or a general fund. The second most popular source was grants, endowments or other local funds. One teacher said, "Funding for educational technology in my class room comes from grants or from corporation money. I typically do not get new educational technology equipment unless I find a way to get it." Another teacher indicated their technology department or media specialist applies for grants, while one teacher stated they apply for grants on their own.

The third most popular response, with 18 participants, indicated their schools have a technology fund which allows the teacher to purchase technology for their department. The fourth most common answer, with 15 responses, was Perkins and Vocational dollars. Some teachers stated that they no longer receive Perkins money and that "we get very little help from the area vocational director…"

Nine participants noted that they use money from their FFA chapter to purchase technology for their classroom. A teacher said, "The FFA actually purchased the student computers in my room." Other responses included money from the greenhouse plant sales. A small number said their school collects a technology fee from the students. Some teachers indicated they purchase technology for their room with their personal money or even use their own personal technology in the classroom. Four responses indicated that their department receives the technology that is discarded or leftover after an upgrade.

Some unique sources of funding included money from the local riverboat casinos and Project Lead The Way funds. Project Lead The Way requires that the school have a one to one student to computer ratio, and some agriculture teachers also teach Project Lead The Way courses which allow them to use these computers for agricultural education.

4.6. Objective 6: Identify the general issues and concerns existing in acquiring educational technology.

In order to achieve this objective, four open-ended questions were posed to the teachers. These open-ended questions were needed because every school corporation and agriculture program has different needs so it was important that the teachers have the freedom to express the factors that influence them, however, there were several common themes. The four questions were as follows:

1. What obstacles have you overcome in order to use educational technology in your classroom?
2. How do your students respond to your use of educational technology in the classroom?
3. What are some factors that influenced your decision to use educational technology in your classroom?

4. What are some issues and concerns regarding your use of educational technology in your classroom?

4.6.1. Obstacles of Technology Use

One hundred and twenty-eight participants responded to this question. The most common response to this question, with 35 responses (27%) was the cost of technology and the funding to get it. A teacher stated, “It is a constant battle for [money] to get and keep upgrading as things advance.” Along with funding, a teacher indicated that completing grant applications is an obstacle they need to overcome. One teacher stated that an obstacle was “purchas[ing] equipment with [the] greenhouse account.” A positive remark was made by one teacher who said, “We have used technology in the agriculture area that was many times the first ones in the high school to use it, such as [the] internet and digital cameras.”

Another common theme, and the second highest response, was a lack of training or knowledge about technology which 27 teachers (21%) indicated was an obstacle. Among those that stated training and knowledge was an issue, a teacher said, “One obstacle that I have had to overcome in order [to] use educational technology in my classroom is understanding the full capabilities that the technology can have. I often feel that I learn the basics and sometimes miss out on other great things that the items can do.” Along with this, another teacher indicated they are not even aware of what is available for use in their classroom.

One teacher even stated, “Over the past 30 years I have gone from mimeograph copiers and overhead projectors to laptop/LCD in my classroom. All learning was done in workshops or through hands-on applications. Keeping up with all that is out there in technology is my biggest hurdle.” Some of the teachers mentioned they have a fear of trying new technologies and relying on the students in their classroom in order to complete tasks with these technologies.

In addition to a lack of training and knowledge, many teachers indicated that problems with technology were a problem when in the classroom. For example, when wireless technologies were being used in the classroom the router did not have enough bandwidth to support the computers being used. Another teacher said, “The biggest obstacle I face is when technology does not work properly. It is hard to teach a class when your lesson plan is based whether the digital camera will record or YouTube will load.”

A lack of access and availability of technology was the third most common theme with 24 responses (18%). The teachers mentioned that gaining access to a computer lab in the school was often complicated or impossible. One teacher said it is an inconvenience when the only computer in the room belongs to the teacher.

