A QUALITATIVE STUDY OF TECHNOLOGY-BASED TRAINING IN ORGANIZATIONS THAT HIRE AGRICULTURE AND LIFE SCIENCES STUDENTS

A Thesis

by

LESLIE JEAN FRAZIER

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

May 2006

Major Subject: Agricultural Education

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Approved by:

Co-Chairs of Committee,	Theresa Pesl Murphrey
	Kim E. Dooley
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ABSTRACT

A Qualitative Study of Technology-based Training in Organizations

That Hire Agriculture and Life Sciences Students. (May 2006)

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Co-Chairs of Advisory Committee: Dr. Theresa Pesl Murphrey
Dr. Kim E. Dooley

Technological advances have created unlimited opportunities in education. Training and technology have merged to create new methods referred to as technology-based training. Technology-based training, for the purpose of this study, was defined as training that is delivered via the Internet, CD-ROM, or video conferencing either at a distance or in a local setting. A variety of forms of technology-based training were found throughout educational and workforce settings.

The purpose of this study was to identify organizations that hire agriculture and life sciences students for positions involving technology-based training and identify competencies required for these positions from the perspective of the identified organizations. This study described the technologies that the identified organizations were using to design and deliver technology-based training, the audience to which the organizations were providing training, and the competencies that the identified organizations were seeking in potential employees.

Findings from this study revealed a need for individuals with specialization in creating and providing technology-based training. Data suggested seven key skills and competencies needed to work in technology-based training: 1) instructional design, 2)

technology/computer skills, 3) the ability to conduct a needs assessment, 4) interpersonal skills, 5) writing skills, 6) planning and organizational skills, and 7) evaluation skills. The identified skills and competencies related to technology-based training mirror those reported in previous research. Based on analysis of the data, it was concluded that students with expertise in these skill and competency areas are more marketable in organizations that hire agriculture and life sciences students.

DEDICATION

This manuscript is dedicated to my loving family who has provided more support and encouragement than anyone could want. To my parents, Jimmy and Barbara Frazier, thank you for standing by my decision to continue my education and provide me with all the love and support I could have imagined. Without your love, I would have never made it this far and I could never thank you enough. To my sister, brother-in-law, and nephew (Laura, Jimmie, and Jackson Osborne) you have encouraged me when I wanted to give up and always helped me to see the brighter side of things. Sister, you are my best friend and without your guidance I never would have made it this far. Thank you all so much for standing beside me and always being there to break my fall. You are the most important people in my life and without your support this would have never been possible. I love you all!

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CHAPTER I

INTRODUCTION

Background of the Study

Distance education is often perceived as a modern trend, while in actuality it has an extensive history throughout government, corporate, and education environments. According to Burgess and Russell (2003), distance education has evolved through four stages over the years, with each evolution resulting in increased effectiveness and creating a wider range of applications. The beginning of distance education dates back to the 1800s with correspondence courses, which evolved to the second stage with the creation of audio and videoconferencing. The third evolution of distance education involved the pairing of multi-media, which may include print, audio, or video, with personal interaction, either by phone or face-to-face. The latest evolution of distance education involves two-way communication using a variety of cutting edge technologies (Burgess & Russell, 2003). This type of distance education is often referred to as technology-based learning. Saba (2001) refers to the current form of this type of learning by stating that:

> For the third time in fifty years distance education has been touted as the elixir that will cure all the ills in education and training. However, what is different is

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This thesis follows the style of *Journal of Agricultural Education*.

> that never before has this much attention, money, publicity, and hope been invested in its practice in education and training. (p. 1)

Technology-based learning has been used throughout educational institutions globally; in addition, many individuals, groups, and institutions began using it to provide new and expanded sources of revenues. Organizational institutions have used modified methods of technology-based learning to train employees and increase their own revenue (Robinson, 2002). According to ASTD's (formerly the American Society for Training and Development) 2004 State of the Industry Report (ASTD, 2004b), classroom learning has steadily decreased from 80 percent in 1999 to 68 percent in 2003. In contrast, ASTD also reported an increase in technology-based training, with an estimated 29 percent of training being conducted through some form of technology-based training, in 2004 (ASTD, 2004b).

With the spread of the technology-based training industry, new and diverse employment opportunities have surfaced, creating jobs and positions requiring specific skills and competencies. In order to identify available technology-based training positions and skills and competencies required for these positions, an assessment of organizations was needed. Specifically, organizations that hire agriculture and life sciences students needed to be assessed. It was hypothesized that students with expertise in the indicated areas would be increasingly marketable if they gained skills and competencies related to technology-based training. Information was gathered so that educational programs could compare and ensure that their current curricula are meeting the requirements of the technology-based training industry.

Conceptual Framework

The agriculture industry consists of a broad range of areas that function in a global market (Watson, 2005). The use of technology-based training has expanded throughout all types of industries (ASTD, 2004b). The utilization of technology-based training by agriculture organizations creates opportunities for students in agriculture and life sciences colleges. Students interested in technology-based training need special skills and competencies (Rugelj, 2005) to become marketable employees throughout the agriculture industry. Studies have revealed skills in three broad areas: computer skills, organizational skills, and writing skills (Egan & Akdere, 2005; Murphrey & Dooley, 2006; Thach & Murphy, 1995; Williams, 2003).

Statement of the Problem

Previous research focused on the effectiveness of technology-based training in comparison to face-to-face training, while few efforts have focused on the identification of skills required to obtain a job in technology-based training. Research revealed benefits of technology-based training such as lower cost, increased flexibility, and increased interactivity (Burgess & Russell, 2003). Although research on technology-based training and education has remained rather narrow, it has begun to expand into new methods, revealing the actual depth of the field (Saba, 2000).

According to Tyler's Basic Principles of Curriculum and Instruction (as cited in Liles & Mustian, 2004) there are three main sources to refer to when creating instruction: the needs of the learner, competencies indicated through research, and

critical competencies indicated by experts. In order to determine what competencies are required to work in the field of technology-based training, experts must be consulted. This study pursued this step of the process, by consulting with organizations that hire agriculture and life sciences students to determine competencies required of prospective employees.

Purpose and Objectives

The purpose of this study was to identify organizations that hire agriculture and life sciences students for positions involving technology-based training and identify competencies required for these positions from the perspective of the identified organizations. This study described the technologies that the identified organizations were using to design and deliver technology-based training, the audience to which the organizations were providing training, and the competencies that the identified organizations were seeking in potential employees. The following objectives were achieved in order to complete this study:

1. Identify organizations that hire agriculture and life sciences students that were implementing technology-based training.
2. Identify positions related to technology-based training that were available in the organizations identified as implementing technology-based training.
3. Describe the design and delivery methods used to implement technology-based training in the organizations identified.

4. Identify competencies required for the identified positions associated with technology-based training.

Methods

A qualitative study was conducted to provide quality, in-depth information (Berg, 2001; Patton, 2002). The research design was based on grounded theory (Glaser & Strauss, 1999), which is "the discovery of theory from data systematically obtained from social research" (p. 2). Grounded theory was used in order to construct concepts from emerging themes present in the data collected.

Purposive sampling (Erlandson, Harris, Skipper, & Allen, 1993; Patton, 2002) was used to indicate organizations that hire agriculture and life sciences students. A semi-standardized interview guide was used to collect data in order to encourage free digression depending on the responses provided (Berg, 2001). Data was collected through semi-structured telephone interviews, documents provided by interviewees, and literature, and ended when theoretical saturation (Strauss & Corbin, 1998) had been reached.

Data was analyzed using the constant comparative method, in order to place relevant data into categories that through integration and delimitation create concepts (Glaser & Strauss, 1999). A color coding system was used as the researcher compared each piece of data with data previously analyzed to form categories and sub-categories (Glaser & Strauss, 1999). As categories were formed, themes emerged and concepts were developed.

Definition of Terms

Terms used throughout the text that may have multiple definitions or that readers may be unfamiliar with are provided below in alphabetical order.

Blended learning

Blended learning is defined as "combining face-to-face with distance delivery systems…to maximize the benefits of both [methods] – using the web for what it does best, and using class time for what it does best" (Osguthorpe & Graham, 2003, p. 227).

CD-ROM

CD-ROM is a technology that allows "multimedia to be captured onto a laser disc and used with personal computers" (Williams, Nicholas & Gunter, 2005, p. 114).

COALS Student Council

COALS Student Council is a student organization at Texas A&M University, which "serves as a sponsoring group for activities of interest to the College of Agriculture and Life Sciences" (College of Agriculture and Life Sciences Student Council, n.d.). Each year the organization puts together a career exposition where organizations interested in recruiting employees from the college set up booths to talk with current students and future graduates.

Competencies

Competencies are clusters of skills, knowledge, abilities, and behaviors required for job success (ASTD, 2004a).

Distance education

Distance education is an “educational program whereby students may complete all or part of an educational program in a geographical location apart from the institution hosting the program” (United States Distance Learning Association, n.d.).

eLearning

Henry (as cited in Murphrey & Dooley, 2006) defines eLearning as “the appropriate application of the internet to support the delivery of learning, skills, and knowledge in a holistic approach not limited to any particular course, technologies, or infrastructures” (p. 1).

Technology-based training

For the purpose of this research, technology-based training will be defined as training that is delivered via the internet, CD-ROM, or videoconferencing either at a distance or in a local setting.

Videoconferencing

Videoconferencing can be defined as two-way audio and video information (Williams, et al., 2005) that is delivered in ‘real-time’ so that individuals in multiple locations may participate (United States Distance Learning Association, n.d.).

CHAPTER II

REVIEW OF LITERATURE

The following review of literature was developed to construct a foundation for the conceptual framework of the study. An understanding of the history of distance education and its role in educational and workforce settings provides a basic understanding of the roots of technology-based training. Key components for implementing technology-based training, including considerations, methods of delivery, and concerns, are discussed to provide an overview of what technology-based training involves. Finally, research related to technology-based training skills and competencies is discussed.

History of Distance Education

Distance education dates back to the mid 1800s when correspondence courses were conducted strictly through mail (Turlington, 2000). "In America, correspondence courses began on three fronts: to provide enriched opportunities, to attain specific vocational skills, and to receive religious instruction" (Berg, 2005, p. 1007). The military began using this form of distance education due to the increase of technical skills required by soldiers (Howard, et al., 2005). In the 1900's professional associations, businesses, administrations, and medical programs all used correspondence courses for training (Berg, 2005).

Technologies began to evolve and with their rapid development and falling prices distance education has boomed for the last thirty years (Turlington, 2000). The internet

has played a primary role in the most recent boom of distance education. The internet began as a top-secret military network and within twenty-five years became a public phenomenon (Zucker, Kozma, Yarnall, & Marder, 2003). Today, the internet is a common method to facilitate distance learning (Williams, et al., 2005).

Research of distance education dates back to the mid-1900s, but focus has been placed on comparing distance education to face-to-face instruction (Saba, 2000). The research conducted in this area has been synthesized into what is called the "no significant difference" phenomenon (Russell, 1996). As distance education matures, more in-depth research is required to explore the complexity by which technology is utilized to deliver education and enhance learning.

Distance Education in Educational Settings

University Settings

Universities were the initiators of technology and distance education, which eventually led to the opening of virtual universities and full degrees being offered through technology-based methods (Zucker, et al., 2003). In the late 1980s universities began to develop "corporate universities," in which they provided continuing education to corporations for revenue (Seufert, 2002). The integration of distance programs blurred the physical boundaries of higher education and allowed for opportunities to expand across borders (Duhaney, 2005). Universities were able to offer education to students enrolled in their own university, students at other universities, as well as business sectors for continuing education purposes (Seufert, 2002).

In the years since World War II, the number of people earning degrees has increased drastically, now being available to all (Maehl, 2004). The adoption of technologies allowed higher education institutions to provide an educational opportunity to people that previously may not have had the option (Burbules & Callister, 2000), due to location, personal and family obligations, or time constraints (Duhaney, 2005). It has always been a goal of institutions, especially land-grant institutions and community and junior colleges, to bring education to those who were unable to go to campus (Burbules & Callister, 2000), and emerging technologies provided a way for institutions to offer this service (Duhaney, 2005). According to the National Center for Education Statistics (NCES), in 2000-2001, 19 percent of all two- and four-year institutions surveyed "had degree or certificate programs designed to be completed totally through distance education" (Waits & Lewis, 2003, p. iv).

