COMPUTER SKILLS ANALYSIS AND TRAINING SOLUTIONS

By

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A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

Capella University

October 30, 2004

UMI Number: 3150455

UMI®

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Abstract

The purpose of this study was to explore the feasibility of adding an online training element to USDA Agricultural Marketing Service to improve employee computer skills. Business considerations were explored for budget, market analysis, technical requirements, vendor selections, vendor partnering, staff acceptance, market campaign, course delivery, and customer outcomes. The goal of the research was to determine the overall analysis of the desired computer skills compared to the actual skills of the Field Office employees. The secondary goal was to explore areas of lacking skills and the proper approach to resolve any shortfall.

Dedication

I would like to dedicate my dissertation to my husband, Daniel, my sons Paul and Kelly, and my grandson Riley for the patience and support they have shown throughout the educational process. I would also like to thank Dr. Mary Dereshiwsky for stepping in as mentor to complete the dissertation process.

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CHAPTER 1

Introduction to the Problem

Technology advances are both assisting and creating challenges for people across the globe. Large organizations are looking for answers and techniques to keep workers abreast of new technologies in an effective way without exceeding their yearly budget. This chapter introduces a study to help one organization, the United States Department of Agriculture (USDA), equip its employees with the necessary technological knowledge and skills to successfully perform their jobs and provide information to their customers.

Specifically, the project investigated the level of computer skills of USDA employees working in the field offices. The information gleaned from the project determined whether a computer-training program would assist these employees in acquiring improved technological skills. The project investigated current practices in corporate education, and examined the reasons for an organization to adopt a training program to impart new knowledge to employees. This chapter elucidated the principal areas of consideration, introduce the research questions, present the rationale for the study, review the definitions of terms, discuss the nature of the study, and preview the organization of the remaining chapters.

Background of the Study

The study was designed to collect information for units of the USDA that gather information on a variety of commodities for the United States and other countries. This study focuses on one of the larger divisions, the Fruit and Vegetable Market.

The Fruit and Vegetable Market exchanges information among growers, current suppliers, shippers, and wholesalers about prices, demand, and supplies of many commodities. These

commodities can only be stored for short periods because they are seasonal and perishable, so it is imperative to pass along information quickly to reflect the rapid price variation. Because the field office employees are the front-line personnel for the suppliers, shippers, and wholesalers, it is very important that their computer skills are current so they can get the latest information to provide to the customers. The goal is for the field office employees to provide one-stop shopping for customers, as well as to furnish timely reports through various electronic channels.

Market News information, in the form of reports, is available on the Internet to assist the field office employees with a mechanism to assist their customers. The reports include shipping and wholesale price point and shipment information. Terminal market reports discussing vegetables and fruits issue from 15 major cities and include local wholesale price data.

Other information includes shipping point reports on vegetable and fruit rail and truck information in major growing areas. Some of the major reports are the *National FOB Review*, *National Potato and Onion Report*, *Western Fruit Report*, and *Chile Fruit and Vegetable Report*. Seasonal shipping point summaries are issued at the end of each marketing season; some deal with only one commodity.

Weekly reports include the *National Shipping Point Trends*, a periodical that details information on shipping points, prices, trading, crop conditions, harvesting progress, and the outlook for the next two weeks. The bi-weekly report is *the International Market News Report*, which reports on the imports from Poland, Panama, Japan, Mexico, Germany, France, England, Bulgaria, Columbia, Canada, the Netherlands, and the basin produce from Mexico, Chile, and the Caribbean. The special reports include the *National Truck Rate and Cost Report*, *AMS Food Purchase Report*, *Pecan Report*, *Peanut Report*, *National Honey Report*, and the *National*

Ornamental Shipping Point Report. With these many reports available for the AMS Division of

USDA, it is understandable that the computer skills of the field office employees designated to

assist the many customers needing this vital information are a major concern (USDA, 2004).