4.6.2. Student Response to Technology Use

There was an overwhelming response from educators that their students enjoy using educational technology in the classroom. Ninety-seven of the participants (75%) said their students respond positively to educational technology in the lessons. Teachers said their students were well-behaved and better engaged. One teacher found that their students are "open and excited with technology in the classroom". This particular teacher indicated that they use a technology called a Mobi which is a smaller version of SMARTboard that is small enough to be held in the students' hands. Also, at this teacher's school they are encouraged to incorporate cell phones into their instruction. The teacher said, "Anytime they [the students] can get their phones out, they are excited."

Some of the teachers indicated that technology helps to add variety to their teaching method which in turn excites the students and provides them with new experiences. Even though the students enjoy using technology one teacher observed that their "students [are] now seeing computers as a tool and less as a novelty." Regarding a specific technology in this study, MyCaert, a teacher said, "Since I have been using MyCaert students have seem to like the test that way because of the instant feed back…"

Very few responses (6%) said their students were indifferent or had a negative attitude toward technology. One comment was particularly interesting:

> It is about half and half. The freshman and sophomore
> grades are learning to use technology easier in my

> classroom than the upper grade levels. Most likely this is the case because the freshman and sophomores were issued their own laptop this year at the school. The juniors and seniors seem to get more frustrated with the technology. I was shocked how many of them do not know some of the most basic tasks (i.e. how to perform successful searches on Google and adding an attachment to an email/ uploading a document).

Just as the literature stated that there was a skill level difference between new and old agriculture teachers, so too is there a difference even between the students, according to this teacher. Teachers observed that some students are "turned off" by technology or rather the students lose interest quickly when technology is used. Some of the teachers indicated that students are losing interest in common technologies such as DVDs, VHS tapes and even presentations on an LCD projector because they are used so much throughout the school.

4.6.3. Factors Influencing Technology Use

The results of this question were promising because 28 (21.8%) participants said that students influence their decision to use educational technology in their classroom. "The biggest factor I use is whether it will engage my students to learn the material" said one teacher. Two participants stated that using educational technology helps them to feel like they are on the leading edge of education and the students benefit from that. Many of the teachers liked that technology is good for the students but did note that using educational technology does not replace good teaching methods.

Eighteen (14%) participants indicated that the ease of use of the technology influences their decision to use educational technology. Age plays a factor in the ease of use of technology as one teacher pointed out, “Being a younger teacher, we grew up in the age of computers. I am much more comfortable working with computers, as are the students I am teaching.” However, one respondent who has been teaching for 33 years, which was indicated in their remarks, said, “To remain current and an affective teacher [I] understood that this technology would not only be beneficial but a necessary part of my job.”

Necessity was a common theme throughout some of the comments. “It is where they live and we must meet them where the[y] are,” “It is where society is going so it needs to be incorporated,” “I believe that technology is important because students will be using technology in the future.” One teacher found it necessary in order to attract students and also to work on FFA projects.

Teachers also mentioned that they use technology because they do not have textbooks for their classes so they must use technology but in doing this it saves them valuable time. “I especially like to use CSA Tracker for quizzes and test because it instantly grades and gives feedback to the students. I also don’t have to spend hours grading tests and quizzes by hand, which allows me to spend more time preparing for classes and FFA activities."

4.6.4. General Issues and Concerns of Technology Use

Among the responses from the teachers, the most common answer dealt specifically with training. There were 31 specific responses related to a lack of knowledge about and unfamiliarity with educational technology and they were simply unaware of current technologies available. One statement was particularly interesting: "most are more advanced tha[n] what I am, don't feel secure using them". Some teachers noted that this unfamiliarity carried over into the students. "The biggest issue I have with the technology is that not all students know how to use the technology properly."

A lack of training was also mentioned. "…I do not feel that I always receive the proper training or learn the full capabilities of the items. Typically it is easier for me to see how others are making it work in their classroom and it helps me to brainstorm ideas or create ways to help my class." Regarding training for educational technology, one teacher stated they would like to see it be more experiential, or hands on. But as one teacher stated, "We are so far behind and cheap in our technology that what I learn in workshops does not work on our technology level."