"As the economy in the United States continues to slump, the demand to increase institutional revenue continues to increase exponentially" (Annetta, 2004, p. 1). According to Archer (as cited in Annetta, 2004), the cutting of state governments educational funding to make up for budget deficits causes institutions to seek new ways of delivering teaching and learning. Many institutions turned to offering courses at a distance. According to a survey conducted by the NCES, 56 percent of two- and four-year degree-granting institutions offered distance courses in the 2000-2001 academic years (Waits & Lewis, 2003). Online enrollments continue to grow, with no evidence that the rate of enrollment will decrease or plateau in the near future (The Sloan Consortium, 2004).

The NCES study reported that one of the most important goals of distance programs in institutions surveyed was to increase student access (Waits & Lewis, 2003). Other goals of distance education programs included convenient availability of courses and creating a more affordable education for students. The Sloan Consortium (2004) indicated that in order for distance education practices to become a permanent avenue available in American higher education, institutions must "believe in its importance and be willing to embrace it as part of their long-term institutional strategies" (p. 2). The NCES study (Waits & Lewis, 2003) found this to be true with the institutions that were not offering distance programs. These institutions reported that factors such as lack of fit with institutional strategies, program development costs, and concerns about course quality kept them from beginning distance programs (Waits & Lewis, 2003).

According to Miller and Pilcher (as cited in Irani, Telg, & Place, 2003), agricultural institutions are often leaders in distance education programs. This could be due to the goal of land-grant institutions, as well as agricultural institutions, which is to reach those geographically dispersed and to provide life-long learning (Irani, Telg, & Place, 2003; Martin & Cheek, 2004). Historically, agricultural colleges frequently experienced budget cuts, which have been accommodated by implementing technology and distance education in order to cut long term costs and increase revenue (Connor, 2003). When looking specifically at agricultural education departments, Roberts and Dyer (2005) indicated that approximately two-thirds of departments were implementing some degree of distance education courses. These courses were most often provided through learning management systems, but other methods such as the internet,

interactive videoconferencing and videotapes or CD-ROMs were also applicable methods.

As increasing numbers of higher education institutions began adopting new technologies some areas of concern have surfaced, which include institutions becoming more entrepreneurial in order to provide new methods, the demographics and aspirations of the new prospective students, and an increased rate of competition offering quality distance programs (Burbules & Callister, 2000). These factors, along with the opening of educational boarders, may have begun eroding the monopoly that institutions once had over intellectual resources and privileges (Burbules & Callister, 2000) and encouraging institutions to increase distance programs for economic reasons. It is important to note that programs created consistent with the culture of the institution have been more successful than those created to boost financial income or save money (Wilner & Lee, 2002).

K-12 Settings

With the high success rate of many of these university programs, state and local governments began realizing the potential and began the first "virtual high school" in 1996 (Zucker, et al., 2003). Florida's statewide virtual high school grew from 50 students and three courses to 6000 students with 60 courses (Silverman, 2001). A director of Florida's virtual high school predicted in 2001 "that within five years, every high school student in the nation will be taking some kind of online course" (Silverman, 2001, p. 31).

The Office of Educational Technology in the U.S. Department of Education conducted a survey to determine the use of technology-based education in K-12 schools nation-wide (Setzer & Lewis, 2005). Approximately 36 percent of school districts had students enrolled in distance courses in the 2002-03 school years, and the majority of the students enrolled were in high school. The most important reason indicated for offering distance courses was to provide students access to courses previously not available in the district. Other reasons included meeting the needs of groups of students and offering Advanced Placement and college-level courses. Of the districts with students enrolled in distance courses, seventy-two percent planned on expanding their distance education programs (Setzer & Lewis, 2005).

Technology has become a dominant feature in everyday life, especially for the technologically-savvy generation in K-12 schools (Donlevy, 2005). While the numbers provided by NCES looked promising, Donlevy (2005) indicated that more schools than not were falling behind due to the fact that they lacked funding to implement cutting-edge technologies and the technological ability of teachers and administrators.

The U.S. Department of Education presented the National Technology Plan that described the steps schools needed to take to become more up-to-date with technology (Donlevy, 2005). The plan focused on seven key areas which include: strengthening leadership that is knowledgeable about technology, considering innovative budgeting to support technology, improving teacher training to assist in mastering technology, supporting eLearning and virtual schools to give students exposure to these methods, encouraging broadband access, moving toward digital content to provide access to

customized and updated information, and integrating data systems to pull the system together. This technology plan supported the fact that technological skills are becoming a staple skill for surviving in our digitized world (Donlevy, 2005).

Workforce Training

The expansion of distance education programs also extended into training of the workforce. Training for workers dates back as far as early colonial America, when apprenticeships were practiced (Roberts, 1971). As time passed, technology increased in the workforce and formal training was implemented. Carnevale and Goldstein (1990) predicted that with the increase of technology in the 1980s, training during the 1990s would predominantly be the responsibility of organizations. Overall, training was expected to increase throughout organizations over the years due to economic trends. In a recent survey conducted by the Institute of Management and Administration, it was reported that "77.8% of survey participants…plan to expand…training efforts to meet expected company growth" (Sandler, 2005, p. 3).

According to Mulder (as cited in Tuijnman, 1996), training is conducted to create a learning experience that will improve performance. Training should result in knowledge, skills, values, attitudes, and actions being gained by participants (Rugelj, 2005). Training is an important tactic in reaching goals and gaining competitiveness in the organization's market (Rugelj, 2005). Many other factors, such as "return-on-expectation, employee retention, employee development, customer satisfaction, bottom-

line results, and lots more" (Abernathy, 1999, p. 1), also play a predominant role in training.

Effective training requires flexibility (Ihalainen, 1999). The majority of training conducted in the past consisted of strictly classroom training, which is now outdated since organizations seek more flexible solutions (Ihalainen, 1999). Traditional training programs required high costs and time commitments that many organizations are trying to stay away from (Piskurich, 2000; Ihalainen, 1999).

"Historically…training has been considered an expense rather than an investment" (Geisman, 2001, p. 2). However, Seufert (2002) found that in order for organizations to remain up to date with new technologies and knowledge, they allocated more funds and time than ever to training. The average organization spent 2.7 percent of payroll dollars on training in 2004 (ASTD, 2004a).

After the Civil Rights Act of 1964, organizations implemented anti-discrimination training in order to educate employees about federal and state laws (Bendick, Egan, & Lofhelm, 2001). Today, diversity training has expanded and covers topics such as sexual harassment and the Americans with Disabilities Act (Bendick, Egan, & Lofhelm, 2001). The majority of large employers and a substantial proportion of medium and small businesses offer diversity training, which results in benefits such as reduction of discrimination and better productivity (Bendick, Egan, & Lofhelm, 2001). The article "22 Tips for Avoiding Employee Lawsuits" (Sandler, 2003) suggests that training of supervisors and managers can prevent lawsuits. Specifically, supervisors and managers should receive training in the following areas: handling

situations, equal employment opportunity, hiring and promoting, disciplining and termination, and harassment.

In order to remain effective and efficient in today's changing economic environment, the workforce must encounter continuous training and development (Duhaney, 2005). The knowledge-based economy requires that people become life-long learners and upgrade their knowledge and skills on their own time, in order to not only enhance, but to maintain their role in the workforce (Clark & Shatkin, 2003). It is not only having skills that make people marketable, but the ability to re-skill when needed is also a very marketable quality (Goolnik, 2002).

Technology-based Training

Typical training has become unpopular in organizations because of its similarity to traditional school, which is viewed by some as a short-term memorization process, rather than a learning process (Huseman & Goodman, 1999). Technology created a learning environment that exceeds that of traditional learning (Brazen & Clark, 2005) and has significantly altered the way that training and development efforts are conducted (Garrett & Vogt, 2003).

Training and technology have merged and created new methods. Delivery methods such as CD-ROM, audio, computer projection, and videoconferencing continue to be used and now new technologies, such as interactive networks that provide web-based instruction (Rugelj, 2005), are becoming more predominate throughout

organizations. These technologies are used to implement learning throughout jobs to create optimal learning results (Confessore, 1996 as cited in Berg, 2005).

As organizations make the transformation into learning organizations, technology will facilitate in the sharing of knowledge (Duhaney, 2005). Research has revealed that agricultural professionals make up a significant number of the students enrolled in agricultural education distance courses (Miller & Miller, 2005; Moore & Wilson, 2005; Roberts & Dyer, 2005). In 2000, organizations spent over 30 billion dollars on training and as they begin to feel more pressure from the economy, they increasingly turn to technology (Lee, Bhattacharya, Nelson, & Kihn, 2002). Organizations will continue to turn to technology to reach people internationally (Garrett & Vogt, 2003), to prepare for organizational growth (Sandler, 2005), and to accommodate for learner's time, financial, and responsibility constraints (Duhaney, 2005).

There are many different reasons for organizations to convert training programs to technology-based methods. The most predominant factor, and often the driving force, for converting to technology-based training are the economic factors (Foshay, 2001). Other reasons include: reduction in time, flexibility, and increased employee productivity (Bagnasco, Chirico, Parodi, & Scapolla, 2003; Burgess & Russell, 2003). ASTD (as cited in Burgess & Russell, 2003) reported that travel after September 11, 2001, decreased, in turn creating an increase in technology-based training.

Many organizations have implemented technology-based training due to the fear of falling behind (Kruse, 2000b), which in turn can benefit employees directly. Converting traditional instruction to technology-based instruction allows the ability to

redesign instruction that was once static into interactive instruction (Kruse, 2000b), which provides a more exciting experience for the learner. Technology-based training provides additional benefits to the learner such as learner control and deciding when and what to learn (Piskurich, 2000). "Technology used in the appropriate situations will continue to provide measurable…reductions in both direct and indirect training costs" (Piskurich, 2000, p. 1).

Skill training and computer skill training are an important focus of most organizations and technology continues to be used to teach these skills (Piskurich, 2000). According to Ellis (2004), organizations used technology-based training in a variety of ways, but end-user or desktop training ranked number one. Other uses ranking in the top five included general business skills, including everything from leadership to sexual harassment to diversity training, task-specific skills, customer service training, and external customer and client training (Ellis, 2004).

Considerations When Selecting Technologies

Although ease of distribution and low production costs increase the number of organizations that implement technology-based training, these organizations must invest in resources that assist in creating effective online learning (Hofmann, 2003). When converting traditional instruction to technology-based instruction the technical limitations of the learners, the lowest common denominator, how the design will work, what methods will be needed to provide the information, and the probability of the content changing, should all be considered prior to deciding what technology will be used to provide the instruction (Kruse, 2000b). In order to achieve successful

technology-based training the plan should align with organizational goals and should have the support of management and stakeholders (Garrett & Vogt, 2003; Geisman, 2001). To gain support there must be a strong case for the conversion to technology-based training, which could include a strong financial impact and measured results that translate into financial terms, such as increased accuracy, quality, sales, productivity, customer satisfaction, and immediate and direct access to information (Geisman, 2001).

Once a decision has been made to add technology-based training to an organization, a decision must be made on where that training will come from, either purchasing it "off-the-shelf" or creating it from ground up (Francis & Emelo, 2002). According to the article "How to Use Training to Accelerate Growth" (Sandler, 2005), large organizations (1,600 or more employees) were more likely than medium or smaller organizations to outsource some of their training duties or hire either full or part time in-house training staff to assist with the organizational growth. Ellis (2004) indicated that the majority of technology-based training originated from training-related departments, while many were controlled by specific departments.

According to Francis and Emelo (2002), an effective decision between "off the shelf" and creating training in-house requires considerations of needs, resources, and uniqueness. Needs must be defined by things such as objectives and skills to achieve and those needs have to be prioritized. Resources such as time, personnel needed for the implementation and support, and money, considering short-term and long-term benefits, should be factored into the decision. The type of skills, whether they are organizational,

job specific, or general, help determine the level of uniqueness required of the training (Francis & Emelo, 2002).

When considering what technology should be selected, it is crucial to work closely with the IT department to ensure a feasible technology is selected (Garrett & Vogt, 2003). Technology is an instrument that enhances learning and should be used in that form (Maehl, 2004) as opposed to focusing on the bells and whistles the technology may be capable of (Kruse, 2000a). Saba (2001) emphasized the importance of not replicating a traditional learning environment, but creating an experience that emphasizes the strengths of the technologies available. One example expressed by Goolnik (as cited in Goolnik, 2002) is that:

> The internet is an excellent tool for distance learning and on-line support training. However, it can only be effective if…those receiving the training have access to the right equipment and software. Personally I think it is the way forward, especially where you have rural issues. (p. 5)

Methods of Delivery

Although organizations are converting to technology-based training methods, they are not replacing classroom training completely (Webb, 2003). According to Bailey (2002) and ASTD's State of the Industry Report (2004b), approximately 60 percent of training remains in the classroom. Blended technology approaches realize that technology-based training will not completely replace traditional training, while acknowledging that appropriate technologies encourage success (Garrett & Vogt, 2003).