  Other tasks of the Fruit and Vegetable Programs include furnishing assistance to the United

States produce industry by providing inspection and grading services, enforcement of the trading

laws, exchange, price, and movement data, and oversight to industry-operated programs. In order

to provide the assistance services, the Fruit and Vegetable Programs are involved in International

activities.

    Members of the Fruit and Vegetable Program are part of the North American Free Trade

Agreement (NAFTA), as members of a working group on agricultural grading standards. Other

countries involved in the working group are Canada and Mexico, with a common goal of

reviewing the standards and grades that have an effect on free trade and resolving issues that

occur because of the standards.

    The Fruit and Vegetable Program also collaborates with North, South, and Central America

to form the Market Organization of the Americas. Other members include Argentina, Bolivia,

Brazil, Canada, Chile, Columbia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras,

Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela. With this larger charter,

along with research and development activities, the Fruit and Vegetable division is justifiably

concerned about the level and quality of its employees' computer skills (USDA, 2004). Running

a large program such as this one requires significant network and storage resources to make

information available for the growers, both in the United States and for the global market.

In order to complete the department's mission, the Fruit and Vegetable division staff need the requisite skills and knowledge for accessing several computer applications. The primary application used by the Market News reporters is the Oracle database, with the secondary applications being the Microsoft Office Suite, primarily Word, EXCEL, and PowerPoint. Management has concerns about the ability of the workers to use the full suite of necessary applications effectively.

Statement of the Problem

The information collected by the researcher conducting preliminary interviews suggests that the field office employees are uncomfortable with personal computer skills (USDA, 2004). Management believes that it is critical to the mission of the organization for the field office employees to have adequate computer skills, but is uncertain of the extent of the present inadequacies. The research study was necessary to gather vital information to identify the shortfalls in the current computer skills. The study identified specific skills that are necessary to ensure that the field office employees can perform their daily tasks.

Purpose of the Study

The purpose of the study was to investigate the current level of computer skills of the USDA Market News reporters by asking targeted questions related to a variety of applications that are used on a regular basis. This study informed Management of the current level of employees' skills, and provided feedback to develop and improve these skills. Management is concerned that proper training has eluded the field office reporters, and its goal is to improve the employees' overall skills. The questionnaire was designed to assess employee satisfaction with

previous computer training courses, and to help determine alternate ways to offer additional

training, either face-to-face or through web-based programs.

Rationale

The need to investigate employees' computer skills has been made apparent by the large

number of calls from the Market News reporters to the Main Office requesting assistance with

computer-related problems. Daily requests and concerns are being channeled to Upper

Management to make them aware of the need for improved employee computer skills. Many

hours are spent each day assisting the field office employees with small issues that they could

accomplish in a short period with the proper training. Management realizes that computers and

software were initially delivered to these employees with an instruction manual but no training.

The market researchers who spent the time to learn computer skills with the training manual

have become more advanced than those employees who did not take the time to study the

software packages.

Through this study, management acquired relevant information in several specific areas,

including employee attitudes toward training, training requirements, preferred training delivery

methods, technical requirements, means of attracting good instructors, and leading vendor

practices in other corporations. The budget is a significant factor for the Fruit and Vegetable

Market; and this study enabled Management to spend the allocated funds wisely to get the most

training for the least cost.

Research Questions

The research questions being addressed are:

1. What is the employee level of discomfort using the current computer applications?

2. What is the level of employee satisfaction with previous computer training courses?

3. What are the concerns of field office reporters about online training compared to the

traditional face-to-face training?

4. What are the preferences of the field office reporters for training amounts and delivery

methods?

Definition of Terms

The terms needing operational definition in this investigation fall generally under the

disciplines of business and computer science. The following definitions provided clarity to the

terms in the study. The terms are listed alphabetically for easy reference:

AMS Agricultural Marketing Service.

Computer Training Skills taught to individuals that will enhance their ability to work with

computer applications.

Face-to-face An instructor-led class delivered with the students and instructor co-located in the

same room.

Online program A course of study delivered via the Internet to students in a remote location.

Outsourcing Paying another company to provide services that a   company might otherwise have

employed its own staff to perform.