Some comments made by teachers provide some ideas for topics that could be covered during training about educational technology. A teacher said, "I must come up with a lot of material myself." This teacher could benefit from a workshop about resources available for agriculture curriculum. A suggestion was made for the teacher education program at Purdue regarding training for educational technology: "Purdue students could spend a whole class devoted to finding good resources to use on the job when time is limited." Another teacher said, "There needs to be more grants available or money available from the state or federal government that schools can use to purchase [educational technology] equipment for our classrooms and students." Some of the comments were that some teachers are willing to apply for grants to acquire technology in their classroom but are not familiar with the grant writing process. Funding was again another common concern in the answers to this question with twenty-six teachers specifically mentioned funding and the cost of technology.

One comment made by a teacher showed that there is still some resistance to the use of educational technology. Their response to this question was, "funding and wasting time on gizmos when we should actually be teaching." Still another said, "Students need to get away from technology and learn how to do things without computers and technology. Believe it or not, there was a life before technology, they need to learn to do things with their hands and minds, not just click a button. My stude[n]ts do not rely on technology and I feel they are better off." This makes it quite clear that attitudes toward educational technology among Indiana's agriculture teachers are wide and varied.

Other responses to this question pertained to availability of technology (15 mentioned this), a concern with the security, usage and quality of the Internet and network at school (11 mentioned this), and 11 teachers also mentioned that time is one of the biggest issues regarding the use of educational technology in their classroom.

CHAPTER 5. CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

This chapter presents conclusions and implications of the findings and results of this study. The purpose of this study was to determine what educational technologies are being integrated and used in Indiana agriculture classrooms, how these technologies are acquired, and what factors influence agriculture teachers to use the technologies.

There were six main objectives in this study. They were to:

(1) Describe the characteristics of current Agricultural Science and Business teachers in Indiana’s secondary classrooms.
(2) Determine what educational technologies are being used in Indiana’s secondary agriculture classrooms.
(3) Identify types and frequencies of use for educational technologies used in agriculture classrooms.
(4) Identify the factors that influence agriculture teachers use of educational technology.
(5) Determine how educational technology is acquired in the classrooms and where the funding for the technology comes from.
(6) Identify the general issues and concerns existing in acquiring educational technology.

5.1. Conclusions and Recommendations

The first objective of this study sought to determine the demographic characteristics of Indiana's secondary agricultural educators. Over half of the respondents have been teaching for eight years or more, so there is a younger cohort of agriculture teachers entering the profession. These new teachers are more technologically savvy and should have an easier time learning how to integrate technology into their lessons since they would have most likely used the technologies during their secondary education.

Teaching future agriculture teachers about technology begins at the post-secondary level. Today's college students are tech-savvy and understand the power of technology but they need to know how to integrate it meaningfully into their lessons. The students should be provided with the opportunity to view exemplary technology-using teachers in their classroom, but should also be able to practice lessons using technology while in college. With the speed at which technology is advancing it is important to keep future teachers up to date about new technologies and how they can be used.

The second objective explored the educational technologies are being used in Indiana's secondary agriculture classrooms. Teachers are primarily using a computer with an LCD projector. These technologies can be effective but are becoming mainstream and students no longer view them as innovative. Lessons should be developed that specifically integrate certain technologies. It is clear that desktop and laptop computers as well as LCD projectors are the most common educational technologies present in Indiana's agriculture classrooms.

Therefore, lessons should be developed that go beyond simply showing a PowerPoint presentation to students. Specific activities need to be explored and integrated into lessons. For example students could create blogs about their classroom experience, prepare educational movies and post them to online video sites, or even prepare a podcast about a topic in their class which could then be used by all agriculture teachers and students in the state. Providing lessons to agriculture educators that already show how to integrate a technology will increase the likelihood that the technology will be integrated and that student learning can be positively impacted.