There are a variety of ways to offer courses using a combination of technologies, which are defined by The Sloan Consortium (2004). Traditional courses are delivered through written or oral communication with no use of technology. Web facilitated courses provide assistive material through technology, with the majority of instruction being provided in a traditional manner. Blended learning combines traditional and technology-based learning, where a substantial amount of information is provided through the later. Finally, there are online or technology-based courses, where the majority or all of the content is provided through a means of technology, like the internet. The most predominant method provided by organizations is a blended approach.

Advancements in technology broaden the possibilities of mixing delivery methods to meet the needs of learners (Oakes & Green, 2003). With these advancements, the lines between classroom and distance learning become blurred (Osguthorpe & Graham, 2003). In order to promote learning and increase success of training, organizations look for combinations of training methods that increase productivity (Oakes & Green, 2003).

According to Osguthorpe and Graham (2003), blended learning helps to provide a balance between methods in order to express the strengths of each selected method. Blended learning involves three elements: learning activities, students, and instructors, which can be blended in multiple ways (Osguthorpe & Graham, 2003). Determining the way in which these three elements will be blended is a key component in creating an effective program.

As for the actual development aspect, knowing what elements and methods need to be provided is another important factor. Oakes and Green (2003) describe the "magic from the mix," or the ideal combination, to create an effective blended learning program as including rich formal training, a system for informal exchange of information, information provided in small chunks, and support from the training team, as well as co-workers. Using a blended learning approach creates a more effective learning environment suitable for a variety of learning styles (Hofmann, 2003).

Concerns About Adopting Technology-based Training

Technology has become a part of everyday life. As people adopt innovations, such as technologies, they are divided into artificial groups depending on their innovativeness. The number of categories and degrees of innovativeness vary across research. Rogers (2003) divides individuals into five adopter categories: innovators, early adopters, early majority, late majority, and laggards. Accordingly, Puetz (2000) indicates that 10-15 percent of people are early adopters of technology, 50-60 percent of people wait for someone to show them how technology can improve their life, which would make up the early and late majority, and 30-40 percent of people resist technology, which translates into laggards. These numbers reflect an interesting statistic that states that "85-90 percent of an organization's employees may be uncomfortable with new technology and are technophobic, to some degree" (Puetz, 2000, p. 1).

Some innovations are adopted by the majority over a short period of time (Rogers, 2003), while other innovations (e.g., videoconferencing) may take longer to be

widely adopted. In addition to the characteristics of those adopting, Rogers (2003) defines characteristics of innovations that affect the rate of adoption. These include the perceived attributes of innovations (i.e., relative advantage, compatibility, complexity, trialability, and observability), who develops the perceived attributes about the innovation, who creates awareness about the innovation, the nature of the social system, and the extent that change agents promote the innovation.

Although many organizations are currently implementing or planning to implement technology-based training, concerns do exist both on the employee and management levels (Ellis, 2004). Employees are concerned about the time required to complete this type of training, as well as technical skills required and self-discipline (Ellis, 2004; Geisman, 2001). Managers are concerned with the cost of implementing this type of training, the technology requirements, and the fear that the organization will not accept technology-based training (Ellis, 2004). Technological limitations include bandwidth limitations and availability, rate of technological changes, and loss of interaction (Murphrey & Dooley, 2000).

Technology-based Training Competencies

Goolnik (2002) expressed the importance of qualified and competent staff in order to create effective technology-based instruction. With the increase of technology-based training, the need for specialists outweighs the supply of competent technology-based trainers (Foshay, 2001). Just as in academic settings where the importance of providing distance education training and support to faculty and staff

has been documented (Murphrey & Dooley, 2000; Roberts & Dyer, 2005), organizations that plan to design and develop technology-based training should hire people with experience (Escoffery, et al., & Smith, 2005).

The field of technology-based training is a multidisciplinary field that requires knowledge and experience in a variety of areas (Rugelj, 2005). ASTD (2004a) indicated that identifying competencies is necessary to guide management decisions, employee performance, and success in the workplace learning environment. With more people pursuing the field of technology-based training, it is critical to identify the competencies for the field to ensure a more competent and effective technology-based workforce (Murphrey & Dooley, 2006). Research has been conducted to identify necessary competencies by authors such as Thach and Murphy (1995), Williams (2003), Egan and Akdere (2005), and Murphrey and Dooley (2006).

Thach and Murphy (1995) conducted research that studied the roles, outputs, and competencies needed by distance education professionals within the United States and Canada. Participants included employees or affiliates of academic institutions that were teachers, researchers, or administrators in distance education for at least one year (Thach & Murphy, 1995). Thach and Murphy's (1995) research indicated four major roles in distance education which included instructor, instructional designer, technology expert, and administrator. Supporting roles also considered important included support staff, site facilitator, technician, graphic designer, librarian, editor, and evaluation specialist.

Thach and Murphy (1995) grouped the top ten competencies required throughout all roles into the categories of communication skills and technical skills. The communication skills include collaboration and teamwork, writing skills, interpersonal communication, feedback skills, and English proficiency. The authors considered the fact that English proficiency would be a prerequisite in English speaking countries and would rank lower in international cases. The technical skills included organizational skills, planning skills, basic technology knowledge, technology access knowledge, and distance learning knowledge.

These roles and competencies provided a comprehensive model for the design of training and certification programs in the area of distance education (Thach & Murphy, 1995). Thach and Murphy (1995) compared the competencies discovered through their research to the competencies derived from literature and found that "all but two [of the skill areas described in the literature] corresponded to the top ten competencies identified" (p. 69).

Williams (2003) conducted similar research, dealing with roles, outputs, and competencies necessary to implement and manage distance education in higher education. This study found that, in addition to the roles that Thach and Murphy (1995) found, two new roles emerged: leader/change agent and trainer. Williams placed the thirteen indicated roles into four categories: administrator, instructor/facilitator, instructional designer, and technical expert. Both studies found general competencies required across all roles, which included: interpersonal and communication skills,

technology skills, and collaboration and teamwork skills (Thach & Murphy, 1995; Williams, 2003).

Egan and Akdere (2005) studied distance education competencies by gathering information from advanced distance education graduate students. The study identified distance education competencies including basic technology, technology access knowledge, computer networking, knowledge of the distance learning field, multimedia knowledge, software skills, adult learning theory, organizational skills, collaborative and teamwork skills, and data analysis skills. The graduate students surveyed indicated technology competencies as the most important. However, the researcher reported that this could be a result of the focus of the students' courses during graduate studies (Egan & Akdere, 2005). This differed from Thach and Murphy (1995) and Williams (2003), who indicated communication competencies as the most important skill set.

Murphrey and Dooley (2006) expanded on previous studies by focusing specifically on competencies in the field of eLearning and conducted a focus group study of current and past graduate students currently working or planning to work in the field of eLearning. The study indicated seven competencies required for eLearning: proficiency with computers and programs (including interface design), organizational skills, instructional design, evaluation and assessment strategies, adult learning theory, written communication skills, and student/teacher relationships to build a sense of community. This study clearly revealed that a wide variety of competencies are required to work in the field of eLearning (Murphrey & Dooley, 2006), as well as in the distance education field. Like the study by Egan and Akdere (2005), technology skills were

indicated as the most important skill set (Murphrey & Dooley, 2006). While similarities and differences existed across the studies mentioned, all four studies emphasized three skill areas: computer skills, organizational skills, and writing skills (Egan & Akdere, 2005; Murphrey & Dooley, 2006; Thach & Murphy, 1995; Williams, 2003).

Conceptual Model

Figure 1 depicts the conceptual model that was used to guide the development and implementation of the study.

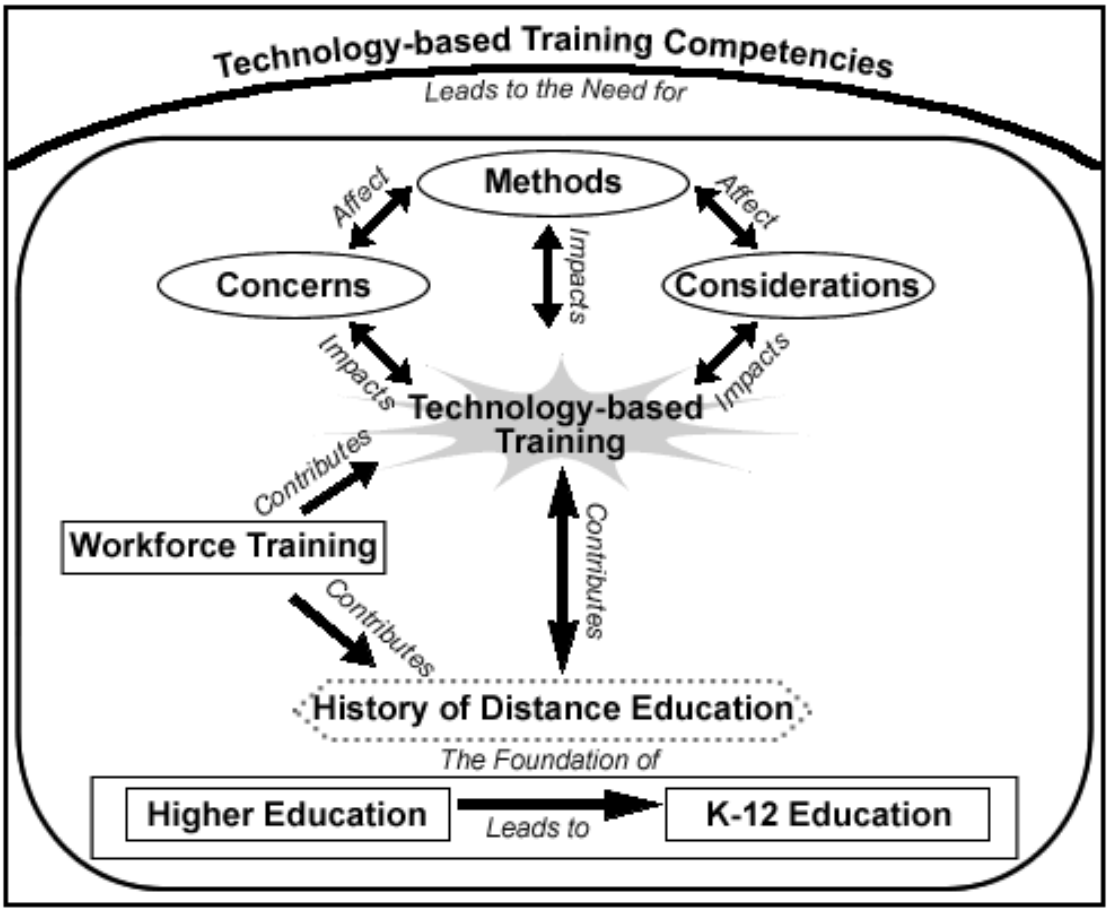

Figure 1. A Conceptual Model to Study Technology-based Training in Organizations.

CHAPTER III

METHODOLOGY

The purpose of this study was to identify organizations that hire agriculture and life sciences students for positions involving technology-based training and identify competencies required for these positions from the perspective of the identified organizations. This chapter describes the research design, population and sample, measurement procedures and instrument, data collection methods, and data analysis used in this study.

Research Design

A qualitative study was conducted to provide quality, in-depth information (Berg, 2001; Patton, 2002). Qualitative research allows one to gather unquantifiable data by examining social settings and individuals in those settings (Berg, 2001). Ideal qualitative research includes "holistic-inductive design of naturalistic inquiry" (Patton, 2002, p. 248). This research was approved by the Texas A&M University Institutional Review Board (#2005-0419) (see Appendix A).

The research was designed based on grounded theory (Glaser & Strauss, 1999), which is "the discovery of [concepts] from data systematically obtained from social research" (p. 2). The design also implemented constant comparative analysis, which is discussed in the data analysis section. Grounded theory was used in order to construct new concepts from emerging themes present in the data collected.

