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STATUS OF INFORMATION TECHNOLOGY IN HIGH SCHOOL AGRISCIENCE CURRICULA IN MICHIGAN AND CALIFORNIA

By

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ABSTRACT

STATUS OF INFORMATION TECHNOLOGY IN HIGH SCHOOL AGRISCIENCE CURRICULA IN MICHIGAN AND CALIFORNIA

By

Matthew Charles Golzynski

This thesis research set out to answer the question of what are the knowledge, skill level, potential usefulness, and value of information technology for Michigan and California high school agriscience educators. A survey was distributed to agriscience educators in both Michigan and California. This survey identified the educators use and knowledge of information technology in the classroom. The results of the survey were analyzed using the SPSS statistical package. Descriptive statistics including means, standard deviations, and frequency distributions were used for demographic data and research objectives. Mean scores were compared between Michigan and California respondents using independent t-tests. Relationships between variables and the value placed on information technology were examined using Pearson Product Moment Correlation coefficient. The responses from both the Michigan and California respondents indicated a significant correlation between their perceived value of information technology with both their technology and software knowledge and skills.

DEDICATION

To my father, David Golzynski.
He always told me to strive towards my potential.

ACKNOWLEDGEMENTS

I would first like to thank my advisor Dr. Luke Reese for guiding me through this process, keeping me focused and reining me back in when I needed it. I would like to thank Dr. Arthur Parham here at California State University, Fresno for accepting the responsibility to be on my committee to finish this thesis at a distance. I would also like to thank the other member of my committee Dr. David Krueger, who has given me some insights and made me think more about this project. I also need to thank Dr. Constance Schneider for running my statistics and helping me understand what all those numbers meant.

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The support and encouragement that I received from my mother and step-father, Carol and Richard Perlick, as well as my brothers Jeff and Jon and my step-brother Allen have be much appreciated. To all my friends along the way, thank you for your support.

I also must thank my daughter Allie for her understanding, as much as a three year old has, during this long process of finishing. We didn't get to spend much time together, but we will now.

Most importantly, the person that makes me strive and attain more than I thought that I ever could, is my inspiration and the person that gave me more support than I deserved through this process is my beautiful wife Dr. Diane Golzynski. Without her, this project would never have finished.

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CHAPTER 1

INTRODUCTION

The Problem

When you look at the world of education today there has been a significant change from just five to ten years ago. There are a greater number of computers and other technological innovations that have made their way into the classrooms of the schools throughout the country. There also has been a change in the type of students that are sitting in the chairs in these classrooms. These students have a greater access to the information world around them and are completely involved in the world of technology (Tapscott, 1998). This new generation of student has been termed an "N-Gener" (Tapscott, 1998) for their use and understanding of the technology that is available to them at home, in school and virtually everywhere that they go.

To keep up with the ever changing demands of these students, educators must keep up-to-date with the burgeoning world of technology and determine how they can best use these technologies to help their students obtain knowledge. This can be a problem for some educators who have been in the classroom for a number of years. Possibly these educators do not have the time or the motivation to keep up-to-date and therefore are falling behind technologically and not reaching their students. There also is the possibility that the school districts in which these educators are working do not have the resources to make the technological updates that are necessary for the educators to keep up-to-date.

Agriscience educators do feel that there is a need for training when it comes to computers and their use in the classroom. The findings from Garton and Chung (1996) showed that teachers ranked the value of having computers in the classroom and some form of training on their use ranked sixth on their list of 50 in-service topics as a need for agriscience teachers. These findings almost mirrored those of an earlier study conducted by Birkenholtz and Harbstreit (1987) where the beginning agriscience educator's greatest need was in computer training. Seeing these needs, Kotrlik, Redmann, Harrison, and Handley (2000) did a study entitled *Information Technology Related Professional Development Needs of Louisiana Agriscience Teachers*. The Kotrlik study is the conceptual basis for this research project.

Problem Statement

Agriscience educators need to have a knowledge base for teaching their students what is to be expected from them in the future so that they will be able to succeed in what ever they decide to do after high school; whether it be going to work on the farm or other business or going off to college. Accomplishing this task is getting harder and harder with the technological innovations that are happening and the speed at which students are learning and expecting these innovations to be used in the classrooms.

Purpose of this Research

This research aims to answer the question of what are the knowledge, skill level, potential usefulness, and value of information technology to Michigan and California high school agriscience educators. An analysis of these answers in relation to independent variables will determine if a relationship exists. This will be accomplished by replicating the study that Kotrlik et al. (2000) performed in Louisiana. In replicating this study the researcher hopes to accomplish a greater understanding of where the agriscience education communities in Michigan and California are in relation to the information technology that is being used in today's classroom.

Research Objectives

The research objectives for this study are the same objectives as those of Kotrlik et al. (2000):

1. To determine the demographic characteristics (degrees held, age, gender, ethnicity, years teaching experience, school location [rural, urban or suburban], grade level, and participation in professional associations) of the selected subjects.
2. To determine the value of information technology as perceived by the agriscience educator.
3. To determine the general information technology knowledge and skill level possessed by the agriscience educator.

4. To determine the general software knowledge and skill level possessed by the agriscience educator.
5. To gain the educator's perception of the potential usefulness of information technology in program and instructional management.
6. To determine the availability of information technology to the agriscience educator.
7. To find out the source of the agriscience educators information technology training.
8. To find if a relationship exists between selected variables and the value placed on information technology by the agriscience educator.

Significance of the Study

Technological innovations are not going to stop just because teachers can not keep up with them. The same can be said of education. There seems to be a growing trend in wanting to get more things done in a shorter amount of time, and one of the ways to do this is with the use of technology. These eight research objectives will help determine where the field of agriscience education in Michigan and California needs to improve in information technology.

Definitions

Compressed Video: Computer-based technology that allows a teacher to instruct one or more classes at different locations –

	students and teacher can see and hear each other and interact live.
Information Technology:	All technology that is used to communicate information within our profession and to students. This includes the World Wide Web, Internet, satellite technologies, and computers.
Multimedia:	Computer-based applications that allow the user to see and hear different types of information using one screen and speakers (e.g., text, pictures, video, animation, sound, music).
Satellite Downlink:	A satellite dish that allows schools to receive televised transmissions broadcast from anywhere in the world and enables a school to view many programs that are not available via cable or regular television transmission.
Video Conferencing:	A method of conferencing in which people at different locations can see and hear one another, as well as communicate using different types of media equipment (e.g., computer, image viewer, slide projector).

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction

Computer technology is an ever-expanding presence in the lives of most people in the United States. This is especially true for children who are growing up in the 21st Century. Today's students in all likelihood have a computer in their home; at least one computer lab in their high school; and could quite possibly attend a college or university that requires incoming students to own a computer (Tapscott, 1998). When it comes to the video quality and graphic capabilities of today's computers, students would not believe the changes in computers from just five to ten years ago. Monochrome green or yellow characters on a black background and if someone was creative they could create an "image" using characters from their keyboards (Tapscott, 1998).

Tapscott (1998) identifies that most children today under 19 years old have been aware of technologically advanced electronic gadgets and devices for as long as they can remember. Twenty to thirty years ago the general public never thought that you could carry a computer around in your backpack that was faster and more powerful than most computers in use at the time. This general population is where the agriscience educators of today have been drawn. This discrepancy then causes a problem for the technology-challenged educator when the technologically literate child of today gets to high school (Tapscott, 1998). Stellwagen (1999) believes that the learning environment that the agriscience instructor has developed is at a distinct disadvantage when it comes to the use and knowledge of technology. The instructor has to try to teach to the students of today with a more fast paced multi-input class style using emerging technologies rather than the lecture/lab based class that has been used in the past. Agriscience instructors, in particular, seem to be behind in their knowledge of the newer technologies (Stellwagen, 1999). These technologies would include, but are not limited to, the Internet/World Wide Web, video conferencing systems, satellite downlinks, compressed video, and compact disc players (Kotrlik et al., 2000).

There is a great deal of controversy and many challenges that have arisen with the influx of people who want educators to move into the digital world. Educators from all disciplines must figure out what is the good information and what is the bad information that is now coming into their classrooms (Nobel, 1997, 1998a, 1998b, 1999). There are many who would argue that information technology is nothing more than a tool that is used to enhance teaching just like a book or any other peripheral instrument that is used by the instructor to get his or her point across to the students (Winsboro, 2002).

Information from the literature regarding the agriscience educators' use and knowledge of information technology can be divided into technological categories. These technological categories are: 1) Basic Computer Skills, 2) Computer Software, 3) Internet/World Wide Web and E-mail, 4) Satellite Distribution (Kotrlik et al., 2000), and 5) Interactive video (Swan & Brehmer, 1994).

Basic Computer Skills

Basic computer skills knowledge differs when comparing agriscience educators to their students. Educators use any method, such as role playing, field trips, videos, or guest speakers, so that they can to get their point across. Most agriscience educators feel that they have enough training and experience with traditional technologies like computers and basic word processing software but have little time to learn and use these technologies to their fullest capabilities (Trede & Miller, 1993).

One of the reasons for this basic skills difference is the fact that agriscience educators feel that they are, for the most part, novice computer users. Most of the instructors are only using the computers that they have available to them for one to three hours per week (Fletcher & Deeds, 1994). Educators must combine two or more information technologies together to help them make their classes more up to date. The educators' lack of knowledge, skill and acceptance are a limiting factor in allowing them to make the change from the traditional ways that they have been teaching to the technologically advanced ways that society deems necessary (McCaslin & Torres, 1992).

The lack of skill and knowledge do not follow a demographic pattern where older educators are less inclined to use the technologies than educators just entering the profession (Peasley & Henderson, 1992). The main reasons for a lack of technological skill and knowledge are: 1) there is a lack of funding at the local school level for many if not all technological upgrades (Trede & Miller, 1993; Swan & Brehmer, 1994; Alston, 2000), and 2) self directed learning on the part of the agriscience educators themselves is the main way that they receive training in new technologies and the time is just not there for these educators to learn all of the new technologies (Kotrlik et al., 2000).

Alston (2000) found that the basic computer and word-processing skills are prevalent with educators, but when it comes to using interactive video or web page design programs these teachers are not very knowledgeable. Even the simple skills of searching the Internet are a challenge (Kotrlik et al., 2000). There is a feeling among some in the agriscience field that educators are not being encouraged by their principals, superintendents, school boards, and state representatives to use computers in the classroom. There also is a lack-of-funding issue that goes right along with this lack of support and many feel if the educators had the support of their supervisors, the educators' acceptance and anxiety level about computers would decrease (Fletcher & Deeds, 1994).

Computer Software

According to Fletcher and Deeds (1994), when it comes to actually programming in a computer language such as BASIC, there is a great amount of anxiety that the agriscience educator feels because of the lack of educator training. Many feel that additional computer training courses need to be implemented into the teacher education programs at the college level to help in the understanding of the computer applications they can expect to encounter (Fletcher & Deeds, 1994). There also are many software titles, such as Microsoft Excel, PowerPoint, Word, etc., used in agriscience classrooms by both instructors and students that are used by many conferencing

different academic programs (Alston, 2000). tellite

of

Internet/World Wide Web and E-mail

Instructors, who are more computer lite

Internet is beneficial and should be used in th

percentage of their students use the Internet (Layfield, ~~1998). Lay~~

reports that a significant factor is the limited access to and support of the World Wide Web provided by the school districts.

When it comes to the use of e-mail the findings are even worse. The number of educators that use e-mail in their educational setting is basically non-existent and the use of e-mail by their students is contrary to this finding (Layfield, 1998). Access and support is a factor in these results. Layfield (1998) reports that the majority of student e-mail account use is for literature searches and not correspondence between individuals.