The third objective identified which agriculture classes most often use educational technology and how often the technologies are used in each of the classes. Even the classes with the highest mean for use of technology were only ranked “rarely” to “occasionally”. However, it should be noted that two of the three ALS classes were present in hardware while all three of the ALS classes were present in software. This is promising because these classes are to be taught as dual credit college courses. The use of technology in these advanced classes can greatly improve the students’ experiences and prepare them for the technology rich world of college.

A low mean in technology use is not an indication of poor teaching. Some courses such as Agricultural Mechanization may only be in a formal classroom environment for only a few weeks out of the semester and then will spend the rest of the semester in the agriculture shop, and likewise with Horticultural Science. The Horticultural Science course may only spend a few weeks in the classroom before they are in the school's greenhouse nearly every day. Any indication of technology use is a positive sign that Indiana's agricultural educators are open to, and willing to use, educational technology.

The fourth objective examined the factors influencing an agriculture teacher's use of educational technology. Anxiety, productivity, gender bias, productivity in the classroom and enthusiasm were studied. This sample of Indiana secondary agricultural educators were enthusiastic about educational technology and felt little anxiety towards the use of it. Gender bias was not overly apparent. In general, the teachers believed that educational technology can increase their own productivity and productivity of students in the classroom.

Factors such as productivity and anxiety can be affected by participation in professional development and courses dealing with educational technology. The more exposure these teachers have to technology the less anxiety they will experience, but they will see how to use technology in ways to make teaching and learning more effective in their classroom.

Gender overall did not have an impact on teachers' views of technology. It was thought that there would be some gender bias among Indiana's agriculture teachers but the data from this study suggests that there is no major significant difference between the gender bias influence questions and gender of the teacher. The first two statements showed that the teachers trust either gender, the third question showed they are still undecided as to which gender is better with technology. The respondents could have also interpreted this question in different ways. When respondents read the statement they could have taken it to mean that both genders are just as proficient with educational technology and they are undecided as to whether males are better than females when using educational technology. Regardless of the interpretation of this data, it will change as teachers enter the profession or retire and cannot be applied to populations outside of Indiana.

The fifth objective explored how educational technology is acquired in the classrooms and where the funding for the technology comes from. It was clear from the open-ended responses that funding is a primary concern. Providing resources to agriculture teachers making them aware of grants available for technology would eliminate financial barriers which were a main cause of a lack of technology and integration of it into the classroom. Many teachers also mentioned to small of a presence of a Career and Technical Education Director in their district. Providing the results of this study to the Career and Technical Education Directors will make them aware of the issues affecting Indiana’s Agricultural Science and Business Teachers. The Directors can work in conjunction with Agricultural Education at Purdue to find and disseminate information about funding for classroom technology.

The final and sixth objective explored what general issues and concerns exist in acquiring educational technology. It asked questions concerning obstacles the teachers had to overcome to use educational technology, how their students respond to technology, factors influencing their decision to use educational technology and general issues and concerns regarding the use of educational technology. Funding again was the primary issue thus proving that funding could solve some of the problems affecting technology integration. Some teachers stated that they use technology because it benefits their students. This is a positive finding which shows that Indiana's agricultural educators do understand the power of educational technology.

Teachers mentioned that they are unfamiliar with how to use current technologies and also are unaware of what technologies are available to use in the classroom. Indiana's secondary Agricultural Educators will benefit from in-service trainings dealing with technology. Different trainings will be needed for different groups of educators. The first group of teachers - those with limited knowledge and skills with technology - will benefit from a more in-depth and comprehensive workshop that, ideally, will be hands-on, just as the teacher's mentioned in the qualitative data. The second group – agriculture teachers with a strong understanding of technology – will benefit from sessions on how to successfully integrate technology into their classroom, or to show them new technologies available for use in the classroom. Some of the teachers are not familiar with what is available for them to use so any exposure to new technologies will benefit them.