The research design was applied to assist in the collection of data regarding technology-based training in organizations that hire agriculture and life sciences students. Concepts were developed concerning positions, skills, and technologies in the field of technology-based training. The concepts were intended to be incorporated into existing concepts in the areas of technology-based training.

Qualitative research maintains limitations in quality of data and objectivity. Although qualitative research provides a deep understanding of information, it is not necessarily generalizable (Patton, 2002). The information provided and the interpretation of the information is subjective due to the human element. This is also a factor in the validity of the data, which is dependent upon the researcher (Patton, 2002). Patton (2002) discusses how every qualitative study is unique, and although each provides guidelines, they provide no set formula to collect and analyze qualitative data.

On the other hand, qualitative research does not constrain a researcher to any predetermined categories and it allows for the design to be emergent throughout the data collection (Patton, 2002). Qualitative research provides the researcher with the ability to collect data in a way that allows subjects to freely express their feelings and the researcher to capture their intended meaning (Patton, 2002). Therefore, this research design provides the ability to create research that provides a deep understanding of unquantifiable data.

Population and Sample

Purposive sampling was used to select the population for the research. "The logic and power of purposeful sampling lie in selecting *information-rich cases* for study in depth. Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the inquiry" (Patton, 2002, p. 230). Purposive sampling provides rich information that increases the range of data exposed (Erlandson, et al., 1993).

The purposive sample selected for this research was organizations that hire agriculture and life sciences students. In order to identify this group, a list of organizations contacted each year to attend the Career Exposition was obtained from the College of Agriculture and Life Sciences Student Council at Texas A&M University. These organizations have previously been identified as organizations interested in hiring agriculture and life sciences graduates by the College of Agriculture and Life Sciences. The original list represented 163 organizations, but with closer examination the list was reduced to 132 due to insufficient information.

The group was purposely selected due to their interest in hiring students from the College of Agriculture and Life Sciences and due to the fact that most organizations provided recruiter contact information. This contact served as the gatekeeper because they were in a position to encourage organization participation (Berg, 2001). "The keys to access any setting are in the hands of certain gatekeepers, or those who have the authority to allow one to enter their world" (Erlandson, et al., 1993, p. 56).

The gatekeeper, in most instances, provided access to the person most knowledgeable about technology-based training, though in some cases the gatekeeper was actually the person interviewed. A total of 132 organizations were contacted, with 59 interviews conducted. In some instances the researcher spoke with individuals within the organizations, but the individuals were unable to provide any information. If the researcher was unable to speak with an individual, a message was left when possible. Some individuals replied to the message, while others never responded. Table 1 provides a more descript summary of the organizations that were contacted.

Measurement Procedures and Instrument

The instrument used to collect data was a semi-standardized interview guide (see Appendix B). This instrument was developed by the researcher to guide the interviewer and encourage free digression depending on the responses provided (Berg, 2001). The guide consisted of five open-ended essential questions designed to address the objectives of the study. With each essential question, there were also probes included to encourage more precise and in-depth information from the subjects (Berg, 2001).

Question one inquired about the position and job duties of the subject. This information was requested in order to gain a better understanding of what role the subject played in technology-based training. Also, this provided information about how technology-based training was managed in the organization. Questions two, three, and five addressed specific objectives of the study, including what media and methods were being used, who was developing the content, and examples of training. Question four

Table 1

Summary of Interview Contacts Regarding Technology-based Training (N=132)

Description	*Amount*	*N*
Total Number in Original List	163	
Deleted from List Due to Insufficient Information	31	
Total Number Available for Contact		132
Organizations Contacted Based on Use of Technology-based Training		
Indicated Use of Technology-based Training	24[a]	
Indicated No Use of Technology-based Training	35	
Organizations Contacted – Provided Information		59
Organizations Contacted – No Information Provided		2
Organizations Contacted – No Reply		71
Total Number Contacted		132

Note. [a] One individual indicated the use of technology-based training, but did not provide any additional information.

provided an opportunity for the subject to provide additional information, as well as request more information from the researcher. This question also provided an opportunity for an informal conversation about the topic at hand.

The instrument was untested, but was approved by professionals that have conducted extensive qualitative research, similar to that conducted in this study. The open-ended nature of the questions provided opportunities for in-depth responses to be

provided. The interviewer was responsible for using probes to encourage more extensive responses as needed.

Data Collection

Data was collected through interviews, documents, and literature. Information was obtained primarily through the interview process. An interview is a conversation with a purpose (Berg, 2001). In some instances, documents were provided by interviewees as additional information related to the organization.

The data collection was intended to explain the positions, skills, and technologies used by the identified organizations through semi-structured telephone interviews. While face-to-face interviews are the preferred method, Berg (2001) states that telephone interviews are appropriate when there is a geographical barrier between the researcher and the subjects to be interviewed.

During the initial protocol, the recruiter identified by the College of Agriculture and Life Sciences was contacted. The researcher requested that the gatekeeper provide access to the most appropriate person to interview. The original intent was to then send the identified individual an introductory letter to provide information and setup a time for an interview. After beginning the research, it was found that in most cases the researcher was immediately connected with the appropriate person, who in most cases was willing to have the interview conducted at that time.

Once the appropriate person was reached, the process followed the telephone interview procedure recommended by Berg (2001). The interviews were conducted in

fifteen to twenty minutes. Limitations existed because only some organizations contacted were willing to participate, and some were not willing to provide in-depth information. After interviews were conducted a thank you letter was sent to the interviewee (see Appendix C), along with an information sheet explaining the study (see Appendix D).

In order to enhance the credibility of the interviews, triangulation was conducted throughout the interview by requesting an example of their actual training programs, when available, and through analysis of the literature. Fielding and Fielding indicated (as cited in Berg, 2001) that an "important feature of triangulation is not the simple combination of different kinds of data but the attempt to relate them so as to counteract the threats to validity identified in each" (p. 5). This idea was implemented into the analysis of the data that was collected to increase the richness of the data and confidence in the findings (Berg, 2001; Erlandson, et al., 1993).

A coding system was used to create an audit trail and ensure confidentiality. As organizations were contacted and interviews were conducted, codes were given. Organizations were coded C01 through C55 and agencies were coded A01 through A05. Documents were also given codes D01 through D04. Once the organization or document was coded, the organization name was no longer associated with the information.

After approximately ten organizations had been interviewed, information collected to that point was analyzed. At this point, a peer debriefing was held with committee members. Emerging themes were indicated through a memo (see Appendix

E), and a plan for contacting the remaining organizations was developed. The committee reviewed the data that had been collected thus far and approved the continuation of the collection process.

Organizations were contacted a minimum of two times. After each organization had been contacted at least twice, a final peer debriefing was held. Another memo was provided to committee members that included themes that had emerged in the pre-analysis of data (see Appendix F). It was determined that sufficient information had been collected. This was determined according to Strauss and Corbin's (1998) theoretical saturation, which is reached when no new information emerges during the analysis process. At that time, the data collection phase ended.

Data Analysis

Grounded theory (Glaser & Strauss, 1999) generates concepts using the constant comparative method to identify categories and relationships that exist among the data. Grounded theory "strives to 'provide researchers with analytical tools for handling masses of raw data'" (Patton, 2002, p. 489). The researcher used this method as a guide for becoming immersed in the data during the analysis process.

The data collected was analyzed through the constant comparative method of qualitative analysis. This method places relevant data, which contribute to a common idea, into categories that through integration and delimitation create concepts (Glaser & Strauss, 1999). This process allowed relationships to emerge and assist in defining and understanding the concepts that were present.

There are four stages of the constant comparative method: “1) comparing incidents applicable to each category, 2) integrating categories and their properties, 3) delimiting the theory, and 4) writing the theory” (Glaser & Strauss, 1999, p. 105). Using this method, the researcher coded similar statements throughout the research using a color coding technique. Once this stage of the process was complete, the coded data was grouped into themes and analyzed further to develop sub-categories of each theme. The concepts were therefore developed with supporting facts from interviews and documents collected throughout the research.

In order to ensure trustworthiness of the research, multiple measures were taken. Credibility was established through triangulation, which was used when available, and peer debriefings. Thick description, which is the foundation of qualitative research, was used to provide transferability of the study. The coding system was implemented to provide an audit trail so one could “determine if the conclusions, interpretations, and recommendations can be traced to their sources” (Erlandson, et al., 1993, p. 35) as a means of dependability and confirmability.

Although a variety of responses were provided, due to the open-ended nature of the instrument, similarities began emerging throughout the data collection process. Using the constant comparative method, the researcher compared each piece of data with data previously analyzed in all groups that had emerged (Glaser & Strauss, 1999). Categories began forming and each piece of information fell into a specific category. Through constantly comparing the categories and information within each, themes emerged and concepts were developed.

CHAPTER IV

FINDINGS AND DISCUSSION

The purpose of this study was to identify organizations that hire agriculture and life sciences students for positions involving technology-based training and identify competencies required for these positions from the perspective of the identified organizations. Findings and discussion will be presented based on themes and categories that emerged from the data.

Profile of Respondents

Of the 132 organizations contacted, 59 interviews were conducted. Interviewees were asked to provide their position. This information was analyzed and it was found that of the 59 interviewees the majority of the reported positions were in human resources, while others fell into the categories of information technology or management. Table 2 provides a list of the positions indicated by interviewees.

The organizations contacted were geographically dispersed. All interviews conducted involved individuals located in the United States, with the exception of one which was located in Canada. Although the interviews were conducted with individuals located in the United States, many of the organizations contacted were international organizations. The size of organizations contacted varied from small to large organizations. The interviewees represented organizations that ranged from government agencies, to production and manufacturing, to service organizations.

Table 2

Summary of Positions of Those Interviewed Regarding Technology-based Training (N=59)

Position	Codes
Accounting Manager	C49
Application Developer	C44
Consultant and Hiring	C10
Corporate Director of Training	C18
Director of Management Education	C31
Director of Scientific Communications	C07
General Manager of Information and Technology	C19
General Manager/Executive Vice President	C08
Head of Human Resources	C09
HR – Recruiting	C24, C25
Human Resources - no description provided	C17, C27, C32, C37
Human Resources Manager – all human resources functions	C29
Human Resources Officer	A05
Manager of Sales Training	C55
Manager of Training and Development	C36
Managing Partner	C39
National Distributor Manager	C21
Office Manager	C06
Organizational Development Trainer	C54
Owner	C33, C51
Personnel Management Program Coordinator (training)	A02
President	C01
Senior Recruiter	C46
Senior Vice President and Chief Information Officer	C52
State Director	A01
Training Administrator	C05
Training and Development Manager	C47
Training and Document Manager	C16
Training and Recruiting Manager	C53
Training Manager	C23, C41
Title not provided.	A03, A04, C02, C03, C04, C11, C12, C13, C14, C15, C20,C22, C26, C30, C34, C35, C38, C40, C42, C43, C45, C48, C50

The majority of organizations that indicated that they were currently conducting forms of technology-based training were international organizations (C03, C06, C07, C09, C16, C19, C21, C25, C29, C31, C32, C36, C46, C44, C52). A few of the organizations were national (A01, A04, C18, C24), a few were state-wide organizations (A02, A05), others were national with international subsidiaries (C27, C55), and one organization was a national subsidiary of an international organization (C41). Of those reporting size, organizations ranged from approximately 500 employees (C29) to greater than 240,000 employees (C21).

The organizations that indicated the use of technology-based training were broken down into seven types of organizations: plant services, products and science; government agencies; food and beverage; medicinal; structural supplies; animal feeds; and agricultural information service. The plant services, products, and science group included manufacturers of plant and planting equipment and products (C29, C32, C36, C46), plant service providers (C06, C44), and a plant research, development, and service organization (C09). The government agencies that indicated use of technology-based training methods included two national government agencies (A01, A04) and two state government agencies (A02, A05). The food and beverage group included meat and food product manufacturers (C21, C27, C41) and a beverage distributor (C18). The medicinal group consists of pharmaceutical organizations (C25, C52) and biotechnology and biological development and research organizations (C03, C07). Structural supply organizations included a plumbing supply distributor (C16) and a window and door manufacturer (C31). The animal feeds category was represented by a single animal

science and nutrition organization (C55). Finally, the agricultural information service organization was a provider of information about innovative products and services in the agriculture and food industry. See Table 3 for a complete breakdown of the types of organizations.