Satellite Distribution

Satellite distribution of educational material has been used in many curricula when a particular school or district has been unable to attract an educator for a specific subject matter (Pelton, 1991). Using this tool, schools have the opportunity to keep courses that may have been eliminated because of the lack of a teacher or limited student numbers to justify a full-time instructor. Many agriscience educators felt that they have no experience with newer technologies like satellite uplink/downlink distribution and video conferencing systems (Trede & Miller, 1993). When educators are exposed to satellite distribution, their benefits in professional development mirror the amount of learning that is gained by the student (Larson & Bruning, 1996). Satellite distribution does have a problem that is not easily overcome, especially when you compare it to its relatively close counterpart Interactive Video; there is no way to communicate with the satellite instructor and the student at the distant site. Larson and Bruning (1996) indicate that students had very few opportunities to interrupt and interact with the television teacher's presentation or be able to ask clarifying questions, as they do in their regular learning environments.

Interactive Video

There are several reasons that many agriscience programs and educators throughout the country do not make use of an interactive video system. Foremost is the significant cost that is assumed when programs decide to go into the interactive video world (Miller & Miller, 2000; Swan & Brehmer, 1994; and Alston, 2000). Miller and Miller (2000) found that even if a system is in place, educators still tend to not use the interactive system to teach their classes because of conflicts with course scheduling, coordinating with other agriscience programs, and training sessions on how to use the technology.

Agriscience Educators

Kotrlik et al. (2000) utilized these technology categories in a research project completed in 1998 with secondary agriscience educators in Louisiana. Objective one of the study found that the majority of respondents (58%) had a master's degree and none had doctoral degrees. Ninety-four percent of the respondents were white with an average age of 42 years old. The majority of the respondents taught in rural schools (81%) where over half (51%) were connected to the Internet (Kotrlik et al., 2000).

In objective two the respondents strongly agreed that information technology was an important aspect to agriscience education ($M \geq 4.5$). They agreed that all of the technology listed in the survey was important, and had a high educational value (M = 3.5-4.49) and should be available for use in the classroom ($M \geq 4.5$). When it came to the area of cost for the technology the respondents were undecided (M = 1.5-2.49) on the cost effectiveness of technology in the classroom (Kotrlik et al., 2000).

In objective three, the respondents rated themselves average (M = 2.5-3.49) in regards to their expertise of the information technologies. The first eight technologies listed in this section were at least a decade old and available to the majority of respondents in the study. When it came to the newer technologies, the last seven in the section, the respondents rated themselves as below average (M = 1.5-2.49) (Kotrlik et al., 2000)

The findings were somewhat the same for objective four. The respondents rated themselves as average (M = 2.5-3.49) in their expertise with basic computer software. With the newer software's (Web browsers, e-mail, FTP, etc.) the respondents rated themselves as below average (M = 1.5-2.49) (Kotrlik et al., 2000)

Objective five of the Kotrlik et al. (2000) study was to determine the usefulness of the information technology in the program and instructional management areas. The respondents found information technology to be moderately useful (M = 3.5-4.49).

The results for objective six also revealed that the majority of the respondents had access to a computer at home (51%) or at work (79%). The majority (84.5%) also had access to multimedia machines; mainly these computers were in the work setting (63.1%) (Kotrlik et al., 2000).

The results of objective seven revealed that the majority of respondents had received their information technology training in a self directed environment (69.8%). This was also true for the learning that they did in the last three years. Respondents (40.3%) reported that this learning was more self-directed in regards to information technology (Kotrlik et al., 2000).

Objective eight showed the relationship between selected variables and the value that was placed upon them from an information technology standard. The variable that had the highest relationship (r = 0.25) was between accessibility of computer technology and the value of information technology (Kotrlik et al., 2000)

Summary

In the Kotrlik et al. (2000) study, agriscience educators are ill prepared and undereducated when it comes to information technology in the classroom. Their results support this idea and indicate that more information technology training is needed to make agriscience educators more comfortable and competent with the use of these technologies in the classroom.

Computer technology changes approximately every eight years. Given this assumption and the five years since the Kotrlik et al. (2000) study, have their results changed in this time period? This study will replicate a modified version of the Kotrlik et al. (2000) study reflecting current technology options and advancements.

CHAPTER 3

METHODOLOGY

Introduction

The purpose of this research was to determine how high school agriscience educators in Michigan and California are keeping up with changing technologies. To complete this research project, the researcher replicated the project done by Kotrlik et al. (2000) in Louisiana. This project used a modified version of the survey instrument used for the Kotrlik research project. The modified survey (Appendix A) was updated to reflect changes in technology since the original survey was conducted. The survey was distributed to agriscience educators in both Michigan and California via the United States Postal Service. The current survey identified the educators use and knowledge of information technology in the classroom. The results of the survey were analyzed using descriptive statistics including means, standard deviations, and frequency distributions for demographic data and research objectives. Mean scores were compared between Michigan and California respondents using independent t-tests. Relationships between variables and the value placed on information technology were examined using Pearson Product Moment Correlation Coefficient. Since this project involved two different states and advisors on the project from two different universities, human subjects approval was obtained from the University Committee on Research involving Human Subjects at Michigan State University (Appendix B). This human subjects approval was given verbal acceptance and approval by the Committee on the Protection of Human Subjects at California State University, Fresno prior to beginning this research project.

Respondents

Respondents for this research project were high school agriscience educators in both Michigan and California. These respondents were identified by a list of names obtained from Michigan State University for respondents in Michigan and from the Internet website www.calaged.org for respondents from California. An equal number of subjects (n = 120) were selected randomly from each list. Each name from the two states was numbered and a random numbers list was generated using Microsoft Excel. When the first 120 corresponding names and numbers from the random numbers list were matched those were the names of the participants to be sent a survey. A separate random numbers list was generated for Michigan and California.

Survey Instrument

The survey instrument that was slightly modified was obtained from Kotrlik and colleagues. Reliability and content validity of the survey had been established prior to its use in the Louisiana research project. The instrument that was used for this research project is divided up into seven parts "A through G" as follows: Information Technology Values; Information Technology Knowledge and Skill; Software Applications Knowledge and Skill; Availability of Computer

Technology; Usefulness of Information Technology in Programs and Instructional Management; Information Technology Training Sources; and Demographic Characteristics. Selected definitions for terms used in the instrument were printed on the last page of the instrument and asterisks were placed throughout the survey directing respondents to this area. The specifics of each of these sections will be discussed in the following paragraphs. Each survey instrument was coded for either Michigan (M-XXX) or California (C-XXX) so that the data could be analyzed to separate the two different regions and to provide confidentiality to the respondents. The code number was also used to complete a reminder post card for non-respondents and then removed form the survey.

Part A, the Information Technology Values section, of the instrument used a Likert scale (Figure 1). This section consisted of four multi-part statements that determined how the respondents value information technology for themselves, their colleagues and their students. See Appendix A for the complete Part A.

1	Strongly Disagree
2	Disagree
3	Undecided
4	Agree
5	Strongly Agree

Figure 1. Part A Information Technology Values Survey Scale.

Part B, the Information Technology Knowledge and Skill section, of the instrument and used a modified Likert scale (Figure 2). This section measured the individual educator's knowledge and skill of information technology with eight individual statements and one multi-part statement with a space for them to add technological equipment that is not on the list. See Appendix A for the complete Part B.

1	I DON'T KNOW enough about this area to respond
2	My knowledge/skill in this area is BELOW AVERAGE.
3	My knowledge/skill in this area is AVERAGE.
4	My knowledge/skill in this area is ABOVE AVERAGE.
5	My knowledge/skill in this area qualifies me as an EXPERT.

Figure 2. Part B Information Technology Knowledge/Skill Survey Scale.

Part C, the Software Applications Knowledge and Skill section, of the instrument and used a modified Likert scale (Figure 3). This section measured the respondent's knowledge of computer programs and software. There were fifteen general areas of software and programs listed each having specific examples of the types of software that belong to these areas. See Appendix A for the complete Part C.

1	I DON'T KNOW enough about this area to respond
2	My knowledge/skill in this area is BELOW AVERAGE.
3	My knowledge/skill in this area is AVERAGE.
4	My knowledge/skill in this area is ABOVE AVERAGE.
5	My knowledge/skill in this area qualifies me as an EXPERT.

Figure 3. Part C Software Application Knowledge/Skill Survey Scale.

Part D, the Availability of Computer Technology section, had eight statements where the subjects placed an "X" in a particular column that describes the availability of computers to themselves and their students. Availability choices include DO NOT HAVE, HAVE NOW, PLAN TO ACQUIRE (Figure 4). The statements in this section consist of three multi-part statements and five individual statements. See Appendix A for the complete Part D.

	Availability		
Information Technology	Do Not Have Now	Have Now	Plan to Acquire

Figure 4. Part D Availability of Computer Technology Survey Scale.

Part E, the Usefulness of Information Technology in Program and Instructional Management, used a Likert scale (Figure 5). This section measured how the respondent feels about the potential usefulness of information technology in their program. This section consisted of ten task examples to clarify certain areas for the respondents. See Appendix A for the complete Part E.

1	Not Useful
2	Low Usefulness
3	Undecided
4	Moderately Useful
5	Highly Useful

Figure 5. Part E Usefulness of Information Technology in Program/Instruction Management Survey Scale.

Part F, the Information Technology Training Source section, of the instrument consisted of eight specific sources of training and one area where the respondent added any other source of training that he/she has used. The respondent circled either "YES" or "NO" if they have used this training source. If they respond "YES" they were asked to then tell whether or not they have had training from this source in the last three years (Figure 6). See Appendix A for the complete Part F.

Information Technology TRAINING SOURCE	Have you ever received training from this source? (circle your answer)	If Yes, have you had training from this SOURCE in the past three (3) years?

Figure 6. Part F Information Technology Training Sources Survey Scale.

Part G of the instrument was the Demographic Characteristics section. In this section the respondents were asked to provide their education level, gender, race, age, teaching experience, teaching level, number of professional workshops or conferences attended, and whether their current employer was involved in any projects that would connect their school to any other schools in their district. See Appendix A for the complete Part G.

Distribution of Survey Instrument

The distribution of the survey instrument was based upon techniques following Dillman's Tailored Design Method (2000) for survey research to collect the desired data for this project. The numbered research instrument, cover letter, and postage paid return envelope was mailed to the selected participants in

Michigan on April 9, 2003 and to participants in California on April 11, 2003 via the United States Postal Service (Appendix C). A postcard thank you/reminder mailing to all participants occurred on April 19, 2003 just over one week after the initial mailing (Appendix D). As surveys were returned, the code on the front page of the survey was used to cross names off of the participant list of those who returned the survey to protect these respondents from any further mailings. A second mailing of the instrument, cover letter (Appendix E), and a postage paid return envelope was sent on May 5, 2003, two weeks after the postcard reminder. This second complete mailing was sent to only those participants who had not responded to the first mailing or the reminder postcard. All returned survey envelopes were discarded to protect the confidentiality of the respondents returning the survey. The researcher limited the time that the responses will be accepted to five weeks and began analysis of the data received on approximately May 30, 2003 (Dillman, 2000).

Data Analysis

Survey responses were tracked on a log as they were returned. A data coding sheet was utilized to assist with accuracy for data entry. Data was entered, checked and verified to decrease error. Descriptive statistics including means, standard deviations, and frequency distributions were used for demographic data and research objectives. Mean scores were compared between Michigan and California respondents using independent t-tests. Relationships between variables and the value placed on information technology were examined using Pearson Product Moment Correlation Coefficient. Educators who did not answer certain sections or certain questions within a section of the survey were not discarded. Rather, those sections or questions in which they did not respond were not used in the data analysis. In these cases, a valid percent is reported. The survey instrument was retested for reliability of scales using Cronbach's alpha (See Appendix G). Results were considered significant at $p = 0.05$ (Rubin & Babbie, 2001).