One possible method for these professional development opportunities would be short online presentations or demonstrations that the teachers can view when it is convenient for them. A short 15 minute presentation or recorded demonstration could provide a quick glimpse at ways to integrate and use old or new technologies available in the classroom. Teachers might be more willing to view 15 minute presentations as opposed to spending a whole day in training.

Once all of the data were gathered and analyzed, an overall adoption level was considered according to Rogers' Theory of Diffusion of Innovations. The levels of Rogers' Theory of Diffusion of Innovations have five distinct levels of adopters: innovators, early adopters, early majority, late majority, and laggards. Determining one overall level for Indiana's agriculture teachers is difficult because of the many different technologies present across the state. Not every teacher has a SMARTboard or laptops for every student. However, since the adopter levels are based on innovativeness, the adopter categories can largely depend on how an agriculture teacher uses the technology.

Through observations of the qualitative data, it appears as though at least some agriculture teachers are innovators or early adopters. For example, the teacher who indicated they use Mobi boards would be an early adopter among the secondary Indiana agriculture teachers. Other teachers indicated that their students would be better off without technology which would classify them as a laggard in the sense of technology adoption.

It is hard to determine a level of adoption in a school setting due to the fact that many times, as teachers indicated, they were required by the school to use a technology. Many school corporations provide and require their teachers to use technologies like a desktop computer to take attendance, for example. In this case, the agriculture teachers have no choice but to be a forced early adopter or innovator of both the desktop computer and the attendance or classroom management software.

5.2. Implications for Practice

The findings from this study can be used in many ways to improve agricultural education in Indiana. This study uncovered what technologies are being used in Indiana's agriculture classrooms and what factors are preventing technology from being used. Now that these factors are known, professional development opportunities can be more focused with regards to technology. Indiana's agriculture teachers can use the data from this study to apply for technology grants to acquire some of the technologies they want to use or currently do not have.

Information from this study can impact how Indiana's agriculture curriculum will be developed in the future. Knowing what technologies are available in Indiana's agriculture classrooms can help curriculum specialists develop lesson plans that integrate a wide variety of technology, but at a minimum includes the most common technologies seen in Indiana's agriculture classrooms.

5.3. Recommendations for Further Research

A study of this nature has never been conducted in Indiana making this study exploratory in nature. This brought about many topics for further research in the area of educational technology in Indiana's secondary agricultural education classrooms. The data gained from this study provide a solid base of information to pose other questions which are discussed in this section.

One study alone should be dedicated just to discovering attitudes, feelings and self-efficacy toward educational technology in general. Developing an understanding of the agriculture instructor's feelings will give a solid base to begin investigating specific technologies. Ideally, a study would be conducted every few years due to the rapid advancement of technology. An entire study could also be conducted on the students in agricultural education programs and how they view educational technology. Learning how the students view technology should ultimately be the reason certain technologies are integrated.

Further study should be completed to investigate the use of specific technologies in Indiana. The study should investigate only one or a few related technologies in order to gain a deeper understanding of those technologies. For example, studying how educators feel about computers in the classroom will be a good gateway to study whether other technologies would be viable in the classroom. If an agriculture teacher is comfortable with a computer then maybe they could be trained to use a webcam that would allow them to connect their classes with experts in subjects they are currently learning.

Research should be conducted to investigate the need for training based on the agriculture teachers' needs. Determining the best methods for presenting educational technology training will provide a more meaningful experience for the teachers. Perhaps even by using methods of integrating technologies into the trainings, a more experiential learning experience can be provided.

Creating opportunities for agriculture teachers to view those teachers who are using innovative technologies would provide yet another means for teachers to see how technology can work in the agriculture classroom. The Theory of Diffusion of Innovations says that people will be more likely to adopt an innovation if they see it working. Because the findings indicated some of Indiana's secondary agricultural educators are innovators or early adopters, it might be beneficial to have them put together a short online video or present a workshop on how they use and integrate new technologies into their rooms.