Table 3

Types of Organizations That Indicated the Use of Technology-based Training (N=24[a])

Organization Type	Codes
Plant Services, Products, and Science	C06, C09, C29, C32, C36, C46, C44
Government Agencies	A01, A02, A04, A05
Food and Beverage	C18, C21, C27, C41
Medicinal	C03, C07, C25, C52
Structural Supplies	C16, C31
Animal Feeds	C55
Agricultural Information Service	C19

Note. [a] One interviewee did not provide information describing the organization (C24).

Why Organizations Are Not Conducting Technology-based Training

As organizations were contacted, they were initially asked whether or not they conducted technology-based training. It was found that due to certain characteristics of the organization, many did not conduct this type of training. These characteristics included size, type of training required for the organization, access, organizational

culture, and lack of resources. As for lack of resources, some organizations had implemented limited amounts of technology-based training, but were unable to increase the amount offered.

Size

Some organizations stated that they did not conduct technology-based training because they had a small number of employees (C01, C08, C33, C43, C50). Small was indicated by interviewees as being between forty employees and one hundred and fifty employees (C01, C08, C50). Another interviewee indicated that the lack of permanent employees, or the large amount of those hired on a project related basis, was the reason for not conducting this type of training (C33).

Type of Training Required for the Organization

Several of the organizations indicated that the type of training they needed to conduct was not suitable for a technology-based method (A03, C05, C10, C32, C39, C42, C45, C48). Some interviewees stated that hands-on or experiential training was required in their organization (A03, C05, C32, C42, C45). One interviewee indicated that their organization sold services, so they promoted face-to-face interaction (C10). Others indicated that the nature of the business, such as using large machinery (C32), horticulture skills (C39), and advanced engineering (C48), did not lend itself to conducting technology-based training.

Access

A few interviewees indicated that they did not have access to the technology (A02, C26, C53). One expressed that everyone in the organization did not have access

to computers (A02). While another interviewee indicated that in addition to not having access to computers, many branch employees were not capable of being up to speed with technology; going on to add that "technologies are there, but [they were] not capable as a system" (C53) [System was defined by the interviewee to mean the organization as a whole, encompassing branches, offices, subsidiaries, etc.]. Further, an interviewee discussed the lack of information about technology-based training from the professional organization to which they affiliated (C26).

Organizational Culture

Organizational culture was a prominent factor in explaining why certain organizations were not implementing technology-based training (A02, A05, C01, C11, C27, C32, C33, C43, C47, C51). These factors ranged anywhere from the amount of training conducted to the types of employees and employee preferences.

A few interviewees expressed the need for classroom training due to the organization focus on instructor-led training (C27), training being new to the organization (C47), and employees preferring to go to a classroom (C32). In one interviewee's personal opinion:

> There is a noticeable difference between those who do take online courses…they have less of a grasp of what they are learning than those who take the course in the classroom and have interaction with the instructor and other agents (C33).

Another organization indicated that most employees were local and it was more cost effective to fly in the few that were geographically dispersed than to create technology-based training (C11).

Some of the interviewees shared that there was no formal training in the organization. One indicated that they asked employees to research and find training on their own and the organization paid for the training (C51). Whereas a separate organization left it up to individuals and their supervisor to find and complete training that was needed (A05). Another indicated that training was done on a case-by-case basis as the need arises (C43). Other areas mentioned included an older workforce (A02) and employees that had been with the organization for an extended period of time and thus did not need training (C01).

Lack of Resources

Lack of resources was indicated as a reason for not conducting technology-based training (A05, C27). These resources included money, specialized skill, and time. One interviewee noted that besides new employee training being provided through technology-based methods, little in-house training was done due to budget cuts (A05). Another organization projected that more technology-based training would be implemented over the next two to three years. Although, they will need someone with time to implement technology-based training, as well as employees finding time to complete it within their schedules, in a more self-directed manner (C27).

Interest in Technology-based Training in the Future

Many of the organizations that were not currently conducting technology-based training expressed interest in implementing some in the future (A02, C01, C08, C10,

C26, C36, C43, C45). Their reasons for being interested included networking and interaction and matching media with methods.

Networking and Interaction

Organizations were interested in the possibilities available through technology-based methods. Being able to connect with others in the field was indicated by one interviewee as being an asset of videoconferencing (C10). In addition, the ability to connect with employees external to the main office and create an interactive environment was of interest to another (A02). Along these same lines, one interviewee indicated that although they were currently conducting technology-based training, there was a need for more, including organization specific training to provide to sales employees that work outside of the office and to international employees (C36). Other organizations expressed interest in industry-wide technology-based training to accompany certification and licensing procedures (C26, C08).

Matching Media with Methods

Interviewees expressed the importance of matching media with methods. Finding the right topic for delivery via technology-based training can be difficult (C43). One interviewee indicated that areas such as sexual harassment or diversity were possibly good topics for delivery using these methods (C43). Another expressed that having a “virtual” training experience could provide a safer environment and encourage better communication (C45).

Organizations That Are Conducting Technology-based Training

Twenty-four organizations interviewed indicated use of technology-based training. Of these organizations, a substantial amount of technology-based training was reported as being created internally. However, it was interesting to note that a nearly equivalent amount was reported as being created externally (see Table 4). Internal training is training created by someone inside of the organizations. External training refers to training developed by someone outside of the organization or purchased off-the-shelf.

Table 4

Creation or Acquirement of Technology-based Training by Organizations Interviewed (N=16)

Description	*N*[a]
External	4
Internal	5
Both	7
Total	16

Note. [a] Only 16 of the 59 interviewees provided information pertaining to where training was created or acquired.

Training Created Externally

Multiple organizations indicated that their technology-based training was created externally. Two organizations specifically indicated that the majority of their

technology-based training was developed externally (C36, C54). Another interviewee indicated that their CD-ROM training was purchased from vendors and online training was provided by an external source (C29). Additionally, a different interviewee shared that their technology-based training was outsourced, with some purchased "off-the-shelf" (C52).

Training Created Internally

Several organizations indicated that their technology-based training was created internally (A01, A05, C16, C21, C27). One interviewee indicated that some training was developed within specific departments, but a lot of the training originated from the agency headquarters (A01). Another interviewee indicated that technology-based training was created internally, yet hosted on an external server (C27). Others indicated that their training was created through collaborative work between departments (C16, C21).

Training Created Both Externally and Internally

While some organizations indicated that technology-based training was developed either externally or internally, many interviewees noted that their technology-based training included both training developed internally and externally (A02, C07, C09, C24, C31, C55). Interviewees indicated that although the training was created internally, external assistance was accessed to assist with the technology aspects of technology-based training (C24, C55). One interviewee stated that "technical training is developed in-house, but many of the software application training programs are 'off-the-shelf' training" (C09). Another interviewee expressed a similar situation (C31).

Type of Content Developed Externally and Internally

Data collected revealed that training developed internally included content specific, technical training, and organization specific topics (C09, C36, C55). Technology aspects of training were often created through external sources (C24, C55). Finally, professional development was created both internally and externally, depending on the organization (C07, C09, C29, C31).

Technology-based Methods Used for Training

Interviewees were asked about methods used to conduct technology-based training. Internet/online, CD-ROM, intranet, webinars, satellite, and blended learning were all indicated as utilized methods. The most frequent response was internet or online training (A01, A02, A03, C09, C16, C18, C24, C25, C27, C29, C31, C54). The training provided through the internet varied greatly, ranging from online readings to full banks of training modules.

Some interviewees indicated using the internet for other purposes, besides formal training. One organization noted that employees conducted research on the internet, but nothing formal (C39). Another said that their organization used the internet, mainly educational sites with extensive research details, to reinforce what the reference books taught them (C08). It was also noted that online self-directed courses were provided to the employees by one organization, in conjunction with a local community college (C32).

CD-ROM training was mentioned frequently as a method (A01, C06, C07, C09, C16, C29, C31, C36, C55, C53). In one instance the CD-ROM provided a "library" of modular training, complete with an assessment and immediate feedback (C09). Yet others indicated that CD-ROMs provided supplemental, pre-training information to employees (A01, C53). One interviewee stated that "technology-based training is strictly CD-ROM" (C06), while others were using multiple methods.

Other methods used included intranet (C09, C16, C52), webinar training (C19, C46), and satellite training (A03). Blended learning was also discussed by one interviewee, which is a combination of delivery methods (C31). This method provided pre-course material in the form of a presentation, video, or other technology, a traditional classroom component, and a follow-up or post course that may be provided through a video or a web site (C31). Another example of blended learning was telephone-based conference calls where participants received a CD-ROM in advance that included a presentation (C31).

Types of Training Offered Through Technology-based Methods

An extensive list of types of training was collected throughout the interviews. This list of training was synthesized into four categories which included organization/industry specific training, professional development, human resource training, and computer training. Table 5 provides interviewees responses to types of training offered through technology-based methods.

Table 5

Types of Training Offered Through Technology-based Methods (N=23)

Description	*N*
Organization/Industry Specific Training (e.g., policies and procedures, sales)	18
Professional Development (e.g., business skills, leadership, communication)	17
Human Resource Training (e.g., sexual harassment, safety, ethics)	15
Computer Training (e.g., software applications, internet security)	12

Note. Interviewees could respond with multiple responses.

Organization/Industry Specific Training

Organization/industry specific training (A05, C06, C07, C09, C16, C18, C19, C24, C31, C36, C41, C52, C54, C55, D02) was described as training specific to the organization or training that can be carried out throughout organizations in a specific industry. Often industry specific training is implemented by professional associations or industry agencies. This type of training included online readings (C07), compliance or legal skills (D02, C36), policies and procedures (C19, C52), product training (C18), health plan training (C06), technical skill training (C09), code of conduct (C36), core values (mission and vision) (C41), sales (C31, C54, C55), training manuals (C16), refresher courses for ongoing projects (C24), and new employee training (A05, C54, C55).

Professional Development

Professional development (A03, C09, C21, C29, C31, C36, C55, D02) included skills that can be applied in any organization across industries, which will add to personal marketability. Professional development included interpersonal skills (D02), business skills (D02, C36), financial service skills (D02), leadership training programs (C09, C29, C31, C36), soft skills (C09), management or supervisory skills (A03, C21, C55), finance (C31), communication skills (C36, C55), negotiation (C36), and setting goals (C55).

Human Resource Training

Human resource training (A01, A03, C06, C07, C09, C21, C24, C27, C31, C36, C46) was described as either annual or mandated training that can be found across industries. Interviewees identified the following training, which became the human resource training group: sexual harassment (C07, C46), workplace etiquette (C07, C21), safety (C06, C31), mandated training (i.e., ethics, workplace violence, conflict training, EEO, security, OSHA required training) (A01, A03, C09, C36), human resource training (C24), basic training (C27), recruitment (C46), employee relations (C46), and customer service training (C55).

Computer Training

The final group of training was computer training (A01, A03, C19, C24, C25, C29, C31, C36, C44, C55, D02). This group included any kind of basic computer or desktop skills, software or computer application training or internet security training.

Learning Management Systems

Interviewees were questioned regarding where technology-based training was located and if their organization used a learning management system, or something similar, to provide training to employees. Most of the organizations that were using a form of a learning management system had purchased the system from an external vendor (C09, C16, C29, C31, C36, C55). One interviewee discussed how the learning management system was implemented into the organization's intranet (C16); while others indicated that the system was provided through the internet (A01, C29, C36, C55).

Some organizations indicated that the learning management system also included ready-made content (C29, C36, C55). A separate system was simply used to guide the process of supplying the content (C24), while one learning management system was provided by the executive branch of the agency (A01).

Positions and Departments Responsible for Technology-based Training

While some organizations indicated that technology-based training was created externally, information regarding these external groups was not provided. Interviewees indicating that training was created internally were questioned further regarding who was responsible for the internally created training. It was revealed that while some training was created through the human resources department, most of the organizations had small training groups that worked with information technology departments to create technology-based training. Three interviewees provided job description documents.

The titles on these documents included: eLearning Consultant (D01), State Recruiting and Training Manager (D03), and Instructional Designer (D04).

Human Resources Department

In some instances it was indicated that the human resources department was responsible for technology-based training (A05, C25, C31). One interviewee stated that the "human resources specialists are in charge of technology-based training for computer applications and beyond that, it is left up to each individual department" (C25). Another interviewee indicated that the development of technology-based training was a collaborative effort in the human resources department, with the web maintenance being the responsibility of a single employee (A05).