In order to accomplish objectives seven and eight and to replicate the methodology of Kotrlik et al. (2000) it was necessary to assign professional development points to the answers given in Part F: Information Technology Training Sources. Each time a respondent indicated that they received training from one of the eight identified training sources, a point was given. Additional points were given to each respondent who indicated that the training had occurred in the past three years. As a result, each respondent could earn a maximum of 16 points. The available number of points was multiplied by the frequency in which the available number of points occurred. This total number of points was then used to establish a baseline for the Pearson Product Moment Correlation analysis. See Appendix F for the Working Table for Professional Development Points.

In the Kotrlik et al. (2000) survey, Cronbach's alpha (α) was used to determine the internal consistency coefficients for four sections of the instrument: Value of Information Technology (α= .87), General Information Technology Knowledge and Skill (α= .95), Software Specific knowledge and Skill (α= .94), and Usefulness of Information Technology in Program and Instructional Management (α= .93) (Kotrlik et al., 2000). For the Louisiana project the alpha level was set at a priori, α=0.05 (Kotrlik et al., 2000). The same alpha level was used for this study.

Post-hoc non-respondent reliability was determined by running a t-test comparison of the grand means between the early and late responders to the study. It was found that there was no significant difference in the grand mean comparison between the two groups from either state.

Data were first entered into a Microsoft XP Excel spreadsheet and then transferred to the statistical software. All statistical tests were performed using the computerized Statistical Package for Social Sciences, version 11.0.

CHAPTER 4

RESULTS

Introduction

This research addressed the following research objectives:

1. To determine the demographic characteristics (degrees held, age, gender, ethnicity, years teaching experience, school location [rural, urban or suburban], grade level, and participation in professional associations) of the selected subjects.
2. To determine the value of information technology as perceived by the agriscience educator.
3. To determine the general information technology knowledge and skill level possessed by the agriscience educator.
4. To determine the general software knowledge and skill level possessed by the agriscience educator.
5. To gain the educator's perception of the potential usefulness of information technology in program and instructional management.
6. To determine the availability of information technology to the agriscience educator.
7. To find out the source of the agriscience educators information technology training.
8. To find if a relationship exists between selected variables and the value placed on information technology by the agriscience educator.

A total of 240 surveys were distributed for the purposes of this research out of a possible 698 possible subjects from both Michigan (n=139) and California (n=559). An equal number of surveys were sent to agriscience teachers in both Michigan and California. The research had a 49.2% (*n*=118) response rate. The distribution of respondents from each state was 48.3% from Michigan (*n*=58) and 50% from California (*n*=60). There were two respondents from Michigan (2.0%) that did not fill out the survey because they both had stopped teaching agriscience and had moved on to other disciplines. In both cases the agriscience programs had been eliminated from their Michigan school districts. These two respondents' surveys were discarded and not used in the data analysis.

Objective One

In Michigan there were 33.3% (*n*=20) who had earned a Bachelor degree, 46.7% (*n*=28) with a Master degree, 13.3% (*n*=8) with Master +30 or Educational Specialist degree, and 1.7% (*n*=1) with both a PhD and other degrees. In California there were 63.3% (*n*=38) who had earned a Bachelor degree, 16.6% (*n*=10) with a Master degree, 20.0% (*n*=12) with Master +30 or Educational Specialist degree, and no one with either a PhD or other degrees.

In Michigan the distribution of the respondents was 53.3% (*n*=32) male and 43.3% (*n*=26) female. The ethnic makeup of the respondents was 95.0% (*n*=57) Caucasian and 1.7% (*n*=1) other. The average age of the respondents was 39.6 years (range=23-58) with an average of 12.9 years (range=1-34) in the classroom. There were two respondents (1.7%) that did not answer the question. In California the distribution of the respondents was 66.7% (*n*=40) male and 31.7% (*n*=19) female. The ethnic makeup of the respondents was 86.7% (*n*=52) Caucasian, 8.3% (*n*=5) Hispanic, and 5.0% (*n*=3) other. There were no respondents from either state that self reported their race being Black. The average age of the respondents was 41.2 years (range=25-61) with an average of 13.1 years (range=1-34) in the classroom.

The respondents in Michigan indicated that 65.0% (*n*=39) were teaching in rural schools while 6.7% (*n*=4) were teaching in urban schools and 25.0% (*n*=15) were teaching in suburban schools. Those that responded indicated that they had been to an average of 7.7 (range=1-25) professional development conferences/workshops in the past three years. The percentage of respondents who said that their school currently is connected to the other schools in their district was 60.0% (*n*=36). Those that said that they were involved in any project that would connect their school to the other schools in the district was 15.0% (*n*=9). The majority of the respondents, 75.0% (*n*=45), indicated that they taught only at the high school level while 3.3% (*n*=2) taught at a middle school/junior high school level and 15.0% (*n*=9) taught at both the middle/junior high and high school levels. In California the respondents indicated that 50.0% (*n*=30) were teaching in rural schools while 25.0% (*n*=15) were teaching in urban schools and 25.0% (*n*=15) were teaching in suburban schools. The respondents indicated that they had been to an average of 7.1 (range=2-20) professional development conferences/workshops in the past three years. The percentage of respondents who said that their school currently is connected to the other schools in their district was 53.3% (n=32). Those that said that they were involved in any project that would connect their school to the other schools in the district was 10.0% (n=6). The majority of the respondents, 98.3% (n=59), indicated that they taught only at the high school level with 1.7% (n=1) teaching at both the middle/junior high and high school levels. Table 1 summarizes demographic characteristics.

Table 1. Summary of Demographic Information.

		Michigan		California	
Category	**Options**	***n***	**%**	***n***	**%**
Highest Degree Held	Bachelor's	20	34.5	38	63.3
	Master's	28	48.3	10	16.7
	Master's +30	8	13.8	12	20.0
	PhD	1	1.7	0	0.0
	Other	1	1.7	0	0.0
Gender	Male	32	55.2	40	66.7
	Female	26	44.8	19	31.7
	No Response			1	1.6
Race	Caucasian	57	98.3	52	86.7
	Black	0	0.0	0	0.0
	Hispanic	0	0.0	5	8.3
	Other	1	1.7	3	5.0
Age (years)		M=39.6	R=23-58	M=41.2	R=25-61
Years Teaching Experience		M=12.9	R=1-34	M=13.1	R=1-34
The area where your school is located	Rural	39	67.2	30	50.0
	Urban	4	6.9	15	25.0
	Suburban	15	25.9	15	25.0
How many professional development conferences/workshops have you attended in the past three years?		M=7.7	R=1-25	M=7.1	R=2-20

Table 1 (cont'd)

Is your school currently connected or involved in any project that would connect your school to the other schools in your district?	Currently Connected	36	62.1	32	53.3
	Involved in Project	9	15.5	6	10.0
	No Response	13	22.4	22	36.7
Do you teach	High school students only?	45	77.7	59	98.3
	Middle school/junior high school students only?	2	3.4	0	0.0
	Both high school and middle school/junior high school students?	9	15.5	1	1.7
	Other	0	0.0	0	0.0
	No Response	2	3.4	0	0.0

Objective Two

Objective two was to determine the value of information technology as perceived by the agriscience educator. The respondents rated each statement on a scale where 1 = Strongly Disagree ($M \leq 1.5$), 2 = Disagree (M=1.5-2.49), 3 = Undecided (M=2.5-3.49), 4 = Agree (M=3.5-4.49), and 5 = Strongly Agree ($M \geq$ 4.5) (Appendix A). The data revealed that respondents strongly agreed on the value of knowing how to use the internet in both Michigan (M=4.93) and California (M=4.88). It also revealed that the respondents strongly agreed on the value of knowing how to use a computer in Michigan (M=4.93) and California (M=4.85).

Statement three in this section was divided up into 11 different areas. The Michigan respondents data revealed that they strongly agreed on the value of programs having computers for teachers to use (*M*=4.97), an Internet connection for teachers (*M*=4.91), having computers for students to use (*M*=4.72), and having an Internet connection for students to use (*M*=4.71). The data revealed that the respondents from Michigan agreed with the value of having multimedia computers for teachers (*M*=4.47), having multimedia computers for students (*M*=4.16), and having DVD players for teachers (*M*=3.72). Michigan respondents data revealed that they were undecided about the availability of satellite downlink capabilities for teachers (*M*=3.48), having video conferencing capabilities for teachers (*M*=3.50), having a compressed video system capability for teachers (*M*=3.45), and having student access to DVD players (*M*=2.96). In California, the respondents data revealed that they strongly agreed on the value of programs having computers for teachers to use (*M*=4.92), having an Internet connection for teachers (*M*=4.92), having computers for students to use (*M*=4.75), having an Internet connection for students to use (*M*=4.72) and having multimedia computers for teachers (*M*=4.56). The data revealed that the respondents from California agreed with the value of having multimedia computers for students (*M*=4.25), having DVD players for teachers (*M*=3.94), and having the availability of satellite downlink capabilities for teachers (*M*=3.57). The data from the California respondents revealed that they were undecided about having video conferencing capabilities for teachers (*M*=3.43), having compressed video capabilities for teachers (*M*=3.42), and having student access to DVD players (*M*=3.12).

Statement four of Part A was divided into 20 different areas that the respondents were to rate. The data of the Michigan respondents revealed that they strongly agreed with the value that Information Technology helps individuals apply knowledge (*M*=4.58). The Michigan respondents agreed with the value of Information Technology as a useful instructional tool (*M*=4.48), that it can improve the quality of programs (*M*=4.38), that it is essential to prepare students for workplace (*M*=4.31), that it allows teachers the flexibility in planning their instruction (*M*=4.04), that Information Technology adds interest in instruction (*M*=4.46), is important in instruction (*M*=4.05), encourages teacher innovation (*M*=4.00), enhances student learning (*M*=4.09), is necessary for the success of students in the workplace (*M*=4.10), that it can improve teacher effectiveness (*M*=4.23), and that it promotes self-directed learning (*M*=4.03). The Michigan data revealed that the respondents were undecided (*M*=2.79) on whether Information Technology creates a problem for the teacher. In the section with the negatively worded statements the data revealed that the Michigan respondents disagreed that Information Technology was too expensive to be cost effective (*M*=2.35), that it makes learning too mechanical (*M*=2.18), that it will limit student-teacher interaction (*M*=2.14), that it causes more problems than it solves (*M*=1.99), that Information Technology will isolate teachers from one another (*M*=2.20), and that it has an adverse effect on teachers (*M*=2.11). The data revealed that the Michigan respondents strongly disagreed that Information

Technology has little value in agriscience education (*M*=1.46). The data of the California respondents revealed that they agreed with the value that Information Technology helps individuals apply knowledge (*M*=4.43), that Information Technology was a useful instructional tool (*M*=4.45), that it can improve the quality of programs (*M*=4.43), that it is essential to prepare students for the workplace (*M*=4.32), that Information Technology allows teachers the flexibility in planning their instruction (*M*=4.22), that it adds interest in instruction (*M*=4.20), is important in instruction (*M*=4.18), encourages teacher innovation (*M*=4.18), enhances student learning (*M*=4.17), that it is necessary for the success of students in the workplace (*M*=4.05), that Information Technology can improve teacher effectiveness (*M*=4.07), and that it promotes self-directed learning (*M*=3.95). The data revealed that California respondents were undecided (*M*=2.58) on whether Information Technology creates a problem for the teacher. The California data in the section with the negatively worded statements revealed that the respondents disagreed that Information Technology was too expensive to be cost effective (*M*=2.27), that it makes learning too mechanical (*M*=2.23), that it will limit student-teacher interaction (*M*=2.08), that it causes more problems than it solves (*M*=2.03), that Information Technology will isolate teachers from one another (*M*=2.02), that it has an adverse effect on teachers (*M*=1.83), and that Information Technology has little value in agriscience education (*M*=1.57). In Part A: Information Technology Values there were no significant differences between the responses from Michigan and California. Table 2 shows a complete mean comparison of Part A: Information Technology Values.