Portal A location on the Internet with links to many other associated web sites

Protocol A standard procedure for regulating data transmission between computers.

Synchronous Occurring or existing at the same time.

Vendor A reseller of hardware or software products.

Vendor collaborating Working with the reseller as a partner to achieve one goal.

Significance of the Study

The significance of the study lies primarily in its value in helping to solve a specific problem for a specific organization. The goal was to first identify the need and then predict the value of additional computer training for the field office reporters. The study provided a guide for the decision-making process by determining the need for the program and the willingness of the employees to participate. It assisted Management in making a more intelligent decision about the benefits of the proposed program and help Management realize all of the areas of concern for the maintenance of the program. It is important for Management to evaluate all of the areas of concern before spending the monies necessary to create the program.

From the study, management was able to assess the current computer level of the employees and to see what programs are necessary for bringing the other market reporters to the same level of expertise. The development of operating criteria benefited the employees and opened the door to future skills measurements. The guidelines should assist the USDA Fruit and Vegetable Market in making an informed decision within a short period, to minimize budget expenditures.

Assumptions and Limitations

Assumptions

1. Survey participants are representative of their colleagues in the division, in that they do similar work of responding to comparable customer demands.

2. Gender was not a factor, although the number or females are disproportionately low.

3. Enough employees participated to get an accurate representation of the division's overall computer skills.

Limitations

1. New employees may not have the full extent of training, as compared to the more seasoned employees. The more seasoned employees not only have the benefit of previous training offerings, but they also have more years of experience with troubleshooting procedures for correcting problems.

2. USDA Management decided to restrict the solicitation of the survey to minimize the impact on the employees. Therefore, only the surveys received were part of the study, and the employees' opinions not received remain unknown.

3. Employees may not want to admit that they feel inadequate with regard to their computer skills because of fear of management reprisal.

4. Employees may have varying understandings of the meaning of good computer skills.

5. Employees may have little incentive or motivation to acquire these skills on their own, due to the availability of outside technology support.

6. Employees may only consider the applications they are using daily, and not include their inadequacy in other applications.

7. No standard practice of adequacy, such as a list of competencies, has been for comparative purposes. Employees with greater skills may be more likely to participate, resulting in a lack of input by Market News reporters with fewer skills.

8. The follow-up calls were limited to ten employees, and this small number of individuals was not able to obtain input from all study participants.

Nature of the Study

The study was primarily quantitative, using a survey designed and approved by Management, which identified employees' shortfall in computer skills according to each specific software application. The USDA administered the survey via email to the target audience of the Market News reporters, and strongly encouraged participation. The completed surveys were delivered directly to the researcher without Management copies.

Two forms of qualitative data, free-form comments on the survey forms and telephone interviews supplemented the quantitative survey data. This qualitative data gathering afforded an opportunity to explore employee views in detail. Statistical reports generated from the survey data, along with qualitative information from the comments and interviews, were analyzed to make a determination of employees' computer skills, satisfaction, comfort levels, and preferences in the delivery of additional training. The results will be delivered to the USDA Management for interpretation.

Organization of the Remainder of the Study

The remainder of the study was organized in five chapters. Chapter 1 contains the introduction and the reason for the study. Chapter 2 presents a review of the literature, including the major findings of past research. Chapter 3 presents analysis information, the research plan, and design procedures. Chapter 4 presents findings and results of the study. Chapter 5 contains a summary of the study, conclusions, and recommendations for practical application of study results, in addition to future related research, and finally, implications of the study.

CHAPTER 2
LITERATURE REVIEW

Introduction

The goal of the research study was to inform the Fruit and Vegetable Division about the computer skills of the current field office employees and the interest and willingness to acquire new skills to meet the mission of the organization. Along with the survey, this research must look at other organizations and examine ways that these issues are being addressed throughout other government and non-government agencies. The survey structure was designed to link current technology issues in comparison to USDA employee issues.