Small Training Groups or Departments

In one organization it was indicated that there was no official training department, managers simply identify what is needed and work with the information technology department to create it (C06). Two organizations' training teams were made up of two people that receive assistance from the information technology departments (A02, C09). Another training department, made up of five members, receives assistance for web development (C36). One interviewee identified specific positions for technology-based training development (C52).

Skills and Competencies for Technology-based Training

Interviewees were asked about skills and competencies for positions in technology-based training. Five interviewees were able to provide this information, with

three interviewees also providing a job description with additional information. The documents provided were further analyzed and were consistent with information provided by the interviewees.

Primary skills and competencies mentioned included presentation skills (C09), instructional design (C09, C16, C31, D04) or "technical writers" (C16), transferring learning (C09), needs assessments (C09, C16, D03), technology/computer skills (C18, C19, C31, D04), writing skills (C16, C31, D04), research (C31), interpersonal skills (C16, C18, C31), management and leadership skills (D04), planning and organizational skills (C18, D01), communication skills (D01), ability to be a change agent (D01), collaborative or team work (D01), training evaluation (D01, C09), creativity (D01), curriculum development (D03), management skills (D03), and project management (C19).

One interviewee indicated the importance of having experience in eLearning (D04). Other skills that were mentioned included the ability to see training from the users' perspective (C16), graphics (C31), web-page design and publishing skills (D04), organization background (C31), and effective delivery of eLearning (D01). There were a variety of technology skills mentioned that included everything from basic computer skills (C18) to software development and network administration (C19). One interviewee expressed the need for a technology background, but also added that support was provided by the Information Technology Department (C31).

One interviewee indicated that the three most important characteristics are the ability to perform accurately, completely, and concisely (C16). Another stated that adult

learning was the number one skill needed (C09). Yet, another interviewee thought that instructional design was most important (C31). Throughout the interviews, seven skills and competencies were repeatedly mentioned, which indicated that these skills were of high importance in the development of technology-based training for the organizations interviewed (see Table 6).

Table 6

Prominent Technology-based Skills and Competencies Indicated by Interviewees (N=5[a])

Skill	Codes
Instructional Design	C09, C16, C31, D04
Technology/Computer Skills	C18, C19, C31, D04
Needs Assessment	C09, C16, D03
Interpersonal Skills	C16, C18, C31
Writing Skills	C16, C31, D04
Planning and Organizational Skills	C18, D01
Evaluation Skills	C09, D01

Note. [a] In addition, three print documents were provided for additional analysis.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter provides a summary of the study conducted, a summary of the findings, conclusions derived from the information gathered, and a section that offers application of study findings and recommendations for further research.

Summary of the Study

The purpose of this study was to identify organizations that hire agriculture and life sciences students for positions involving technology-based training and identify competencies required for these positions from the perspective of the identified organizations. This study was formulated to describe the technologies that the identified organizations were using to design and deliver technology-based training, the audience that the organizations were providing training to, and the competencies that the identified organizations were seeking in potential employees. The following objectives were achieved in order to complete this study:

1. Identify organizations that hire agriculture and life sciences students that were implementing technology-based training.
2. Identify positions related to technology-based training that were available in the organizations identified as implementing technology-based training.
3. Describe the design and delivery methods used to implement technology-based training in the organizations identified.

4. Identify competencies required for the identified positions associated with technology-based training.

This qualitative study (Berg, 2001; Patton, 2002) was designed based on grounded theory (Glaser & Strauss, 1999). Through purposive sampling, organizations that hire agriculture and life sciences students were selected and contacted to participate in a telephone interview. The interview process followed a semi-standardized interview guide, which consisted of five open-ended essential questions and probes for each question. Each essential question was created to answer the objectives of the study. After data was collected, it was analyzed through the constant comparative method of qualitative analysis. The constant comparative method allowed the researcher to group ideas present in the raw data into themes and develop concepts from these emerging themes.

Summary of the Findings

Of the 132 organizations contacted, 59 interviews were conducted. Of the 59 interviews conducted, 35 indicated no use of technology-based training, while 24 reported use of technology-based training. The majority of individuals that were interviewed were in information technology or human resource departments. The organizations contacted were geographically dispersed and varied in size and type of organization.

Organizations were contacted and asked if they were conducting any forms of technology-based training, which was further explained if necessary. Many

organizations indicated that they were not conducting this form of training for reasons that included organization size, type of training required for the organization, access to technologies, organization culture, and lack of resources. Of the 35 organizations that were not conducting technology-based training, many expressed interest in implementing a form of this type of training in the future. Some thought it would provide an opportunity to network and connect with geographically dispersed employees, as well as people within the industry. Others expressed interest in finding appropriate training to provide through technology-based methods.

As shared earlier, twenty-four organizations that were contacted and provided information reported conducting technology-based training. These organizations were primarily international organizations, with only a few national and state organizations. The organizations were broken down into seven types (i.e., plant services, products and science; government agencies; food and beverage; medicinal; structural supplies; animal feeds; and agricultural information service), with the majority of them being involved in plant services, products, and science. Government agencies, food and beverage, and medicinal organizations were the other types of organizations that represented a large segment conducting technology-based training.

Organizations reported technology-based training as being created both internally and externally. Four organizations indicated that the majority of their technology-based training was created externally, being either purchased from vendors or created by an external source. Technology-based training was reported as being created completely internally by five organizations. On the other hand, the majority of the organizations

reported creating some technology-based training internally and using external sources for additional technology-based training. Externally developed training was created for general or professional training, while training created internally involved organization specific training.

Technology-based training was described as being provided through a variety of methods across the organizations interviewed, with the majority of the training being provided through the internet. Another method that was widely used was training provided on CD-ROMs. Methods less common across the organizations included intranet, webinars, and satellite. One organization specifically discussed blended learning as a method that they utilized, while others indicated using the internet for informal training purposes.

The types of training provided through technology-based methods reported by these organizations varied greatly. Training types were categorized into four groups: organization/industry specific training, professional development, human resource training, and computer training. The most common training programs provided through technology-based methods included computer training, leadership training, mandated training, management or supervisory training, new employee training, and sales training.

Learning management systems were used by some of the organizations for multiple reasons. Some used them for simply supplying their training through a secure online system. Some not only used the system to provide the training to employees, but also purchased actual training content from the vendor. Another organization used the vendor's platform for assistance in creating their technology-based training.

Organizations that indicated that their training was created internally were further asked about who was responsible for the creation of the training. Some of the training was created through the human resources department. The majority of organizations identified a small training group that worked with the information technology department to create technology-based training. Three interviewees provided titles for positions responsible for technology-based training. These titles included: eLearning Consultant, State Recruiting and Training Manager, and Instructional Designer.

Finally, interviewees were asked about skills and competencies specific to technology-based training positions. Although most interviewees were unable to provide information, some provided not only their own words, but also job descriptions. Skills required ranged from general skills to more specific technology skills. Instructional design and technology/computer skills were the skills and competencies most frequently emphasized by the interviewees. Additional skills that were stressed included: the ability to conduct a needs assessment, interpersonal skills, writing skills, planning and organizational skills, and evaluation skills.

Conclusions

Multiple conclusions were drawn from the findings of this study. The findings revealed that several organizations that hire agriculture and life sciences students are implementing technology-based training. Approximately 40 percent of the organizations interviewed indicated that they were implementing this type of training. While a higher percentage of organizations interviewed, 60 percent, are not currently

conducting technology-based training, the findings provide evidence to conclude that a substantial number of agriculturally related organizations are implementing some form of technology-based training.

While many of the organizations that interviewed were not currently conducting technology-based training, a substantial number expressed interest in implementing this type of training. In addition, factors including size, type of training, access, organizational culture, and lack of resources were revealed as barriers to the use of technology-based training. This supports previous research in "How to Use Training to Accelerate Growth" (Sandler, 2005), which indicates that large organizations are most likely to implement technology-based training. As technologies evolve, technology-based practices spread, and support for technology-based instruction increases, organizations may be able to overcome the barriers to technology-based training through increased access, greater options regarding the types of training that can be delivered, and more available resources due to support. One can conclude based on these findings, that there is a possibility that the future will bring an increase in technology-based job opportunities.

Of the six types of organizations that emerged from the data, four types of organizations (i.e., plant services, products, and science; government agencies; food and beverage; and medicinal organizations) were utilizing technology-based training more than other types of organizations (i.e., structural supplies, animal feeds, and agricultural information service organizations). Particularly, organizations involved in the area of plant services, products, and science more commonly used technology-based training.

Given this information, it can be concluded that an individual in agriculture and life sciences, interested in technology-based training, would be more likely to find a job in an organization involved in one of these areas.

As increasing numbers of organizations adopt the use of technology-based training, more organization specific training is desired. This requires the employment of individuals internally who possess the set of skills to oversee or create this training. Findings revealed in this study indicate that organizations not only have the need for technology-based training, but also need individuals experienced in creating and providing technology-based training, which suggests that there may be an increase in technology-based training positions within these organizations.

Information collected from interviews and documents revealed a specific skill set required of individuals working in the area of technology-based training. The documents collected from interviewees indicated three job titles for positions relevant to technology-based training, which include: eLearning Consultant, State Recruiting and Training Manager, and Instructional Designer. Based on these documents, one can conclude that position titles for technology-based training positions vary greatly. Given the diversity of these titles, as well as the variety of departments the researcher was directed to visit with during the interview process (e.g., human resources, training, and information technology), individuals pursuing a career in technology-based training should explore an assortment of positions and departments. On the other hand, findings revealed that external sources are recruited to create and implement technology-based training for some organizations. This suggests that technology-based training positions

may be just as plentiful in organizations specific to technology-based training as in industry-specific organizations.

While organizations reported a variety of methods to deliver technology-based training, the internet and CD-ROM were found to be dominant delivery methods in the organizations interviewed. This finding may indicate a greater need for eLearning specialists. The finding that webinars were used by a few organizations and that some organizations were encouraging the use of the internet for informal training indicates support of new technologies. This lends further support to the prediction that there will be an increase in technology-based training across organizations.

Some interviewees expressed that although they were conducting technology-based training, it would never completely replace traditional training. One organization specifically identified blended learning and its importance, while others unknowingly identified this type of learning. These findings support that of previous research (Garrett & Vogt, 2003; Hofmann, 2003; Oakes & Green, 2003; Osguthorpe & Graham, 2003), that predict an increase in this type of delivery.

A wide variety of training was reported as being delivered through technology-based methods. Interviewees indicated that technology-based training was primarily being used for organization/industry specific training. In addition, computer training, human resource training, and professional development were noted. Computer training was noted as a prominent type of off-the shelf training provided through technology-based methods, which supports Ellis' (2004) findings. Based on these findings, one can

conclude that organizations that hire agriculture and life sciences students have a need for diverse content.

The findings revealed seven key skills and competencies needed to work in technology-based training: (a) instructional design, (b) technology/computer skills, (c) the ability to conduct a needs assessment, (d) interpersonal skills, (e) writing skills, (f) planning and organizational skills, and (g) evaluation skills. Based on these findings, technology-based training competencies closely coincide with eLearning competencies, with only adult learning theory not appearing as a key competency, yet it was identified. As found in Murphrey and Dooley's study (2006), the eLearning field has unique competencies. This study may coincide so closely, due to the fact that most organizations interviewed use online methods to provide training to employees.

When comparing the current study to the previous competency studies (see Table 7), it is apparent that computer skills, interpersonal skills, writing skills, and planning and organizational skills are important to any aspect of technology-based fields. As in eLearning competencies, instructional design was specifically mentioned in this study as an important competency. Other studies mentioned similar competencies that are parts of instructional design, but only Williams' (2003) study indicated these aspects in the top ten competencies. Technology/computer skills, similar to the eLearning competencies, cover a general area; whereas the other studies broke this area down into specific skills, which were all mentioned in their top ten competencies. It is important to note that in previous studies evaluation and assessment skills have been treated as a

Table 7

Comparison of Technology-based Training Skills to Existing Literature

Technology-based Training Competencies	Murphrey & Dooley (2006)	Egan & Akdere (2005)	Williams (2003)	Thach & Murphy (1995)
Instructional design	Instructional design	Not in top ten; #16	Skills in development of collaborative student-focused learning environment	No Mention
Technology/ computer skills	Proficiency with computers and programs and interface design	Basic technology; Technology access knowledge; Knowledge of distance learning field; Multimedia knowledge; Software skills	Basic technology knowledge; Knowledge of distance learning field	Knowledge of distance learning field; Basic technology knowledge; Technology access knowledge
Needs assessment	Evaluation and assessment strategies	Not in top ten; #21	Not in top ten; #22	Not in top ten; #18
Interpersonal skills	Student/teacher relationship	Collaborative and teamwork skills	Collaboration and teamwork skills; Interpersonal communication skills	Interpersonal communication Collaboration and teamwork; Feedback
Writing skills	Written communication skills	Not in top ten; #13	Writing skills; English proficiency	Writing; English proficiency
Planning and organizational skills	Organizational skills	Organizational skills	Not in top ten; #12	Planning; Organization
Evaluation skills	Evaluation and assessment strategies (repeated)	Not in top ten; #21 (repeated)	Not in top ten; #22 (repeated)	Not in top ten; #18 (repeated)

single skill, but in the current study individuals expressed needs assessment and evaluation skills as individually important factors. Based on these findings, one can conclude that students with expertise in the area of technology-based training are in fact more marketable.