Table 2. Mean Comparison of Value of Information Technology as Perceived by Michigan and California High School Agriscience Teachers*.

Value of Information Technology	**Michigan**			**California**			
	n	***M***	***SD***	***n***	***M***	***SD***	***t***
Teachers should know how to use the Internet	58	4.93	0.32	60	4.88	0.32	-0.809
Teachers should know how to use computers	58	4.93	0.26	60	4.85	0.36	-1.413
Programs should have the following technology available for use in instruction							
Computers for teachers	58	4.97	0.18	60	4.92	0.28	-1.127
Internet connections for teachers	58	4.91	0.28	60	4.92	0.28	0.056
Computers for students	58	4.72	0.49	60	4.75	0.51	0.282
Internet connections for students	58	4.71	0.56	60	4.72	0.45	0.104
Multimedia computers for teachers	58	4.47	0.71	59	4.56	0.70	0.708
Multimedia computers for students	57	4.16	0.82	60	4.25	0.91	0.573
DVD players for teachers	58	3.72	1.01	60	3.94	1.07	1.135
Satellite downlink capability for teachers	58	3.48	0.98	60	3.57	1.05	0.449
Video conferencing capability for teachers	58	3.50	1.03	60	3.43	1.08	-0.343
Compressed video capability for teachers	58	3.45	1.06	60	3.42	1.11	-0.158
DVD players for students	56	2.96	1.11	60	3.12	1.22	0.701

Table 2 (cont'd)

Value of Information Technology	**Michigan**			**California**			
	n	***M***	***SD***	***n***	***M***	***SD***	***t***
Information Technology							
Helps individuals apply knowledge	55	4.58	0.57	60	4.43	0.70	-1.245
Is a useful instructional tool	56	4.48	0.54	60	4.45	0.62	-0.296
Can improve the quality of programs	56	4.38	0.70	60	4.43	0.77	0.426
Adds interest in instruction	56	4.46	0.57	59	4.20	0.81	-1.996
Is essential to prepare students for the workplace	56	4.31	0.80	60	4.32	0.87	0.027
Can improve teacher effectiveness	56	4.23	0.74	60	4.07	0.80	-1.156
Allows teachers flexibility in planning their instruction	56	4.04	0.63	60	4.22	0.64	1.532
Enhances student learning	56	4.09	0.67	60	4.17	0.69	0.612
Is important in instruction	56	4.05	0.77	60	4.18	0.89	0.835
Encourages teacher innovation	56	4.00	0.76	60	4.18	0.75	1.306
Is necessary for the success of students in the workplace	56	4.10	0.95	60	4.05	0.89	-0.281
Promotes self-directed learning	56	4.03	0.69	60	3.95	0.83	-0.542

Table 2 (cont'd)

Value of Information Technology	**Michigan**			**California**			
	n	***M***	***SD***	***n***	***M***	***SD***	***t***
Creates problems for the teacher	56	2.79	1.26	60	2.58	1.28	-0.857
Is too expensive to be cost effective	56	2.35	0.96	60	2.27	1.13	-0.463
Makes learning too mechanical	56	2.18	0.79	60	2.23	0.95	0.340
Will limit student-teacher interaction	56	2.14	0.94	60	2.08	0.98	-0.334
Will isolate teachers from one another	56	2.20	0.86	60	2.02	0.91	-1.092
Causes more problems than it solves	56	1.99	0.81	60	2.03	0.99	0.252
Has an adverse effect on teachers	56	2.11	1.09	60	1.83	0.91	-1.466
Has little value in agriscience education	56	1.46	0.71	60	1.57	0.95	0.661

*$\alpha \leq 0.05$

<u>Objective Three</u>

Objective three was to determine the general information technology knowledge and skill level possessed by the agriscience educator. The respondents rated each statement with 1 = I DON'T KNOW enough about this area to respond ($M \leq 1.49$), 2 = my knowledge/skill in this area is BELOW AVERAGE (M=1.5-2.49), 3 = my knowledge/skill in this area is AVERAGE (M=2.5-3.49), 4 = my knowledge/skill in this area is ABOVE AVERAGE (M=3.5-4.49), and 5 = my knowledge/skill in this area qualifies me as an EXPERT

($M \geq 4.5$) (Appendix A). The data of the Michigan respondents revealed that they felt that their knowledge and skills were above average when it came to knowing how to operate a computer (M=3.77), locating computer-based teaching materials for use in instruction (M=3.74), integrating computer-based teaching materials into instruction (M=3.57), knowing the basic components of a computer (M=3.57), and evaluating software for instruction (M=3.57). Michigan respondents data also revealed that they felt they were average in their knowledge and skill in selecting information technology that fits program needs (M=3.42), knowing how to prepare students to use information technology (M=3.32), and evaluating software for program management (M=3.30). Statement nine of this section was divided into seven parts. The Michigan respondents data revealed that they felt that their knowledge and skill was above average when it came to using the Internet E-mail (M=4.31), the World Wide Web (M=4.22), and DVD players (M=3.57). The data showed that they were average in the knowledge and skills when using multimedia computers (M=2.91). The data also showed that the Michigan respondents felt that their knowledge and skills were below average when it came to using video conferencing equipment (M=2.12), satellite downlink technologies (M=1.95), and compressed video technologies (M=1.84).

The data of the California respondents revealed that they felt that their knowledge and skills were above average when it came to knowing how to operate a computer (M=3.87), locating computer-based teaching materials for use in instruction (M=3.77), integrating computer-based teaching materials into instruction (*M*=3.68), knowing the basic components of a computer (*M*=3.65), and selecting information technology that fits program needs (*M*=3.59). California respondents data also revealed that they felt that they were average in their knowledge and skill in evaluating software for instruction (*M*=3.47), knowing how to prepare students to use information technology (*M*=3.47), and evaluating software for program management (*M*=3.32). In statement nine of this section the California respondents data revealed that they felt that their knowledge and skills were above average when it came to using the Internet E-mail (*M*=4.17), the World Wide Web (*M*=4.16), and DVD players (*M*=3.67). The California data showed that the respondents were average in the knowledge and skills when using multimedia computers (*M*=2.97). The California data showed that the respondents felt that their knowledge and skills were below average when it came to using video conferencing equipment (*M*=2.10), satellite downlink technologies (*M*=2.02), and compressed video technologies (*M*=2.00). There were no significant differences in the responses from the Michigan and California respondents in the Information Technology Knowledge/skill section of the survey. Table 3 is a complete mean comparison of Part B: Information Technology Knowledge/Skills.

Objective Four

Objective four was to determine the general software knowledge and skill level possessed by the agriscience educator. The respondents rated each statement with 1 = I DON'T KNOW enough about this area to respond, 2 = my

Table 3. Mean Comparison of Michigan and California High School Agriscience Educators' Report of Information Technology and Skills*.

Technology Knowledge and Skills	**Michigan**			**California**			
	n	***M***	***SD***	***n***	***M***	***SD***	***t***
Know how to operate a computer	58	3.77	0.62	60	3.87	0.70	0.814
Can locate computer-based teaching materials for use in instruction	58	3.74	0.76	60	3.77	0.83	0.172
Can integrate computer-based teaching materials into instruction	58	3.57	0.82	60	3.68	0.87	0.730
Know the basic components of a computer	58	3.57	0.92	60	3.65	0.88	0.489
Know how to select information technology that fits program needs	56	3.42	0.85	55	3.59	0.85	1.064
Can evaluate software for instruction	58	3.57	0.92	60	3.47	0.97	0.063
Know how to prepare students to use information technology	57	3.32	0.76	56	3.47	0.71	1.075
Can evaluate software for program management	58	3.30	0.88	60	3.32	1.00	0.086
Know how to use							
Internet E-mail	58	4.31	0.78	58	4.17	0.82	-0.930
World Wide Web	58	4.22	0.75	58	4.16	0.81	-0.475
DVD players	58	3.57	1.03	58	3.67	1.05	0.536
Multimedia computers	58	2.91	1.19	58	2.97	1.11	0.242
Video Conferencing	58	2.12	1.09	58	2.10	1.00	-0.088

Table 3 (cont'd)

Technology Knowledge and Skills	**Michigan**			**California**			
	n	***M***	***SD***	***n***	***M***	***SD***	***t***
Satellite downlink technologies	58	1.95	1.05	58	2.02	1.07	0.351
Compressed video	58	1.84	0.99	58	2.00	1.08	0.809

$*\alpha \leq 0.05$

knowledge/skill in this area is BELOW AVERAGE, 3 = my knowledge/skill in this area is AVERAGE, 4 = my knowledge/skill in this area is ABOVE AVERAGE, and 5 = my knowledge/skill in this area qualifies me as an EXPERT (Appendix A). The data from the Michigan respondents revealed that they felt their software knowledge and skill was above average when it came to word processing software (M=3.93), Internet E-mail software (M=3.94), World Wide Web browsers (M=3.92), and grade book software (M=3.54). The Michigan respondents felt that their knowledge and skill was average when it came to using presentation software (M=3.40), spreadsheet software (M=3.13), operating systems (M=3.43), graphics software (M=3.00), desktop publishing software (M=2.94), database software (M=2.39), instructional software (M=2.79), and desktop utility software (M=2.68). The data revealed that the Michigan respondents were below average in their knowledge and skill in lesson planning software (M=1.97), World Wide Web page creator software (M=2.33), and file transfer software to and from other computers using a modem or a local area network (LAN) (M=2.22).

The California respondents data revealed that they felt their software knowledge and skill was above average when it came to word processing software (*M*=4.10), Internet E-mail software (*M*=3.93), World Wide Web browsers (*M*=3.90), grade book software (*M*=3.59), and spreadsheet software (*M*=3.67). The California respondents felt that their knowledge and skill was average when it came to using presentation software (*M*=3.45), operating systems (*M*=3.13), graphics software (*M*=3.13), desktop publishing software (*M*=3.13), database software (*M*=3.09), instructional software (*M*=2.93), and desktop utility software (*M*=2.88). The California data revealed that the respondents were below average in their knowledge and skill in lesson planning software (*M*=2.40), World Wide Web page creator software (*M*=2.33), and file transfer software (*M*=2.33). Table 4 is a complete mean comparison of Part C: Software Applications Knowledge/Skill. There were significant differences between the California and Michigan respondents' rating of their software knowledge and skills in three areas. For skills in using spreadsheets, California respondents rated their skills significantly higher (*M*=3.67; *SD*=1.00) than the Michigan respondents (*M*=3.13; *SD*=0.99) at *p*=0.01. In their knowledge and skills in the use of database software California respondents also rated their skills significantly higher (*M*=3.09; *SD*=1.11) than their Michigan counterparts (*M*=2.39; *SD*=0.94) at *p*=0.05. This also was true when it came to the knowledge and skill in using lesson planning software. California respondents rated their skills higher (*M*=2.40; *SD*=1.24) than the skills of the Michigan respondents (*M*=1.97; *SD*=1.08) at *p*=0.05.

Table 4. Mean Comparison of Michigan and California High School Agriscience Educators' Perception of Software Specific Knowledge and Skills*.