In the tradition of Action Science, this research was aimed less at answering an abstract question than to providing information needed to guide action in a specific setting. Therefore, the literature review focused on identifying patterns of skills needed by end users of organizational computing systems, as well as methods of delivering training to address those needs. Its purpose was to help make sure the survey and interviews ask the right questions so that USDA management got the appropriate information to guide its actions.

Factors Affecting End-User Skill Need

End user computer skill needs are increasing and changing across many sectors, not just the USDA. Workers need many skills for today's job market and need the ability to learn new products, processes, and releases of software and hardware. Mentoring was a traditional way for employees to learn in some industries but has not been as popular others. Some major corporations are trying to change this. Companies embracing this mentoring concept are IBM and Price Waterhouse Coopers. IBM has a program to mentor new and upcoming employees by

matching them with more experienced employees that is a value practiced and rewarded. Price Waterhouse Coopers assigns new employees a coach to assist them in growth areas for the new employee. The same thinking goes into the mentoring program that is now popular among online programs (Khirallah, 2002).

Industrial workers need the ability to troubleshoot and analyze complex problems as they occur. Skills needed include a stepped approach to problem solving. The first step is to define the problem, which is the thought process that determines the issue at hand. The second step would be defining the task using the technology currently in the network. The third step would be to determine the current available resources. If a system is down, it may not be a resource at that time. The fourth step is to know how to get additional information through the Internet or investigation. The fifth step is getting additional information quickly to solve the problem in a timely manner. The final step is the solution and the ability to look ahead to future times with faster information and resolution. These and other skills are also typical of the information needs of students in the online classroom (Canning, 2002).

Users today need a change in direction thatbegins with knowledge as the basis for growth. Employees have a great demand for more information and are unwilling to perform tasks without ample knowledge. The second is the shift from production of goods to delivery of services. Many large populous areas have no manufacturing plants and employment is plentiful. Employees provide a powerful infrastructure for the rest of the nation. The third is the shift wherein professional occupations growing faster than the traditional blue-collar occupations. Previously the blue-collar positions prevailed but now a new form of economy called "informationalism" has arisen that utilizes information to organize and become more productive.

Shifts in the workforce on a positive note create opportunities for universities with training and enhancing skills for these workers (Castells, 2000).

Some of the services available in today's society are electronics, computer software, audio, and video productions, electronic stock trading, and many others that provide employment for many workers. Employees performing these tasks are now highly paid whereas in the past, high pay was associated with very physical labor. Relatively unskilled workers are now making low wages with professional workers commanding the higher wages. All positions require a form of education for the present and future delivered by the online classroom with the right network sizing and connectivity (Castells, 2000).

<p style="text-align:center">Planning for Future Growth</p>

What is the role of educational management for workers in the new workforce? The transformation of work is expected to continue to 2005 by the US Bureau of Labor Statistics. Employment opportunity in health and business services along with other industries is expected to grow, as are those in legal, engineering, educational, and architectural services (Castells, 2000).

Public officials have expressed an interest in changing the way research supports programs that combine science and technology, and are both good for the economy and support scientific research on ways to conserve energy. Another example includes research into fiber optics and alternate communication technologies.

Medical research will stay in the limelight as it is on the brink of many important discoveries such as DNA sequencing and other medical discoveries will be work of the future. Manufacturing, transportation, and communications will be areas for attention in the future.

Telecommuting and alternative work styles will get a lot of attention in the coming years. Time management will play a role in education and instructional design for corporation. With overall skill levels rising, a demand for more education in more convenient formats will require network sizing for optimal performance to the organization (Karle, 2000).

<div align="center">Skills for the Future</div>

What types of work will future employees perform and what will be the online program requirements? Some of the emerging positions for workers in the future involve robotics and artificial intelligence with a prediction that computer scientists and systems analysts are two of the fastest growing areas for growth projected into 2005.

What skills will workers need in the future? High school students need to be competent in computer skills as a requirement for graduation. Students in the eighth grade in 1996-1997 were required to pass computer proficiency tests and these tests will be mandatory for students projected to graduate in 2005 and beyond (North Carolina Competency Test, 2001).