Recommendations

The following section provides application of study findings and recommendations for future research to be conducted based on the findings and conclusions drawn in the study.

Considering that this study focused on a set of organizations with a specific interest, the study should be replicated, not only with another population of organizations that hire agriculture and life sciences students, but also with organizations in other industries. Individuals should be interviewed in these studies to compare frequencies of those who are and who are not conducting technology-based training. Are organizations in other industries implementing technology-based training? What barriers exist? What competencies do these organizations perceive as necessary for someone working in technology-based training? What factors influence the adoption of newer methods?

Given the variety of job titles and departments related to technology-based training revealed in this study, further research is needed. Job descriptions related to technology-based training should be collected and analyzed. A more in-depth study should be conducted to determine what departments are responsible for technology-

based training across organizations in order to more accurately identify job opportunities for individuals with expertise in technology-based training.

Of the organizations in this study that were not conducting technology-based training, many expressed their inability to implement technology-based training due to the technical skills or large equipment that their training involves. Research should be conducted to identify methods to meet the needs of training for technical skills, as well as methods for training on large equipment. One method that should be examined includes simulations, or "virtual training," for large, often dangerous, equipment.

Some organizations expressed interest in having more certifications provided through technology-based methods. These individuals were interested in having preparation courses, practice tests, and actual certification tests provided through technology-based methods. Research is needed to determine to what extent certification programs have been converted to technology-based methods and to measure the effectiveness of these certifications.

While this study supports previous research conducted by Thach and Murphy (1995), Williams (2003), Egan and Akdere (2005), and Murphrey and Dooley (2006), further research is still needed. Additional research should be conducted to more precisely define the competencies required of individuals working in the area of technology-based training.

Technology-based training is a complex and growing industry in itself. As it becomes more prevalent across industries, more detailed information can be determined regarding competencies required and to what extent technology-based training is being

implemented. As technologies continue to change at a rapid pace, technology-based training should be continuously studied in an effort to remain current.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL

VPR
Office of the Vice President for Research
Texas A&M University

Office of Research Compliance

Academy for Advanced Telecommunication and Learning Technologies

Center for Information Assurance and Security

Comparative Medicine Program

Institute for Scientific Computation

Institute for Telecommunications and Information Technology

Integrative Center for Homeland Security

Microscopy Imaging Center

Office of Business Administration

Office of Distance Education

Office of Graduate Studies

Office of Organizational Development and Diversity

Office of Proposal Development

Office of Sponsored Projects

Professional Development Group

Technology Commercialization Center

Texas A&M University Research Park

Texas A&M University

1186 TAMU
1500 Research Parkway
Suite B 150
College Station, Texas
77843-1186

979.458.1467
FAX 979.862.3176

August 29, 2005

MEMORANDUM

Congrats!

TO: Leslie Frazier
Agricultural Education
MS 2116

FROM: Dr. Alvin Larke Jr., Chair
Institutional Review Board
MS 1186

Alvin Larke Jr.

SUBJECT: IRB Protocol Review

Title: A Qualitative Study of Technology-based Training in Companies

Protocol Number: 2005-0419
Review Category: Expedited Review
Approval Date: August 29, 2005 to August 28, 2006

The approval determination was based on the following Code of Federal Regulations:
45 CFR 46.110(b)(1) - Some or all of the research appearing on the list and found by the reviewer(s) to involve no more than minimal risk.

Remarks: Expedited Review Category 7

The Institutional Review Board - Human Subjects in Research, Texas A&M University has reviewed and approved the above referenced protocol. Your study has been approved for one year. As the principal investigator of this study, you assume the following responsibilities:

Renewal: Your protocol must be re-approved each year in order to continue the research. You must also complete the proper renewal forms in order to continue the study after the initial approval period.

Adverse Events: Any adverse events or reactions must be reported to the IRB immediately.

Amendments: Any changes to the protocol, such as procedures, consent/assent forms, addition of subjects, or study design must be reported to and approved by the IRB.

Informed Consent/Assent: All subjects should be given a copy of the consent document approved by the IRB for use in your study.

Completion: When the study is complete, you must notify the IRB office and complete the required forms.

APPENDIX B

INSTRUMENT - INTERVIEW GUIDE

Instrument - Interview Guide

1. What is your official title? (As if you handed me your business card)
    a. Exactly what do you do?
2. When I was given your contact information I was told that the organization was conducting technology-based training, could you describe what your organization is doing?
    a. Methods (Classroom, Audio, Video, CD-ROM, etc.)
    b. Types of media
    c. Is there a particular learning or course management systems that you are using? (WebCT, Blackboard, etc.)
    d. What content is being provided through tech-based training? (management, leadership, technical skills, basic skills, etc.)
    e. Are you using handouts/workbooks, CD-ROM, VHS, etc.?
3. Who develops the content?
    a. Internal
        i. Tell me about the positions in this area.
        ii. What skills do you expect people applying for these positions to have?
        iii. What kind of programs do they use?
        iv. Would it be possible to send me position descriptions to share with faculty to help get the students the correct skill set?
    b. External? (if external – who?)
    c. Purchase content?
    d. So, tell me about the positions in this area.
4. Is there anything else you would like to add? Any questions you have for me?
5. Thank you ------ do you have any links or examples of your training that is created that I could see, we want to make sure that students are getting the right skill set so they will be able to perform at the level expected of them and so students are getting what it is that you require for these positions?

APPENDIX C

LETTER THANKING THE INTERVIEWEE FOR THEIR PARTICIPATION

Date

Dear _____:

I spoke with you a few days ago about technology-based training in your organization. I wanted to thank you for taking time out of your busy schedule to speak with me. I just wanted to follow up and provide you with an explanation of my research. An information sheet is attached with a description of the research. If you have any further questions or concerns, please feel free to contact me. Again, thank you for taking to time speak with me the other day.

Sincerely,

Leslie Frazier
Graduate Assistant
Department of Agricultural Education
Texas A&M University
lfrazier@aged.tamu.edu

Enclosure (1)

APPENDIX D

INFORMATION SHEET

A Qualitative Study of Technology-based Training in Organizations That Hire Agriculture and Life Sciences Students

The research project entitled, "A Qualitative Study of Technology-based Training in Organizations That Hire Agriculture and Life Sciences Students," is being conducted to determine competencies required for job positions in technology-based training in organizations that hire agriculture and life sciences students. The Department of Agricultural Education at Texas A&M University supports the practice of protection for human subjects participating in research. The following is provided for you to decide whether you wish to participate in this present study:

- You will be asked to participate in a phone interview.
- The phone interview will take no longer than 30 minutes.
- All organizations contacted to participate in the Agriculture and Life Sciences Career Exposition will be solicited to participate in the study.
- Your participation in this study is requested on a voluntary basis and you may withdraw from the study at any time without penalty.
- The information you share will remain confidential.

By answering the questions in the interview and in the online survey, you are volunteering your participation. There are no direct risks or benefits of your participation in this study.

If you would like additional information concerning this study before or after it is completed, please contact the investigator by e-mail or phone at: Leslie Frazier, Department of Agricultural Education, Texas A&M University, lfrazier@aged.tamu.edu, (979) 458-2749 or Dr. Theresa Pesl Murphrey, Department of Agricultural Education, Texas A&M University, t-murphrey@tamu.edu, (979) 458-2749.

This research study has been reviewed and approved by the Institutional Review Board – Human Subjects in Research, Texas A&M University. For research-related problems or questions regarding subjects' rights, contact the Institutional Review Board through Ms. Angelia Raines, Director of Research Compliance, Office of Vice President for Research at (979) 458-4067 (araines@vprmail.tamu.edu).

APPENDIX E

PEER DEBRIEFING MEMO

DATE: October 14, 2005

TO: Dr. Theresa Murphrey, Visiting Assistant Professor
Dr. Kim Dooley, Associate Professor and Associate Department Head
Dr. Larry Dooley, Associate Professor

FROM: Leslie Frazier, Graduate Assistant

SUBJECT: Peer Debriefing

My research is well on its way and I am now in the stage of data collection. I have collected some data and would like you to review the information that I have found. I would like to, as a group, discuss the current and future direction for this stage of research. Below, I have listed important information about what data has been collected to date.

As of October 10, 2005:

- Called 35 organizations
- Spoken with 14 organizations
- 7 said they are not using technology-based training
- 1 organization does tech-based training, but unable to give me specifics or transfer me to anyone else
- 1 organization has policy that doesn't allow market survey or solicitation
- 5 organizations are doing some form of tech-based training

Emerging Themes:
(Interview codes are provided after each statement)

- Some organizations are not conducting technology-based training due to certain characteristics of their organization, such as size, type of training, and low employee turnover.
    - All training is done informally because there are only 38 employees (C16)
    - The organization sells their services, so they promote hands-on, face to face interaction (C10)
    - One organization has about 40 employees, most of which have been with the organization for about 20 years, so there is not much training to be done (C8)
- Most of the organizations that do not do technology-based training expressed interest in implementing some in the future.
    - Thought that videoconferencing would be beneficial to connect with others in the field (C10)

- Expressed personal interest in having certification prep courses available online, as well as continuing education courses that are required to maintain certification (C16)

- 3 of the 5 organizations use a combination of online and CD-ROM for training.
  - All new employees have part of their training on CD-ROM and specific departments require online readings during their training (C11)
  - Training is provided through vendor web-sites, organization intranet, and CD-ROMs, which provides a "library" of modular training (C21)
  - Most of the technology based training is done online, but CD-ROM's are provided to field staff, mainly providing presentations (C157)
- Organizations do create a lot of training internally, but there is a large amount that is externally created.
  - New employee training is organized and developed by the human resources department, while other training is created by individuals in specific departments as needed. CD-ROMs for new employee training are purchased and on-going professional training is externally contracted (C11)
  - Technical training is developed in-house, but many of the software application program training are "off-the-shelf" training (C21)
  - Although some training is developed by specific departments, a lot of the training comes from the federal branch of this agency (C157)
- A variety of training is offered through technology-based training.
  - Sexual harassment and workplace etiquette are two examples of training offered through technology-based methods (C11)
  - Interpersonal skills, technology skills, business skills, basic computer/desktop skills, financial service skills, and compliance skills are all offered through online training courses (C12 – website)
  - Safety and health plan training are offered on CD-ROM for employees (C19)
  - Technical skill training, federally mandated training (e.g., ethics, workplace violence, conflict training), leadership training programs, software applications, and soft skills are all provided through means of technology-based training (C21)
  - Mainly provide federal annually required training (e.g., ethics, EEO, security, etc.) online, but also provide computer applications training (e.g., Lotus, Word, Excel) through <AgLearn – an online training "bank"??> (C157)

Other Information:
I have received little information on specific skills/job descriptions. Most people that I have talked to have a small (e.g., 2 people) team that develops training internally. In other organizations training is developed department by department, with no formal training department.