Software Specific Knowledge and Skills	**Michigan**			**California**			
	n	***M***	***SD***	***n***	***M***	***SD***	***t***
Word Processor	57	3.93	0.84	60	4.10	0.86	1.084
Internet E-mail	57	3.94	0.87	60	3.93	0.88	-0.033
World Wide Web Browser	58	3.92	0.76	60	3.90	0.84	-0.152
Grade Book	57	3.54	1.24	60	3.59	1.09	0.222
Presentation Software	58	3.40	1.01	60	3.45	1.08	0.277
Spreadsheet	58	3.13	0.99	60	3.67	1.00	2.936*
Operating System	58	3.43	0.98	60	3.13	1.02	-1.619
Graphics	58	3.00	0.96	60	3.13	1.02	0.732
Desktop Publishing	58	2.94	1.12	60	3.13	1.14	0.890
Database	57	2.39	0.94	58	3.09	1.11	3.641*
Instructional Software	58	2.79	1.12	60	2.93	1.24	0.711
Utilities	58	2.68	0.99	60	2.88	1.02	1.046
World Wide Web Page Creator	58	2.33	1.23	60	2.33	0.97	0.028
File Transfer to and from other computers using a modem or LAN	58	2.22	1.20	60	2.33	0.97	0.543
Lesson Planning	58	1.97	1.08	60	2.40	1.24	2.037*

*$\alpha \leq 0.05$

Objective Five

Objective five was to gain the educator's perception of the potential usefulness of information technology in program and instructional management. The respondents rated each statement on a scale where 1 = Not Useful, 2 = Low Usefulness, 3 = Undecided, 4 = Moderately Useful, and 5 = Highly Useful (Appendix A). The data from the Michigan respondents revealed that all of the categories in this section were moderately useful in instructional management

(*M*=4.40), in program planning, development and evaluation (*M*=4.05), in student vocational organizations (*M*=4.06), in instructional planning (*M*=3.96), in professional role and development (*M*=4.02), in instructional execution (*M*=3.88), in the coordination of cooperative programs (*M*=3.64), with student guidance and career development (*M*=3.95), school community relations (*M*=3.87), and with instructional evaluation (*M*=3.81).

The California respondents data also revealed that all of the categories in this section were moderately useful in instructional management (*M*=4.35), in program planning, development and evaluation (*M*=4.23), in student vocational organizations (*M*=4.20), in instructional planning (*M*=4.20), in professional role and development (*M*=4.07), in instructional execution (*M*=3.93), in the coordination of cooperative programs (*M*=3.92), with student guidance and career development (*M*=3.88), school community relations (*M*=3.82), and with instructional evaluation (*M*=3.78). There were no significant differences in the responses from the Michigan and California respondents in the Usefulness of Information Technology in Program/Instructional Management section of the survey. Table 5 is a complete mean comparison of Part E: Usefulness of Information Technology in Program/Instructional Management.

Objective Six

Objective six was to determine the availability of information technology to the agriscience educator (Appendix A). In question one of the section, the

Table 5. Mean Comparison of Michigan and California Agriscience Educators' Report of Usefulness of Information Technology in Program and Instructional Management*.

Usefulness of Information Technology	**Michigan**			**California**			
	n	***M***	***SD***	***n***	***M***	***SD***	***t***
Instructional Management	57	4.40	0.86	60	4.35	0.73	-0.362
Program Planning, Development & Evaluation	57	4.05	0.85	60	4.23	0.85	1.127
Student Vocational Organizations	57	4.06	0.91	60	4.20	0.71	0.924
Instructional Planning	57	3.96	0.96	60	4.20	0.78	1.457
Professional Role and Development	57	4.02	0.81	60	4.07	0.90	0.309
Instructional Execution	57	3.88	0.97	60	3.93	0.80	0.342
Coordination of Cooperative Programs	57	3.64	0.93	59	3.92	0.92	1.601
Student Guidance and Career Development	57	3.95	0.84	60	3.88	0.90	-0.504
School Community Relations	57	3.87	0.95	60	3.82	0.91	-0.301
Instructional Evaluation	57	3.81	0.93	59	3.78	0.87	-0.163

*$\alpha \leq 0.05$

percentage of Michigan respondents who now have a computer available with World Wide Web access at home was 93%, who do not have World Wide Web access was 5% and those who plan to a acquire access was 2%. Those respondents who had Internet E-mail access was 93%, who did not have access was 5% and those who plan to acquire access was 2%. Michigan respondents whose home computer had multimedia capabilities was 81%, who did not have the capabilities was 18% and those who planned to acquire a computer with these capabilities was 2%. The percentage of Michigan respondents who now have a computer available with World Wide Web access in their office or classroom was 98%, who do not have World Wide Web access was 2% and those who plan to a acquire access was 0%. Those respondents who had Internet E-mail access was 98%, who did not have access was 2% and those who plan to acquire access was 0%. Michigan respondents whose work computer had multimedia capabilities was 86%, who did not have the capabilities was 11% and those who planned to acquire a computer with these capabilities was 3%. The percentage of Michigan respondents who now have a computer available with World Wide Web access in a computer lab was 78%, who do not have World Wide Web access was 16% and those who plan to acquire access was 2%. Those respondents who had Internet E-mail access was 77%, who did not have access was 21% and those who plan to acquire access was 2%. Michigan respondents whose computer lab computers had multimedia capabilities was 79%, who did not have the capabilities was 18% and those who planned to acquire a computer with these capabilities was 4%.

The percentage of Michigan respondents that had multimedia computers in their schools currently was 88%, those who did not have was 11% and those that planned to acquire the technology was 2%. There were 64% of Michigan respondents who currently had a DVD player in their school and 36% who did not have a DVD player and 0% planned to acquire. When it came to satellite downlink technologies in their school, 42% had the technology currently, 53% did not have the technology, and 2% were planning on acquiring the technology. In Michigan 40% of the respondents stated that they had a compressed video system currently in their school, 60% said that they did not have such a system, 0% planed to acquire a system. There were 46% of Michigan respondents who currently have video conferencing systems in their schools while 52% said that they do not have these systems and 2% plan to acquire a video conferencing system.

The percentage of California respondents who now have a computer available with World Wide Web access at home was 83%, who do not have World Wide Web access was 14% and those who plan to a acquire access was 3%. Those respondents who had Internet E-mail access was 81%, who did not have access was 14% and those who plan to acquire access was 5%. The respondents from California whose home computer had multimedia capabilities was 67%, who did not have the capabilities was 24% and those who planned to acquire a computer with these capabilities was 7%. The percentage of California respondents who now have a computer available with World Wide Web access in their office or classroom was 95%, who do not have World Wide Web access was 3% and those who plan to a acquire access was 2%. Those California respondents who had Internet E-mail access was 97%, who did not have access was 2% and those who plan to acquire access was 2%. California respondents whose work computer had multimedia capabilities was 81%, who did not have the capabilities was 13% and those who planned to acquire a computer with these capabilities was 5%. The percentage of California respondents who now have a computer available with World Wide Web access in a computer lab was 64%, who do not have World Wide Web access was 26% and those who plan to acquire access was 10%. Those respondents who had Internet E-mail access was 60%, who did not have access was 31% and those who plan to acquire access was 9%. California respondents whose computer lab computers had multimedia capabilities was 59%, who did not have the capabilities was 35% and those who planned to acquire a computer with these capabilities was 7%.

The percentage of California respondents that had multimedia computers in their schools currently was 78%, those who did not have was 17% and those that planned to acquire the technology was 5%. There were 52% of California respondents who currently had a DVD player in their school, 38% who did not have a DVD player and 10% who planned to acquire a DVD player. The percentage of California respondents who currently had satellite downlink technologies in their school was 19%, 74% did not have the technology, and 7% were planning on acquiring the technology. In California, 14% of the respondents stated that they had a compressed video system currently in their school, 83% said that they did not have such a system, 4% planed to acquire a system. There were 13% of California respondents who currently have video conferencing systems in their schools while 80% said that they do not have these systems and 7% plan to acquire a video conferencing system. Table 6 is the complete frequency distribution for Part D: Availability of Computer Technology.

Objective Seven

Objective seven was to determine the source of the agriscience educator's information technology training (Appendix A). The percentage of the Michigan respondents who reported that their information technology training was self-directed was 88% and of those 92% had received training from this source in the last three years. School districts or state sponsored in-service training accounted for 91% of the technology training and 88% reported participating in the last three years. Michigan respondents reported that 84% of them had received technology training at a professional conference and 86% had received technology training from this source in the last three years. Of those reporting, 76% of the Michigan respondents had received training from a college course and 57% had received this training in the last three years. Those receiving technology training from a written source reported at 70% while 87% of those had done so in the past three years. Michigan respondents reported that 62% had received technology training from a college workshop and 72% said that this training had occurred in the past three years. The percentage of Michigan respondents who reported receiving training from an industry workshop was 29% and 88% had had received training in the last three years. Those receiving technology training from suppliers reported at 27% while 67% had received this training in the past three years.

The percentage of the California respondents who reported that their information technology training was self-directed was 87% and of those 98% had received training from this source in the last three years. School districts or state

Table 1. Availability of Computer Technology as Reported by California and Michigan High School Agriscience Teachers.

	California						Michigan					
	Have Now		Don't Have		Plan to Get		Have Now		Don't Have		Plan to Get	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Computer at home with...												
World Wide Web access	53	93.0	3	5.0	1	2.0	48	83.0	8	14.0	2	3.0
Internet E-mail	53	93.0	3	5.0	1	2.0	47	81.0	8	14.0	3	5.0
Multimedia capabilities	46	81.0	10	18.0	1	2.0	39	67.0	14	24.0	5	7.0
Computer available in office or classroom with...												
World Wide Web access	56	98.0	1	2.0	0	0.0	55	95.0	2	3.0	1	2.0
Internet E-mail	56	98.0	1	2.0	0	0.0	56	97.0	1	2.0	1	2.0
Multimedia capabilities	49	86.0	6	11.0	2	3.0	47	81.0	8	13.0	3	5.0
Computer lab in department with...												
World Wide Web access	46	78.0	9	16.0	1	2.0	37	64.0	15	26.0	6	10.0
Internet E-mail	43	77.0	12	21.0	1	2.0	35	60.0	18	31.0	5	9.0
Multimedia capabilities	44	79.0	10	18.0	2	4.0	34	59.0	20	35.0	4	7.0
Multimedia computers in school	50	88.0	6	11.0	1	2.0	45	78.0	10	17.0	3	5.0
DVD players in school	36	64.0	20	36.0	0	0.0	30	52.0	22	38.0	6	10.0
Satellite downlink technologies in school	23	42.0	31	53.0	1	2.0	11	19.0	42	74.0	4	7.0
Compressed video in school	22	40.0	33	60.0	0	0.0	8	14.0	47	83.0	2	4.0
Video conferencing in school	26	46.0	29	52.0	1	2.0	7	13.0	45	80.0	4	7.0

sponsored in-service training accounted for 85% of the technology training and 92% reported of participating in the last three years. California respondents reported that 46% of them had received technology training at a professional conference and 96% had received technology training from this source in the last three years. Of those reporting, 76% of the California respondents had received training from a college course and 49% had received this training in the last three years. Those receiving technology training from a written source reported at 71% while 93% of those had done so in the past three years. California respondents reported that 75% had received technology training from a college workshop and 79% said that this training had occurred in the past three years. The percentage of California respondents who reported receiving training from an industry workshop was 36% and 76% had received training in the last three years. Those receiving technology training from suppliers reported at 27% while 72% had received this training in the past three years. Table 7 is a complete report on Part F: Information Technology Training Sources.

Objective Eight

Objective eight was to determine if a relationship exists between selected variables and the value placed on information technology by the agriscience educator. Table 8 reports the Pearson Product Moment Correlation coefficients along with the levels of significance and the number of respondents used for each correlation analysis. The correlations were interpreted using the scale developed by Davis (1971) where 0.01-0.09= negligible correlation, 0.10-0.29=

Table 7. Self-Reported Information Technology Training Received within the Past Three Years.