More organizations are realizing the need for computer skills and are preparing the students to meet this challenge. North Carolina has a five-year plan that includes computer skills for fifth grade students. North Carolina has instituted a technology department for the school for the lower grades. Plans exist that start the student on computer development in kindergarten and continues through high school (Board of Education, 2002).

<div align="center">Federal Government Response</div>

Federal agencies are preparing for the future by implementing student work programs including from summer employment, fellowship programs, and others that focus on specific business needs. These programs provide a good way to test the skills of the personnel and

provide them a good opportunity to choose a field of interest. Networks sized to accommodate the proposed programs that are available all or part of the school term.

Eligibility requirements include the legal age to perform work at the desired location, enrollment in a two or four-year degree program, and USA citizenship or meeting the qualifications to work in the United States. This offers a great opportunity for both the student and the agency, and encourages students to stay in school, rather than drop out to go to work (USAjobs, 2002).

One of the factors contributing to a change in direction for workers is the opportunity to form personal relationships with others and the desire to work in a different type of environment may make a person move to a different organization. Educated workers are usually more confident than other groups about making these changes. Professional advancement may be another factor since some professionals only reach a certain level without further advancement. To advance a person must switch from a technical to a managerial position. For many, this is a very difficult transition and many technical workers speak of glass ceilings. Commuting long distances, being required to travel or stress are factors causing a change that may encourage adults to return to college (Radin, 1998).

<div align="center">Economic factors</div>

Another major factor for continued online education is the downturn in the economy that adversely affects workers. Many workers are having a difficult time securing high paying positions that is similar to what they had in the past and are rethinking career choices. Some are turning to other career offerings.

Globalization is causing workers to perform different tasks with the world as the market place. Organizations need the ability to accommodate international employees and that factor greatly affects the overall network design. Workers must relocate or work flexible schedules to compensate for the different time zones. "Call centers" are creating opportunities for IT workers to assist users throughout the world (Asia Pacific Management Forum, 2001).

Making Training Work

Here is what we know about what it takes to make training work. Information about students can be collected from other instructors who have previous training experience, as well as from surveys and discussions conducted early in the program. Accessibility should assure a 24-hour response time and office hours where synchronous chats or telephone access is available. Student concerns prevented additional messages and questions might signal the need for additional broadcast messages from the instructor to clarify the situation. Student instructions should include access information effectively by pointing to previously posted information in documents and other messages.

Within the technologically mediated system, many channels of communication, including direct e-mail messages, synchronous discussion tools, asynchronous message boards, multiple addressing tools, message forwarding, message history data, and document posting are available. Communication can and should occur outside the technology-mediated system and include a phone call, voice mail message, or face-to-face encounter. Communicating outside the system may also reduce the message volume. Further empirical study is necessary to test correlations between instructor characteristics and message volume, student characteristics and message volume, and course characteristics and message volume when sizing a network (Hartman, 2002).

Distance education and traditional instructional contexts can be used together strategically to facilitate the benefits of both contexts and accommodations of the business communication for teachers having insufficient class time to cover all of the topics important for business communication. A combination of traditional and distance methods for the same course, allows students to reap the rewards of social- and technology-based experiences. Research can generate a clearer idea of how the logistics of such an arrangement is possible.

The extent that distance education uses teaching methodologies in business communication, where the interactive features have maximum potential, allows for verbal and nonverbal exchanges between teacher and student and among students. Doing so may present some challenges, but if real face-to-face interaction is not feasible, highly interactive forms of virtual contact is the best possible alternative. Other technology-based interchanges such as email, discussion boards, chat rooms, and other forms of communication can suffice to support online education. What does the future hold for business communication and distance education? Following the path of distance education too narrowly means that the managers who insist employees have good communication skills may have to lower expectations considerably (Wardrope, 2001).

An analysis of the information shows that an organization must be very cognizant of bandwidth when planning programs that will utilize a great deal of speed and processing power. A determination is made of the return on investment if the program of choice requires system upgrades. The system upgrades could be additional storage, servers, networking devices or increased bandwidth. A large employee population would support the capital investment for such a program.