The findings from this study indicated that educational technology is being used in Indiana's secondary agricultural education classrooms. While not all teachers have adopted newer innovations, it is clear that technology is, and will continue to be, present in the classrooms and will continue to evolve as will the learners who enter the classrooms.

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APPENDICES

Appendix A. Survey

The Integration and Use of Educational Technology in Indiana's Secondary Agriculture Classrooms

Thank you for agreeing to participate in this survey. If at any time you need to go back, please use the back button located at the bottom of the survey. **DO NOT USE YOUR BROWER'S BACK BUTTON.**

Also, if at any time you need to stop the survey, you can restart the survey from the point at which you left off by clicking the link provided to you in your e-mail. However, **you MUST restart on the same computer on which you originally began.**

Please answer the following demographic data:

1. How many college or university courses have you taken that deal with educational technology?
   0
   1
   2
   3 or more

2. Have you attended any professional development events or workshops that specifically dealt with educational technology?
   Yes
   No

3. What is the highest degree that you have earned?
   Bachelor's
   Master's
   Doctorate

4. Please indicate your gender.
   Male
   Female

5. How many years have you been teaching?
   1-3 years
   4-7 years
   8-12 years
   13 or more years

6. What schedule does your school follow? Traditional: Six or seven periods per day every day (semester length is 18 weeks) Block 4: Four classes per day and classes meet every day for 9 weeks Block 8: Eight class periods available and students take up to 4 per day on an alternating day basis (semester length is 18 weeks) Modified Block: A mix of Block and Traditional scheduling Trimester: Five periods per day every day (semester length is 12 weeks)

   Traditional
   Block 4
   Block 8
   Modified block
   Trimester

7. Listed below are the 14 approved agricultural science and business courses approved by the Indiana Department of Education. Please select which of the following courses you are currently teaching THIS SEMESTER:PLEASE NOTE: Do not use your web browser's back button. Please use the back button located at the bottom of each page in this survey.

   Exploring Agricultural Science and Business
   Advanced Life Science, Animals
   Advanced Life Science, Foods
   Advanced Life Science, Plants and Soils
   Agribusiness Management
   Agricultural Mechanization
   Animal Science
   Farm Management
   Food Science
   Fundamentals of Agricultural Science and Business
   Horticultural Science
   Landscape Management
   Natural Resource Management
   Plant and Soil Science

Note: The following question would have been asked for each class the agriculture teacher indicated they were teaching during the semester this survey was administered.

8. In [CLASS CHOICE FROM QUESTION #7] how frequently have you used the following educational technologies THIS SEMESTER?
   0= Never- you have not used this technology in this class this semester
   1= Rarely- on average, in this class, you use this technology about once per week
   2= Occasionally- on average, in this class, you use this technology about twice per week
   3= Frequently- on average, in this class, you use this technology 3-4 times per week
   4= Extensively- you use this technology every day in this class

   Desktop computer
   Laptop computer
   LCD projector
   Overhead projector
   TV
   SMARTboard
   DVD Player
   VCR
   MP3 Player/iPod
   Camcorder (any type)
   Digital camera
   Webcam
   Online video (e.g. YouTube, United Streaming, etc)
   Podcasts
   Classroom website
   EZ Records
   CSA Tracker
   CAERT.net
   MyCAERT.com

9. In the boxes below, indicate the quantity of each technology that is present in your room this semester, even if you do not use it. If the technology is not present in your classroom please leave the box blank. If you obtain the technology from an outside source such as a Media Center, please indicate that you use that technology.

Desktop computer
Laptop computer
LCD projector
Overhead projector
TV
SMARTboard
DVD Player
VCR
MP3 Player/iPod
Camcorder (any type)
Digital camera
Webcam
Computer with wired access (connected to a network/internet via a cable)
Computer with wireless access ("wi-fi")

Note: This question was asked for each technology the agriculture indicated was present in their room.

10. Please indicate the level of agreement with the following statements regarding the [TECHNOLOGY FROM QUESTION # 9] in your classroom. *SD* = Strongly Disagree, D = Disagree, U = Undecided, A = Agree, SA = Strongly Agree.