	Michigan				California			
	Attended		Within Past 3 Years		Attended		Within Past 3 Years	
Training Source	*n*	%	*n*	%	*n*	%	*n*	%
Self-Directed	49	88.0	43	92.0	52	87.0	48	98.0
School District/State	51	91.0	44	88.0	50	85.0	44	92.0
Professional Conference	46	84.0	38	86.0	50	46.0	46	96.0
College	42	76.0	24	57.0	45	76.0	22	49.0
Written Materials	39	70.0	32	87.0	42	71.0	37	93.0
College Workshop	34	62.0	23	72.0	44	75.0	34	79.0
Industry Workshop	16	29.0	14	88.0	21	36.0	16	76.0
Suppliers	15	27.0	10	67.0	13	72.0	6	46.0

low correlation, 0.30-0.49= moderate correlation, 0.50-0.69= substantial correlation, and ≥0.70= very strong correlation.

There was a positive moderate correlation (*r*=0.40) between the perceived value of information technology and the Technology Knowledge/Skills Scale for the Michigan respondents at p=0.05, as well as the California respondents (*r*=0.33). In the Software Knowledge and Skills Scale, the Michigan respondents had a positive moderate correlation (*r*=0.32) and the California respondents had a low correlation (*r*=0.26) with the perceived value of information technology. A low correlation (*r*=0.29) was found between the perceived value of information technology and the number of professional development points for the California respondents. Michigan respondents also had a low positive correlation with the location of their school (r=0.18), their school involvement with other schools (r=0.11), and the age of the respondents (r=0.13). A negative low correlation was observed with the Michigan respondents if the indicated that they taught both high school and middle school (r=-0.12) and with the number of professional development activities (r=-0.11) that they attended. None of the other selected variables, school location, school involvement with other schools, age, highest degree held, teach middle school only, teach high school only, gender, years teaching experience, teaching both high school and middle school, the number of professional development activities attended, or race showed a significant correlation with the perceived value of information technology for the California respondents.

Table 8. Relationships Between Perceived Value of Information Technology Scale and Selected Variables[1].

Variable		*M*	*r*[3]	*p*[4]	*n*[5]
Technology Knowledge/Skills Scale grand mean[2]	**Michigan**	3.31	0.40	0.005	48
	California		0.33	0.014	54
Software Knowledge & Skills Scale grand mean	**Michigan**	3.13	0.32	0.026	50
	California		0.26	0.047	57
Professional Development Points[6]	**Michigan**	9.67	0.05	0.737	53
	California	8.81	0.29	0.026	59
School Location	**Michigan**		0.18	0.196	52
	California		0.02	0.859	59
School Involvement with other Schools	**Michigan**		0.11	0.500	39
	California		0.01	0.954	37
Age	**Michigan**		0.13	0.390	47
	California		-0.02	0.915	55
Highest Degree Held	**California**		0.01	0.980	52
	Michigan		0.06	0.635	59
Middle School Only	**Michigan**		0.03	0.82	52
High School Only	**Michigan**		0.04	0.765	52
	California		-0.04	0.781	59
Gender	**Michigan**		0.08	0.594	52
	California		-0.06	0.684	58
Years Teaching Experience	**Michigan**		-0.06	0.674	52
	California		-0.02	0.886	58

Table 8 (cont'd)

Variable		*M*	*r*[3]	*p*[4]	*n*[5]
High School and Middle School	**Michigan**		-0.12	0.411	52
	California		0.05	0.701	59
Number of Professional Development Activities	**Michigan**		-0.11	0.431	50
	California		-0.02	0.911	55
Race	**Michigan**		-0.12	0.389	52
	California		-0.05	0.727	59

[1] Variables selected were the grand means of the Technology Knowledge/Skills, Software Knowledge/Skills, demographic variables, and professional development activities.
[2] Grand Mean = all respondent's means for each variable within the scale were averaged to yield one mean for the scale.
[3] r = Pearson correlation coefficient, rounded to the second significant digit.
[4]p= Level of significance – correlations were significant at the 0.05 level (2-tailed).
[5]*n*= the number of respondents used in the correlation analysis based upon respondents' decision to participate in the survey question.
[6] Professional development points were calculated under objective seven to replicate the methodology used by Kotrlik et al. (2000). See Appendix F.

<u>Summary</u>

This study was designed to replicate the methodology of Kotrlik et al. (2000). The objectives were duplicated and a modified questionnaire was mailed to 240 High School agriscience teachers in Michigan and California. Their responses indicated a significant correlation between their perceived value of information technology with both their technology and software knowledge and skills. A large number of surveys were received from both Michigan (*n*=58) and from California (*n*=60) although, the percentage of respondents for this survey was less than the percentage, 65.0%, of respondents in the Kotrlik et al. (2000) study. The respondents from each state showed a high level of computer and software related knowledge and skill. Respondents from both states identified the usefulness of information technologies for the betterment of their students' education and as assistance for accomplishing this goal.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

Introduction

This research attempted to answer the question of what are the knowledge, skill level, potential usefulness, and value of information technology to Michigan and California high school agriscience educators. This was accomplished by replicating the study that Kotrlik et al. performed in Louisiana in 1998. In replicating this study the researcher hoped to accomplish a greater understanding of where the agriscience education communities in Michigan and California are in relation to the information technology that is being used in today's classroom. This research addressed the following research objectives:

1. To determine the demographic characteristics (degrees held, age, gender, ethnicity, years teaching experience, school location [rural, urban or suburban], grade level, and participation in professional associations) of the selected subjects.
2. To determine the value of information technology as perceived by the agriscience educator.
3. To determine the general information technology knowledge and skill level possessed by the agriscience educator.
4. To determine the general software knowledge and skill level possessed by the agriscience educator.

5. To gain the educator's perception of the potential usefulness of information technology in program and instructional management.
6. To determine the availability of information technology to the agriscience educator.
7. To find out the source of the agriscience educators information technology training.
8. To find if a relationship exists between selected variables and the value placed on information technology by the agriscience educator.

Objective One Discussion and Conclusions

There were a greater number of respondents from Michigan that held advanced degrees than their counterparts in California. The number of male respondents was greater than their female counterparts in California while the respondents from Michigan were dispersed fairly equally. In both states, the overwhelming majority of respondents self reported their race to be Caucasian, while there were no respondents from either state that represented themselves as being black. The age and number of years teaching experience was approximately equal between both states while the majority of the respondents taught at rural schools with an equal number of respondents from California teaching in urban and suburban schools. The respondents from both Michigan and California attended approximately the same number of professional development workshops and conferences. There were a greater number of Michigan respondents who taught at the middle school and junior high level than their counterparts in California and it is believed that this is because there are fewer agriscience educators in Michigan.

This information reflects that the two populations are very similar in most of their characteristics with the largest discrepancy being in the number of respondents with advanced degrees. The Louisiana study (Kotrlik et al., 2000) had a majority of respondents with advanced degrees (58.0%), much like the respondents from Michigan, were almost exclusively male ((94.0%), like the California respondents, and Caucasian (94.0%), like the respondents from both Michigan and California except that there were respondents in the Louisiana study that reported themselves as black (5.0%). The Louisiana respondents' average age was slightly higher (42) and their years of teaching experience were also greater (18) than the respondents from Michigan and California. The majority of the respondents taught in rural areas and in high school like the respondents from Michigan and California.

<u>Objective Two Discussion and Conclusions</u>

The Michigan and California respondents were very similar in their perceived value of information technology with no significant deviation found in any of the positively or negatively worded statements. In comparing the findings of these values with those of Kotrlik et al. (2000), there is an increase in the means of the responses in the positively worded statements and a decrease in the means of the negatively statements. These results showed an increase in the value that is placed on information technology and the belief that there are fewer obstacles to implementing information technologies in agriscience education.

The reason for this could possibly be the ever changing attitude towards technology that has occurred in the five years since Kotrlik et al. (2000) performed their study. These results help to reinforce that educators must keep up-to-date with the burgeoning world of technology and determine how they can best use these technologies to help their students obtain knowledge.

Objective Three Discussion and Conclusions

The respondents from both Michigan and California were very similar in their information technology knowledge and skill levels with no significant difference in any of the different areas of technology listed in the survey instrument. As stated before, their knowledge and skills means were higher all across the board than those of the respondents in the Kotrlik et al. (2000) study. For example, the mean for knowing how to use a computer was 2.93 in the Kotrlik et al. (2000) study and 4.93 in Michigan and 4.85 in California. A reason for this could be that the respondents in the Kotrlik et al. (2000) study are of an age when they would not have been exposed to computer technologies until after many of them would have graduated from college. With this information one could assume that their technology skill levels would be lower than that of persons who graduated from college five years later when the computer technology growth and innovation was taking off.

This falls in line with the responses from the previous section. Since there is a greater perceived value of information technology by both of the subsets in the study, it just follows along that both groups would have a greater knowledge and skill level with the technology than their counterparts did five years ago. The results of this objective follow along with the results of objective six and the percentage of respondents who have access to technology both at home and in the classroom.

Objective Four Discussion and Conclusions

In this objective there was a significant difference in three distinct software knowledge and skill areas between the respondents from California and the respondents from Michigan. The areas in which this difference occurred were spreadsheet software, database software, and lesson planning software. In each of these areas the mean score for California was higher than that of Michigan indicating a greater knowledge and skill in these areas. A reason for this could be that these software's are required by more school districts in California to possibly record grades or other tasks on a more regular basis than their Michigan counterparts. Another possible explanation for this is the number of California respondents who attended college and industry sponsored workshops as part of their professional development practices. Another possibility is that the majority of California respondents taught at the high school level only where software programs such as these would be more likely used in the classroom. The number of Michigan respondents that taught at the middle school or junior high school level could possibly not be covering material where these software programs would be needed.

The results of this objective differed from those that Kotrlik et al. (2000) found. Their findings indicated that the respondents perceived themselves at an average to below average level when it came to software specific knowledge and skill; especially in the areas of World Wide Web browsers (M=1.92), Internet E-mail (M=1.91), file transfer (M=1.79), and presentation software (M=1.97) where the Michigan and California respondents rated themselves above average and average. These findings follow along with the discussion from the previous section. The advent of the World Wide Web as we know it today has really been since the Kotrlik et al. (2000) study was performed five years ago. It is believed that if the study was done with this population again that the findings would be more in line with the results from Michigan and California.

<u>Objective Five Discussion and Conclusions</u>

The respondents from both Michigan and California all rated the potential usefulness of information technology in program and instructional management moderately useful to highly useful for all of the categories that were available to them. There was no significant difference in the respondents reporting for either Michigan or California.

The possible reason for this goes along with the same reasons in the responses to objectives two and three. There is a growing acceptance and understanding of technology in today's workplace and a feeling that information technology can assist in the completions of many tasks that were time consuming and monotonous in the past (Tapscott, 1998), such as calculating grades or keeping a database of contact information for student vocational opportunities. Technology has made these types of endeavors easier to access and maintain. The respondents in the Louisiana study rated the potential usefulness of information technology in program and instructional management only moderately useful in all categories (Kotrlik et al., 2000). For example, the instructors in Louisiana had a mean of 4.02 in the usefulness in student vocational organizations and a mean of 3.89 in instructional execution compared with means of 4.06 and 4.20 in Michigan and California in the usefulness in student vocational organizations and 3.88 and 3.93 in Michigan and California in instructional execution.

Objective Six Discussion and Conclusions

The results of this objective showed that the availability of information technology, more specifically computer technology, has almost reached a 100% saturation level with the sample that was used for this study; whether it was at home, in their classroom or office or in a computer lab in their school. The number of respondents who had access to higher priced technologies was much lower than those with access to computers. Although, the Michigan respondents reported a greater number of them had access to satellite downlink technologies, compressed video systems, and video conferencing systems than their counterparts in California.

This area also falls in line with the others when it comes to the value that the respondents are placing on the usefulness of information technology. They are embracing it by bringing it into their homes and using it in many different ways. A possible reason that the Michigan respondents have a greater level of availability of the technologies that would be used to transmit information on a more face to face level is that Michigan has fewer agriscience programs than California and the need to communicate and share information with their colleagues at other schools is possibly greater. There is a possibility that these systems could be used to share teachers so that a school district can keep an agriscience program going when there is a lack of funds to hire a teacher for that district. The results from this section were far greater than those of Kotrlik et al. (2000) and the Louisiana study, where just over half of the respondents had computers at home and only three fourths had computers in their offices or classrooms. Less than one-quarter of the respondents had access to Internet E-mail or the World Wide Web at home, classroom, office, or lab. When it came to the higher end technologies Louisiana and California had similar response rates.