APPENDIX F

FINAL PEER DEBRIEFING MEMO

DATE: November 28, 2005

TO: Dr. Theresa Murphrey, Visiting Assistant Professor
Dr. Kim Dooley, Associate Professor and Associate Department Head
Dr. Larry Dooley, Associate Professor

FROM: Leslie Frazier, Graduate Assistant

SUBJECT: Final Peer Debriefing

Numbers: (Last updated: 11/21/05)

35 – No
1 – Couldn't provide any information
1 – Only takes calls from employees
23 – Yes and provided information
1 – Yes, but couldn't provide any information

71 – Left messages and have not called back

32 –deleted from list because unable to locate contact information or duplicated information

Emerging Themes:

- **Some organizations are not conducting technology-based training due to certain characteristics of their organization, such as size, type of training, and low employee turnover**.
  - **Size**
    - All training is done informally because there are only 38 employees (C08)
    - There has not been a great degree of numbers to required technology-based training. (C43)
    - Size is an issue because the organization only has between 100-150 employees and closer to 150 with seasonal employees. (C50)
    - The organization has about 40 employees (C01)
    - There are really no "permanent" employees – they are hired on a project related basis. (C33)

  - **Type of Training Required for Organization**
    - The organization sells their services, so they promote hands-on, face to face interaction (C10)
    - The training required is hands-on/experiential. (C05, C32, C45, A03)
    - The nature of the business (e.g., how to use a tractor or a combine). It has been found that employees prefer to go and sit in the class and the

organization has found that they get more productivity out of this method. (C32)
- The nature of the work does not lend itself to conduct technology-based training; it would be difficult to teach someone how to water or how to make cuttings through these methods. (C39)
- Training is conducted for the products that are to be sold; it is really just about getting in front of the product and getting to know it. (C42)
- Most training is done face2face because the nature of the business e.g., advanced engineering. (C48)

- **Access**
  - Many people do not have access to computers. (A02)
  - The equipment required is not available and the technology has not dropped in their lap yet, so they don't use it. Also, the professional association the organization if affiliated with has not presented any information about technology-based training to encourage its use. (C26)
  - All the [locations] do not have computers and many are not capable of being up to speed with technology. "Technologies are there, but not capable as a system." (C53)

- **Organization Culture**
  - The organization culture is focused more on instructor-led training. (C27)
  - Training is done in the classroom because training is new to the organization and they feel like they would be turning the students loose. (C47)
  - No formal training is done within the organization. They ask employees to research themselves and the organization pays for the training. (C51)
  - The majority of the training is up to the employee and the individual supervisor to find training that is needed and complete it. (A05)
  - Most employees have been with the organization for about 20 years, so there is not much training to be done (C01)
  - Not all training is good through technology-based methods, and older workforce. (A02)
  - In one interviewees personal opinion there is a noticeable difference between those who do take online courses…they have less of a grasp of what they are learning than those who take the course in the classroom and have interaction with the instructor and other agents…to complete online courses you have to complete some kind of progress system, and it is perceived by the interviewee that fraudulent practices are happening. (C33)
  - The majority of employees are local, with only a few located out of state, so it is more cost effective to fly the few in. (C11)
  - Training is done on a case-by-case basis as the need arises, and (C43)

- **Lack of Resources** (money, personnel, specialized skill, time)
  - Besides new employee training being provided through technology-based methods little in-house training is done due to budget cuts. (A05)
  - Projected that the organization will implement more over the next 2-3 years. But, they have to have someone with time to implement eLearning, as well as employees finding time to complete it in their schedules in a more self-directed manner. (C27)

- **Most of the organizations that do not do technology-based training expressed interest in implementing some in the future (C01).**
  - **Networking and Interaction**
    - Thought that videoconferencing would be beneficial to connect with others in the field (C10)
    - Want to be able to provide training to employees external to main office and use technology-based methods in the field to create a more interactive environment. (A02)
    - Benefits from technology-based training include ability to maintain required licenses, as opposed to travel, and legal or HR related training, as opposed to showing the same video year after year and provides updated material. (C26)
    - Although they are currently conducting technology-based training, there is a need for more, including organization specific training to provide to sales employees that work outside of the office and international employees. (C36)
    - Expressed personal interest in having certification prep courses available online, as well as continuing education courses that are required to maintain certification (C08)

  - **Match the Media and Methods**
    - There is no opposition to technology-based training, but you must find the right topic, areas such as sexual harassment or diversity where you could send the training to them and track their process. (C43)
    - Expressed interest in using a "virtual" training method. Thought it would be safer and encourage better communication. (C45

- **Organizations do create a lot of training internally, but there is a large amount that is externally created.**
  - **External Training**
    - CD-ROMs typically come from vendors and online training is provided through an external source. (C29)
    - An external provider is used to supply the bulk of technology-based training. (C36)
    - The majority of web-based training is developed externally. (C54)

- Some technology-based training is outsourced, with others are purchased "off-the-shelf." (C52)

- **Internal Training**
  - Although some training is developed by specific departments, a lot of the training comes from the federal branch of this agency (A01)
  - All training is created internally, where HR and IT work together and may outsource some jobs, but to people within the organization. (C21)
  - Web-based content is prepared and deployed in-house. The IT department created the basic software to use. Research has been done on commercial software, but none could provide the training desired using reasonable bandwidth, which is impractical for smaller branches. (C16)
  - Training is created internally and hosted on an external server. (C27)
  - Technology-based training is created internally. (A05)

- **Internal and External Training**
  - New employee training is organized and developed by the human resources department, while other training is created by individuals in specific departments as needed. CD-ROMs for new employee training are purchased and on-going professional training is externally contracted (C07)
  - Technical training is developed in-house, but many of the software application program training are "off-the-shelf" training (C09)
  - Created internally and externally. (A02)
  - Sometimes someone external is brought in to guide web-based programs. (C24)
  - Some created internally, with approximately 50 courses purchased for use by all employees. (C31)
  - Recently the first training module was created in-house using an external sources platform. (C36)
  - Technology-based training is developed internally with the help of a vendor for the technology side of the training. (C55)

- **Type of Content Developed Internally and Externally**
  - Internal content/technical/organization specifics (C09, C36, C55)
  - External technology aspects (C24, C55)
  - Internal and External professional development (C31)
  - External Professional (C29, C07, C09)

- **Technology-based Methods used for Training**
  - **Internet/Online Training** (A02, C09, A01, C18, C24, C25, C16, C27, C29, C31, A03, C54)
  - **CD-ROM for training**
    - Some CD-ROM training. (C29, C31, C36, C55, C16)

        - All new employees have part of their training on CD-ROM (C07)
        - Some training is provided through CD-ROMs, which contain a "library" of modular training complete with assessments and immediate feedback. (C09)
        - Currently the technology-based training is strictly CD-ROM, which provides safety and health plan training. (C06)
        - Some CD-ROMs are provided to employees to view before training. (C53)
        - CD-ROM's are provided to field staff, mainly providing presentations (A01)
    - **Intranet Training** (C09, C16, C52)
    - **Webinar Training** (C19, C46)
    - **Satellite Training** (A03)
    - **Blended Learning**
        - A form of blended learning is used that includes: sending pre-course material that may include a presentation, video, or other technology, a traditional classroom component, and a follow-up/post course that may be a video or a web site. (C31)
        - Telephone-based conference calls may be conducted where participants receive a CD-ROM in advance with a presentation, mainly for those that are geographically dispersed. (C31)
    - **Some organizations are using the internet for other sources:**
        - To reinforce what they learn from the reference books. They generally use university websites that have done extensive research already on specific areas. (C08)
        - Provide all employees access to online self-motivated courses in conjunction with a local community college. (C32)
        - Employees conduct research on the internet, but no formal training. (C39)

- **A variety of training is offered using technology-based methods**
    - **HR Training (annual or mandated/required training)**
        - Sexual harassment (C07, C46)
        - Workplace etiquette (C07, C21)
        - Safety (C06, C31)
        - Mandated training (i.e., ethics, workplace violence, conflict training, EEO, security, OSHA required training) (C09, A01, C36)
        - HR training (C24)
        - Basic training. (C27)
        - Recruitment (C46)
        - Employee relations (C46)
        - Ethics (A03)
        - Customer service (C55)

- **Organization/Industry Specific Training**
  - Online readings (C07)
  - Compliance/Legal skills (D02, C36)
  - Policies and procedures (C19, C52)
  - Product training (C18)
  - Health plan training (C06)
  - Technical skill training (C09)
  - Code of conduct (C36)
  - Core Values (Mission and Vision) (C41)
  - Sales (C31, C54, C55)
  - Training manuals (C16)
  - Refresher courses for ongoing projects (C24)
  - New employee training (C54, A05, C55)

- **Professional Development**
  - Interpersonal skills (D02)
  - Business skills (D02, C36)
  - Financial service skills (D02)
  - Leadership training programs (C09, C29, C31, C36)
  - Soft skills(C09)
  - Management/Supervisory (C21, A03, C55)
  - Finance (C31)
  - Communication skills (C36, C55)
  - Negotiation (C36)
  - Setting goals (C55)

- **Computer Skills**
  - Basic computer/desktop skills; IT; software/computer applications (D02, A01, C19, C24, C25, C29, C31, C36, C44, C55, D02)
  - Internet security (A03)

- **LMS or CMS (A01, C18)**
  - A LMS is being implemented into the organization's intranet. (C16)
  - A LMS was purchased externally. (C31, C55)
  - Online training "bank" (AgLearn)

- **Internally Creating Training**

  Most have small training groups that work with IT departments to create technology-based training. Others are created through HR.

  - **Small Training group or departments works with IT**
    - Two people make up the training department, with assistance from the IT department. (A02)
    - There is no training department. VPs and managers say what they want developed and there is an IT person to assist. (C06)

- Have a two person technology-based training team that receives assistance from the IT and Computer Integrated Manufacturing groups (C09)
- 5 people in corporate training and development, but also use in-house contractors for web-development because the training and development department does not have the resources to support this function. (C36)
- There are positions available for technology-based training and they work with the IT department which creates the assessment and certification and with the Policy Center which develops the instruction. (C52)

- **Human Resources**
  - HR specialists are in charge of technology-based training for computer applications and beyond that it is left up to each individual department. (C25)
  - Course developers create the instruction. (C31)
  - There is a collaborative effort in the HR department and then a single employee puts the online information together and maintains the training. (A05)

- **Skills for technology-based training**
  - a degree (C18, D01, D03)
  - eLearning experience (D04)
  - Three most important characteristics are the ability to perform accurately, completely, and concisely. (C16)
  - #1 is adult learning (C09)
  - The most important skill is instructional design (C31)

General Skills

- presentation skills (C09)
- instructional design (C09, C16, C31, D04) “technical writers” (C16)
- transferring learning (C09)
- needs assessments (C09, C16, D03)
- Writing skills (C31, C16, D04)
- research (C31)
- interpersonal skills (C31, C16, C18)
- Course Development (D04) – instructional design
- Management and leadership skills (D04)
- Planning and organizational skills (D01, C18)
- Communication skills (D01)
- Be a change agent (D01)
- Collaborative/Team Work (D01)
- Training Evaluation (D01, C09)
- Creativity (D01)
- Curriculum Development (D03)

- Management Skills (D03)
- project management (C19)
- ability to see training from the users' perspective (C16)
- graphics (C31)
- Web-page design and publishing skills (D04)
- Effective delivery of eLearning (D01)

IT skills

- These are more important than IT because you can always find an IT person (C09)
- basic computer skills (e.g., Microsoft Office) (C18)
- software development (C19)
- network administration (C19)
- security (C19)
- all aspects of computers (C19)
- Instructional technology background is needed, but support is provided by the IT department. (C31)
- computer software (C31)
- Experience with a variety of media (D04) – technology
- organization background (C31)

➢ **Position of Interviewee:**

(majority were in HR, a few IT, a few in other management positions)

- Training Administrator C05
- President C01
- General Manager/Executive Vice President C08
- Director of Scientific Communications C07
- Personnel Management Program Coordinator (training coordinator) A02
- Office Manager C06
- Head of Human Resources C09
- State Director A01
- Corporate Director of Training C18
- General Manager of Information and Technology C19
- National Distributor Manager C21
- HR Specialist – recruiting C24
- HR – recruiting C25
- Training and Document Manager C16
- HR Manager – all HR functions C29
- Director of Management Education C31
- HR C32, C27, C17, C37

- Owner C33, C51
- Manager of Training and Development C36
- Application Developer C44
- Senior Recruiter C46
- Organizational Development Trainer C54
- Senior Vice President and Chief Information Officer C52
- Manager of Sales Training C55
- Consultant and Hiring C10
- Managing Partner C39
- Training Manager C41, C23
- Training and Development Manager C47
- Accounting Manager C49
- Training and Recruiting Manager C53
- HR Officer A05

Title not given – C11, C26, C42, C43, C45, C48, C50, A04, A03, C12, C13, C14, C15, C20, C22, C36, C30, C34, C35, C38, C40, C02, C03, C14

VITA

Name:	Leslie Jean Frazier
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