11. Indicate your level of agreement regarding educational technology and **enthusiasm.**

SD=Strongly Disagree, D=Disagree, U=Undecided, A=Agree, SA=Strongly Agree

	SD	D	U	A	SA
Figuring out problems with educational technologies does not appeal to me.					
I think that working with computers would be enjoyable and stimulating.					
Educational technologies are not exciting.					
I enjoy working with educational technology.					
Learning about educational technology is boring to me.					

12. Indicate your level of agreement regarding educational technology and **anxiety.**

	SD	D	U	A	SA
Working with educational technology makes me feel tense and uncomfortable.					
Educational technologies frustrate me.					
I have avoided the use of educational technologies because they are unfamiliar and somewhat intimidating to me.					
I have a lot of self confidence when it comes to working with educational technologies.					
I feel at ease when I am around educational technologies.					

13. Indicate your level of agreement regarding educational technology and **productivity.**

	SD	D	U	A	SA
The use of educational technology would increase my productivity					
The use of educational technology would help me learn.					
Knowing how to use educational technology is a worthwhile skill.					
Educational technologies will improve education.					

14. Indicate your level of agreement regarding educational technology and **gender**.

	SD	D	U	A	SA
I would trust a woman just as much as a man to figure out how to operate educational technology.					
I would be just as likely to ask a woman for help with educational technology as a man.					
In general, boys are better than girls at using educational technology.					

15. Indicate your level of agreement regarding educational technology and **productivity in the classroom.**

	SD	D	U	A	SA
Educational technology stimulates creativity in students.					
Educational technology would significantly improve the overall quality of my students' education.					
Educational technology motivates students.					
Educational technology should be used in agricultural education.					

Open-ended Questions:

16. Where does the funding for educational technology in your room come from?
17. What obstacles have you overcome in order to use educational technology in your classroom?
18. How do your students respond to your use of educational technology in the classroom?
19. What are some factors that influenced your decision to use educational technology in your classroom?
20. What are some issues and concerns regarding your use of educational technology in your classroom?

Appendix B. IRB Approval

PURDUE
UNIVERSITY

HUMAN RESEARCH PROTECTION PROGRAM
INSTITUTIONAL REVIEW BOARDS

To:	JERRY PETERS AGAD 220A
From:	RICHARD MATTES, Chair Social Science IRB
Date:	09/08/2010
Committee Action:	**Exemption Granted**
IRB Action Date:	09/07/2010
IRB Protocol #:	1009009627
Study Title:	The Integration and Use of Educational Technology in Indiana's Secondary Agriculture Classrooms

The Institutional Review Board (IRB) has reviewed the above-referenced protocol and has determined that it qualifies for exemption pursuant to Federal regulations 45 CFR 46.101(b) exempt category(1) .

If you wish to revise or amend the protocol, please submit a revision request to the IRB for consideration. Please contact our office if you have any questions.

We wish you good luck with your work. Please retain copy of this letter for your records.

Ernest C. Young Hall 10th Floor · 155 S. Grant St. · West Lafayette, IN 47907-2114 · (765) 494-5942 · Fax (765) 494-9911

Appendix C. Letters of Support and Participant Mailings

Request for Letter of Support

Dear Travis,

On Monday September 20, 2010 I will be distributing a survey via the Indiana Agricultural Education e-mail list as part of my research for my Master's Thesis. The title of the study is "The Integration and Use of Educational Technology in Indiana's Secondary Agricultural Classrooms." My committee, consisting of Dr. Jerry Peters (chair), Dr. Allen Talbert, and Dr. Levon Esters, and myself thought it would be appropriate for you, as the current president of the Indiana Association of Agricultural Educators, to send out a letter of support encouraging our colleagues to complete the survey.