Objective Seven Discussion and Conclusions

The training sources used for information technology showed that the majority of the respondents were self-directed learners. There were a greater number of California respondents who reported attending college and industry workshops than their counterparts from Michigan, but there was not a significant difference between the two.

This area is expected to have a high response rate because of the requirements of educators to obtain continuing education credits to keep their teaching credentials. The fact that these respondents are using technology as an area to increase their knowledge is not surprising given the information that has been discussed in the previous sections of this chapter. The need to educate oneself to keep up with technology falls in line with the need to keep educating oneself to keep their teaching credentials. The results of the Kotrlik et al. (2000) study followed the same lines as this current study where the majority of the respondents in Louisiana were self directed learners (69.8%) when it came to information technology. The Louisiana respondents also reported a high level of training from college and industry workshops (54.0%) as did the California respondents.

Objective Eight Discussion and Conclusions

In the results for this objective there are several significant relationships which suggest that the selected variables may be associated with the respondents' value placed on information technology. The General Information Technology Knowledge/Skill variable can be interpreted to have a moderate association which can suggest that if the respondent knows how to operate a certain technology and can use various components of said technology that they will in turn place a higher value on information technology as a whole. The Michigan respondents had a significantly higher association between technology knowledge and skills than that of the respondents from California. This can possible mean that it is more important for the Michigan respondents to believe that they are knowledgeable about information technology than the California respondents when it comes to predicting the value placed on information technology.

The data from this study shows a stronger association than the data reported for the study done by Kotrlik et al. (2000) where all of the correlations were interpreted as either low or negligible. There is a strong indication that if educators have the technology skills and attend professional development activities that there is a greater value placed on information technology. This also goes along with the tenor of the findings for this study.

Recommendations for Agriscience Educators

Since the Kotrlik et al. (2000) study was performed, a great deal of innovation in the world of information technology has happened. What was discovered with this current survey is that the agriscience educators are developing a value of information technology that was not seen in the 1998 study. This is a good trend and they must not stop pursuing a higher knowledge and skill level when it comes to information technology. They also need to remember that the need to push their students into the using these technologies because it will not only help them in the field of agriscience, but in many of the challenges they will receive from many other areas. Technology is not going away and the fact that the agriscience education community is starting to grasp this concept is going to help the field to keep moving forward.

Recommendations for Further Research

There are four areas in which the researcher feels further research is recommended and/or needed in the area of information technology:

1. Look further into the significant differences that arose in the software knowledge and skill section of this research project to determine the reasons for the differences.
2. Use the same survey instrument and perform the study again in 5 years (the same interval between this study and the Kotrlik et al. (2000) study) and see what changes, if any, have come about in the value and knowledge of information technology.
3. Use the same survey instrument and perform the study in another region of the country and compare the findings to the two previous research projects to see how different regions of the country compare.
4. Use the data gathered from a subsequent research project, if any occur, to validate the relationships discussed in objective eight of this research project.

Summary

Technological innovations are not going to stop just because the general public can not keep up with them. The same can be said of education. There seems to be a growing trend in wanting to get more things done in a shorter amount of time, and one of the ways to do this is with the use of technology. From these eight research objectives, one can assume that educators in the field of agriscience education in Michigan and California see a great value in their use and knowledge of information technologies. This knowledge and these skills are vastly improved in regards to information technology and their use in the classroom and with information dissemination. Educators are starting to keep up with the trends of their students when it comes to the information technologies making their classrooms a more vibrant, energetic, fun, and realistic learning environment.

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APPENDICES

APPENDIX A

STATUS OF INFORMATION TECHNOLOGY
IN
HIGH SCHOOL AGRISCIENCE CURRICULA

The purpose of this study is to determine the status of information technology in Michigan and California's high school agriscience curricula. Instructions are provided at the beginning of each section. This **<u>IS NOT</u>** a test and there are no "correct" answers. Your individual answers will be kept confidential. We appreciate your cooperation in completing this questionnaire.

Information Technology is defined as all technology that is used to communicate information within our profession and to our students. This includes, but is not limited to, the World Wide Web, Internet, satellite technologies, and computers.

Code No. ________

PART A: INFORMATION TECHNOLOGY VALUES

INSTRUCTIONS: Using the scale below, please circle the response that indicates your level of agreement with each statement.

1	Strongly Disagree
2	Disagree
3	Undecided
4	Agree
5	Strongly Agree

	Information Technology VALUES	**Value Level**				
		Strongly Disagree				Strongly Agree
1.	Agriscience Teachers should know how to use computers.	1	2	3	4	5
2.	Agriscience Teachers should know how to use the Internet.	1	2	3	4	5
3.	Agriscience programs should have the following technology available <u>for use in instruction</u>					
	. . . computers for teachers	1	2	3	4	5
	. . . computers for students	1	2	3	4	5
	. . . multimedia computers for teachers*	1	2	3	4	5
	. . . multimedia computers for students*	1	2	3	4	5
	. . . Internet connections for teachers	1	2	3	4	5
	. . . Internet connections for students	1	2	3	4	5
	. . . DVD players for teachers	1	2	3	4	5
	. . . DVD players for students	1	2	3	4	5
	. . . video conferencing equipment for teachers*	1	2	3	4	5
	. . . satellite downlink capabilities for teachers*	1	2	3	4	5
	. . . compressed video capabilities for teachers*	1	2	3	4	5

*Selected definitions of terms may be found on the back cover.

Information Technology VALUES	Value Level				
	Strongly Disagree				Strongly Agree
4. Information Technology . . .					
. . . helps individuals apply knowledge	1	2	3	4	5
. . . creates problems for the teacher	1	2	3	4	5
. . . improves the quality of programs	1	2	3	4	5
. . . makes learning too mechanical	1	2	3	4	5
. . . adds interest in instruction	1	2	3	4	5
. . . improves teacher effectiveness	1	2	3	4	5
. . . is a useful instructional tool	1	2	3	4	5
. . . causes more problems than it solves	1	2	3	4	5
. . . is important in instruction	1	2	3	4	5
. . . is too expensive to be cost effective	1	2	3	4	5
. . . isolates teachers from one another	1	2	3	4	5
. . . limits student-teacher interaction	1	2	3	4	5
. . . promotes self-directed learning	1	2	3	4	5
. . . allows teachers flexibility in planning their instruction	1	2	3	4	5
. . . encourages teacher innovation	1	2	3	4	5
. . . enhances student learning	1	2	3	4	5
. . . has little value in agriscience education	1	2	3	4	5
. . . is essential to prepare students for the workplace	1	2	3	4	5
. . . is necessary for the success of students in the workplace	1	2	3	4	5
. . . has an adverse effect on teachers	1	2	3	4	5

PART B: INFORMATION TECHNOLOGY KNOWLEDGE/SKILL

INSTRUCTIONS: How much knowledge and skill do you have in the area of information technology? Using the scale below, please circle the response that represents your level of knowledge/skill in each area listed.

1	I DON'T KNOW enough about this area to respond
2	My knowledge/skill in this area is BELOW AVERAGE.
3	My knowledge/skill in this area is AVERAGE.
4	My knowledge/skill in this area is ABOVE AVERAGE.
5	My knowledge/skill in this area qualifies me as an EXPERT.

Information Technology KNOWLEDGE AND SKILL	**Knowledge/Skill Level**				
	Don't Know				**Expert**
1. Know how to operate a computer.	1	2	3	4	5
2. Know the major components of a computer.	1	2	3	4	5
3. Can evaluate software for instruction.	1	2	3	4	5
4. Can evaluate software for program management.	1	2	3	4	5
5. Can locate computer-based teaching materials for use in instruction.	1	2	3	4	5
6. Can integrate computer-based teaching materials into instruction.	1	2	3	4	5

Information Technology KNOWLEDGE AND SKILL	Knowledge/Skill Level				
	Don't Know				Expert
7. Know how to select information technology that fits program needs. *(computers, printers, modems/LAN, CD/DVD players/burners, etc.)*	1	2	3	4	5
8 Know how to prepare students to use information technology.	1	2	3	4	5
9. Know how to use . . .					
. . . Internet E-mail.	1	2	3	4	5
. . . World Wide Web.	1	2	3	4	5
. . . video conferencing.*	1	2	3	4	5
. . . satellite downlink technologies.*	1	2	3	4	5
. . . compressed video.*	1	2	3	4	5
. . . multimedia computers.*	1	2	3	4	5
. . . DVD players.	1	2	3	4	5
. . . other: ______________________________	1	2	3	4	5

*Selected definitions of terms may be found on the back cover.

PART C: SOFTWARE APPLICATIONS KNOWLEDGE/SKILL

INSTRUCTIONS: How much knowledge and skill do you have in using each of the following computer programs? Please respond to the following items by circling the response that represents your level of knowledge/skill using the scale below.

1	I DON'T KNOW enough about this area to respond
2	My knowledge/skill in this area is BELOW AVERAGE.
3	My knowledge/skill in this area is AVERAGE.
4	My knowledge/skill in this area is ABOVE AVERAGE.
5	My knowledge/skill in this area qualifies me as an EXPERT.

Information Technology SOFTWARE	**Knowledge/Skill Level**				
	Don't Know				**Expert**
1. Grade Book	1	2	3	4	5
2. Word Processor *(Examples: Microsoft Word, WordPerfect, etc.)*	1	2	3	4	5
3. Spreadsheet *(Examples: Excel, Microsoft Works, Quatro Pro, etc.)*	1	2	3	4	5
4. Database *(Examples: dBase, Microsoft Access, etc.)*	1	2	3	4	5
5. Lesson Planning *(Examples: 4Mation, PET, etc.)*	1	2	3	4	5
6. Instructional Software *(Examples: My Resume, Microsoft Money, Quicken, Injured Engine, livestock feed ration formulation, nutrition, house design, health diagnostics, etc.)*	1	2	3	4	5
7. Graphics *(Examples: Photoshop, Paintbrush, MacPaint, Harvard Graphics, Print Shop, etc.)*	1	2	3	4	5
8. Presentation Software *(Examples: Microsoft PowerPoint, WordPerfect Presentations, Freelance Graphics, Harvard Graphics, etc.)*	1	2	3	4	5

Information Technology SOFTWARE	Knowledge/Skill Level Don't Know				Expert
9. World Wide Web browser *(Examples: Internet Explorer, Netscape, AOL, etc.)*	1	2	3	4	5
10. World Wide Web page creator *(Examples: Microsoft FrontPage, Adobe GoLive, Netscape Composer, Dream weaver, etc.)*	1	2	3	4	5
11. File Transfer to and from other computers using a modem or LAN *(Examples: WS_FTP, Fetch, etc.)*	1	2	3	4	5
12. Internet E-mail *(Examples: America On-Line, Microsoft Outlook, Eudora, Juno, etc.)*	1	2	3	4	5
13. Desktop Publishing *(Examples: Pagemaker, Microsoft Publisher, etc.)*	1	2	3	4	5
14. Utilities *(Examples: Norton, PC Tools, Norton Antivirus, McAfee Antivirus, etc.)*	1	2	3	4	5
15. Operating System *(Examples: Windows95, Windows98, Windows Millennium, Windows XP, Macintosh, Power MAC, etc.)*	1	2	3	4	5

PART D: AVAILABILITY OF COMPUTER TECHNOLOGY

INSTRUCTIONS: How accessible is information technology to you? Please indicate the availability of the technology listed by placing an **X** in the appropriate column **(You May Check More Than One Column)**.

Information Technology	**Availability**		
	Do Not Have Now	**Have Now**	**Plan to Acquire**
1. Computer at home with. . .			
. . . multimedia capabilities.*			
. . . World Wide Web access.			
. . . Internet E-mail.			
2. Computer available in office or classroom with . . .			
. . . multimedia capabilities.*			
. . . World Wide Web access.			
. . . Internet E-mail.			
3. Computer lab in department with . . .			
. . . multimedia capabilities.*			
. . . World Wide Web access.			
. . . Internet E-mail.			
4. Video conferencing in school*			
5. Satellite downlink technologies in school*			
6. DVD players in school			
7. Compressed video in school*			
8. Multimedia computers in school*			

*Selected definitions of terms may be found on the back cover.

PART E: USEFULLNESS OF INFORMATION TECHNOLOGY IN PROGRAM/INSTRUCTIONAL MANAGEMENT

INSTRUCTIONS: We want to know you opinion of the ***potential*** usefulness of information technology in your program. Using the scale below, rate the ***potential*** usefulness of information technology for each task listed by circling your response.

1	Not Useful
2	Low Usefulness
3	Undecided
4	Moderately Useful
5	Highly Useful

	USEFULNESS of Information Technology	**Usefulness**				
		Not Useful				**Highly Useful**
1.	Program Planning, Development and Evaluation *(Examples: youth organization activities, program reports, budget, equipment/maintenance reports, long-range planning, funding requests, fund raising, instructional material, equipment purchases, etc.)*	1	2	3	4	5
2.	Instructional Planning *(Lesson/Unit/Curriculum Planning)*	1	2	3	4	5
3.	Instructional Execution *(Presentation of Instruction)*	1	2	3	4	5
4.	Instructional Evaluation *(Testing, Assessment)*	1	2	3	4	5
5.	Instructional Management *(Grade Reports, Student Records)*	1	2	3	4	5
6.	Student Guidance and Career Development	1	2	3	4	5
7.	School Community Relations *(Public Relations)*	1	2	3	4	5
8.	Student Vocational Organizations	1	2	3	4	5
9.	Professional Role and Professional Development	1	2	3	4	5
10.	Coordination of Cooperative Programs	1	2	3	4	5

PART F: INFORMATION TECHNOLOGY TRAINING SOURCES

INSTRUCTIONS: Please indicate in the middle column if you have received information technology training from the source listed by circling either "yes" or "no." ***IF*** you circled "yes" in the middle column, then circle either "yes" or "no" in the right column indicating if you have had training from this source in the past three (3) years.

Information Technology TRAINING SOURCE	**Have you ever received training from this source?** (circle your answer)	**If Yes, have you had training from this SOURCE in the past three (3) years?**
University/college course	YES NO	YES NO
University/college workshop	YES NO	YES NO
Industry workshop	YES NO	YES NO
Professional conference	YES NO	YES NO
Self-directed learning/personal experience	YES NO	YES NO
Suppliers of equipment and software	YES NO	YES NO
School, district or state sponsored in-service training	YES NO	YES NO
Written materials such as information booklets, training manuals, etc.	YES NO	YES NO
Other – please identify:	YES NO	YES NO

PART G: DEMOGRAPHIC CHARACTERISTICS

Instructions: We would like to know some basic information about you. Please respond to these questions by placing an **X** in the correct blank or by providing the information requested.

Highest Degree Held: ___Bachelor's ___Doctorate
___Master's ___Other
___Master's + 30/Ed. S.

Gender: ___Male ___Female

Race: ___Caucasian ___Black
___Hispanic ___Other

Age: ___years

Years Teaching Experience: ___years

The area where your school is located: ___Rural ___Urban
___Suburban

In what district do you teach? ____

How many professional development conferences/workshops have you attended in the past three years? ________

Is your school currently connected or involved in any project that would connect your school to the other schools in you district?
____currently connected ___involved in project

Do you teach: ___High school students only?
___Middle school/junior high school students only?
___Both high school and middle school/junior high school students?
___Other (please identify level) ______________________

Definitions

Compressed Video- this computer-based technology allows a teacher to instruct one or more classes at different locations – students and teacher can see and hear each other and interact live.

Information Technology- all technology that is used to communicate information within our profession and to our students. This includes the World Wide Web, Internet, satellite technologies, and computers.

Multimedia- computer-based applications that allow the user to see and hear different types of information using one screen and speakers (e.g., text, pictures, video, animation, sound, music).

Satellite Downlink- a satellite dish that allows schools to receive televised transmissions broadcast from anywhere in the world and enables a school to view many programs that are not available via cable or regular television transmission.

Video Conferencing- a method of conferencing in which people at different locations can see and hear one another, as well as communicate using different types of media equipment (e.g., computer, image viewer, slide projector).

THANK YOU!!

An addressed envelope with the correct postage was included with this survey. If you have lost the envelope, please return this survey to: Golzynski, California State University, Fresno 5300 N Campus Dr. M/S FF17 Fresno, CA 93740.

APPENDIX B

MICHIGAN STATE
UNIVERSITY

March 4, 2003

TO: Luke REESE
409L Agriculture Hall

RE: **IRB# 03-173** CATEGORY: EXEMPT 1-2

APPROVAL DATE: March 3, 2003
EXPIRATION DATE: February 3, 2004

TITLE: STATUS OF INFORMATION TECHNOLOGY IN HIGH SCHOOL AGRISCIENCE CURRICULA IN MICHIGAN AND CALIFORNIA

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the **UCRIHS approved this project.**

RENEWALS: UCRIHS approval is valid until the expiration date listed above. Projects continuing beyond this date must be renewed with the renewal form. A maximum of four such expedited renewals are possible. Investigators wishing to continue a project beyond that time need to submit a 5-year application for a complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please include a revision form with the renewal. To revise an approved protocol at any other time during the year, send your written request with an attached revision cover sheet to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

PROBLEMS/CHANGES: Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of further assistance, please contact us at (517) 355-2180 or via email: UCRIHS@msu.edu. Please note that all UCRIHS forms are located on the web: http://www.msu.edu/user/ucrihs

Sincerely,

Ashir Kumar, M.D.
UCRIHS Chair

AK: jm

cc: Matthew Golzynski
13 Royal Oak Dr.
Gladstone, MI 49837

OFFICE OF
RESEARCH ETHICS AND STANDARDS
University Committee on Research Involving Human Subjects
Michigan State University
202 Olds Hall
East Lansing, MI
48824
517/355-2180
FAX: 517/432-4503
Web: www.msu.edu/user/ucrihs
E-Mail: ucrihs@msu.edu

APPENDIX C

Status of Information Technology in High School Agriscience Curricula in Michigan and California

April, 2003

Name
Address
City, State Zip

Dear Sir or Madame:

Enclosed you will find a questionnaire about your knowledge of information technology. It should only take about 15 to 20 minutes to complete the 55 question survey. The questionnaire is 12 pages long only because a larger font size was used to make it easier to read.

The benefit of your participation in this research project is to help the Agriscience profession better understand the usefulness of informational technology in the high school Agriscience classroom. By completing and returning this survey, this indicates your consent to be part of the research project.

Your participation is completely voluntary and at any time during the completion of the survey you may decline to respond to any given item. You may choose not to participate at all, but we would really appreciate your input.

The only cost to you in this whole procedure is your time. You may return your survey in the self addressed stamped envelope that is enclosed.

If at any time you have questions regarding this survey you can reach me at (559) 324-7197 or by email at golzynsk@msu.edu. If you have questions or concerns regarding your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact – anonymously, if you wish – Ashir Kumar, M.D., Chair of the University Committee on Research Involving Human Subjects (UCRIHS) by phone: (517) 355-2180, fax: (517) 432-4503, e-mail: ucrihs@msu.edu, or regular mail: 202 Olds Hall, East Lansing, MI 48824.

Your participation in this survey will be completely confidential. The survey has an identification number on it that will enable us to check your name off the mailing list when the questionnaire is returned. The identification number will be removed and destroyed prior to any data entry or analysis to maintain the confidentiality of all responses. Your name will never be placed on or related to your completed survey.

All returned surveys will be maintained in a locked file cabinet within my office. After the raw survey data is entered, summarized and reported, all surveys will be destroyed. Collected data will be entered and stored on a password-protected computer. Your privacy will be protected to the maximum extent allowable by law.

The information from this study may be published in refereed journals or presented at appropriate conference and meetings, but your identity will be kept strictly confidential.

Thank you for your time. If you have any questions at any time, please feel free to call or email.

Sincerely,

Luke E. Reese	Matthew Golzynski
Thesis Advisor	Graduate Student

APPENDIX D

About 1 week ago you should have received a survey of Information Technology. If you have completed and returned your survey, thank you very much for your time. If you haven't yet done so, please take a few minutes and fill out the survey. If you have not yet received your survey, please let one of us know so that we can send you another. The purpose of this research is to determine the status of information technology in Michigan and California's high school agriscience curricula.

Please be sure that your survey is postmarked by **May 9, 2003.**

Thank you again; we greatly appreciate your effort in helping us complete this research project. If you should have any questions, please do not hesitate to contact us.

Luke Reese (517) 355-6580 Matthew Golzynski (559) 278-5294

APPENDIX E

Status of Information Technology in High School Agriscience Curricula in Michigan and California

May, 2003

Dear Sir or Madame:

A few weeks ago you received a survey packet in the mail about your use and knowledge of Information Technology. We have not yet heard from you and are giving you one more chance to respond. The deadline for receiving these surveys is May 23, 2003. Please take a few minutes and fill this out.

Enclosed you will find a questionnaire about your knowledge of information technology. It should only take about 15 to 20 minutes to complete the 55 question survey. The questionnaire is 12 pages long only because a larger font size was used to make it easier to read.

The benefit of your participation in this research project is to help the Agriscience profession better understand the usefulness of informational technology in the high school Agriscience classroom. By completing and returning this survey, this indicates your consent to be part of the research project.

Your participation is completely voluntary and at any time during the completion of the survey you may decline to respond to any given item. You may choose not to participate at all, but we would really appreciate your input.

The only cost to you in this whole procedure is your time. You may return your survey in the self addressed stamped envelope that is enclosed.

If at any time you have questions regarding this survey you can reach me at (559) 324-7197 or by email at golzynsk@msu.edu. If you have questions or concerns regarding your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact – anonymously, if you wish – Ashir Kumar, M.D., Chair of the University Committee on Research Involving Human Subjects (UCRIHS) by phone: (517) 355-2180, fax: (517) 432-4503, e-mail: ucrihs@msu.edu, or regular mail: 202 Olds Hall, East Lansing, MI 48824.

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All returned surveys will be maintained in a locked file cabinet within my office. After the raw survey data is entered, summarized and reported, all surveys will be destroyed. Collected data will be entered and stored on a password-protected computer. Your privacy will be protected to the maximum extent allowable by law.

The information from this study may be published in refereed journals or presented at appropriate conference and meetings, but your identity will be kept strictly confidential.

Thank you for your time. If you have any questions at any time, please feel free to call or email.

Sincerely,

Luke E. Reese	Matthew Golzynski
Thesis Advisor	Graduate Student

APPENDIX F

Working Table for Professional Development Points

Available Points[1]	n[2]	Points[3]
0	4	0
1	1	1
2	1	2
3	3	9
4	4	16
5	1	5
6	9	54
7	4	28
8	20	160
9	10	90
10	18	180
11	10	110
12	16	192
13	6	78
14	8	112
15	1	15
16	3	48
Total	119	1100

[1] One point was given for each professional development activity that was attended. An additional point was given if the professional development activity was attended within the past three years. A maximum of 16 points could be accrued per educator.
[2] Frequency or count representing the number of respondents accruing the available points.
[3] Points accrued by frequency (the available number of points was multiplied by the frequency) resulting in 1,100 points from a possible 1,904 points or 58%.