The findings of this study will benefit Indiana Agricultural Education in many ways. Firstly, it will provide information to all of the stakeholders involved with Indiana Agricultural Education regarding exactly which technologies are being used in agriculture classrooms and how often it is being used. A formal study of this topic has never been conducted in Indiana. Also, in this study, data will be collected to understand what influences agriculture teachers in Indiana to use educational technologies in their classrooms. All of this data can then be used by Purdue teacher education and the Department of Education for future agriculture teacher training programs and workshops. Lastly, we hope that the findings of this study can show that Agricultural Education is keeping up with the rigorous demands of 21^{st} century educational standards by integrating technology in the agriculture classroom.

I would greatly appreciate it if you would send a letter of support to our colleagues via the IAAE e-mail list after the survey has been distributed. If you agree to the request I can craft an e-mail letter that you can edit and send to the teachers. If you have any questions please feel free to contact me.

Respectfully,

Ryan Wynkoop
Graduate Research Assistant
Youth Development and Agricultural Education

Letter of Support from the President of the Indiana Association of Agricultural Educators

Colleagues in Agricultural Education,

I am writing to encourage you to complete the survey that Purdue University will be distributing courtesy of the efforts of YDAE graduate student, Ryan Wynkoop. Ryan is a former agriculture student and FFA member at Kankakee Valley. He has been active in agricultural education and IAAE – Purdue during his undergraduate career. His survey would be an asset to our profession in assessing our current perceptions and uses of technology in the agriculture classroom.

You can be of the mindset that this is one more thing to do or you can be progressive and realize the impact the information from this survey could be used for technology grants and curriculum development for your classroom. I appreciate your continued time and efforts towards moving our profession forward.

Travis Scherer

President

Indiana Association of Agricultural Educators

Survey Pre-Notice

Dear (Participant first name) (Participant last name),

On **Wednesday September 22, 2010**, you will receive an e-mail invitation to participate in a survey entitled **"The Integration and Use of Educational Technology in Indiana's Secondary Agricultural Education Classrooms."** This is part of a research project for a Master's Thesis. The data provided by this survey will have numerous positive implications for the success of Agricultural Education in the state of Indiana.

The invitation will come in the form of a web link from this same e-mail address. The link will take you to a survey portal used by Purdue called Qualtrics. It might be necessary for you to contact your building's Information Technology department in case a web filter prevents you from accessing the survey.

Thank you in advance for your participation.

Respectfully,

Jerry L. Peters
Professor
Agricultural Education
Agricultural Administration, Room 220A
615 West State Street
West Lafayette, IN 47907-2053
Phone: (765) 494-8423 FAX: (765) 496-1152
peters@purdue.edu

Ryan Wynkoop
Graduate Research Assistant
Agricultural and Extension Education
Agricultural Administration, Room 221
615 West State Street
West Lafayette, IN 47907
Phone: (765) 494-8439
rwynkoop@purdue.edu

Initial Survey E-mail

Dear (Participant first name) (Participant last name),

You are invited to participate in a study titled "The Use and Integration of Educational Technology in Indiana's Secondary Agricultural Education Classrooms". The purpose of this study is to determine what educational technologies are currently being used in Indiana's agriculture classrooms and what factors influence the acquisition, integration, and use of technology in agriculture classrooms.

Participation in this survey is completely voluntary. The survey is online and should only take about 20-25 minutes to complete depending upon the number of courses you are teaching this semester. You can expect to see multiple-choice and Likert-scale type questions as well as short answer questions. You can stop the survey at anytime and resume by clicking the same link *as long as you use the same computer on which you initially began the survey*. Your personal information will not be recorded so the researcher cannot identify any of your answers.

The data gained from this survey will have implications at all levels of Agricultural Education in Indiana, from the students in your classroom to the students who will be prepared to become agriculture teachers in the future. Thank you in advance for your participation.

The survey can be found and completed at this link:

https://purdue.qualtrics.com/SE?SID=SV_8tOnYJi82tWNceU

Respectfully,

Jerry L. Peters
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