Many of the programs mentioned in the literature would require additional upgrades to be successful. Some programs with a small amount of interest would not be worth the investment as they yield only a small return. Many times the staff developing the programs does not have a full understanding of the impact the programs will have on the overall network availability of the organization. A breakdown in communication could be costly when the processing power is not readily available to run a program. The planning group must prepare for these circumstances by having more processing power than needed or have the modular ability to add extra connections immediately.

<div align="center">Technology and Satisfaction Rating</div>

An understanding of ways that people learn is part of the knowledge required for the facilitation of a good learning environment. Trainers need a good understanding to be more effective in presenting material to students in a format that compliments to learning styles and the technology must support this environment. A recent study, Adaptive Categorization in Unsupervised Learning, explains how people learn in an unsupervised environment and how the subjects allowed learning in a controlled environment, but without feedback. The learners were required to complete a series of numbers to assess the outcome. The goal of the study was measure, evaluate, and analyze the way that learners correlated data and looked for patterns or traits. The number series had definite patterns. A good assessment was made using binary techniques, and the results convinced the researcher that learners that were unsupervised were not in the prime-learning environment (Clapper, 2002).

An alternate way of assessing was by the learner segregating it into various categories and contrasting for comparable results. The two techniques of correlation and separation were

studied with other testing stimuli to obtain the technique most often used by the learners. After

many series of tests, it was evident that learners generally learned by separation more often than

by correlation and that those learners looked for patterns of events and behaviors to define the

criteria for separation. Without the various categories, no appropriate place existed to define the

exceptions or unusual data (Clapper, 2002).

Results from Learning Studies

Researchers concluded that individuals learn in an orderly way and do not fare as well

when given random assignments unrelated to the subject matter. Learners are confused and

struggle to make sense of the order, inhibiting the ability to organize ideas about the subject

matter and making them unresponsive to unordered work assignments and flow.

These experiments suggest a requirement to have online tools available to order the

material provided by the online facilitator and the technologist. The material is then presented is

in an orderly fashion and provides a sense of how to approach the problem. The instructor gets

feedback to determine if the learner is confused with the chosen approach.

Contrasting Studies

Another contrasting study conducted at the University of Georgia with interactive

learning modules to determine the characteristics of the learner was developed to test the

characteristics. The information was divided into various categories to test the strength of the

delivery method. Some of the delivery methods included games, learner role-playing, problem-

based learning, drills, and simulations. The result of the testing found the techniques to be very

effective for the learners. The learners learned by actually doing simulations of the work and got a hands-on approach to the problems (Kim, 2002).

Recent studies indicate that employees learn more and have a higher retention with the real world situations and simulation activity. Interactive learning modules have been proven to be effective learning tools. They create yet another challenge for the technologist offering simulation that allows actual work with the software. The challenge for the facilitator and technologist is to engage the student in realistic situations that simulate real-world activity so the student conceptualizes and interprets the experience into learning.

Another study done in 2002 by the Higher Education Funding Council for England compared issues in the online classroom with the face-to-face learning model and identified a virtual university composed of students from around the world. Technology was used to bring these students together for the learning experience. The paper called Blueprint 2000 goes beyond the online environment to tie other resources to the learning environment. In this model, the learner has the benefit of the instructor as a facilitator.

The model has the facilitator creating small teams and keeps the class going when an issue arises. The facilitator guides the students through the learning process, administers assignments, and provides feedback for student progress. The roles in this model are teachers, learners, course providers, and coordinators. Some organizations have adopted this and found it very effective but the model makes administration a very important aspect of the teaching profession, while other organizations prefer a mentorship approach (Cvetkovic, 2002).

The online facilitator has a variety of options depending on the method of the facilitation, which could be either an asynchronous or synchronous. Email, bulletin boards, chat rooms, slide

presentation, black boards, or many other delivery methods are used to communicate with the students. The online facilitator can be very flexible and has many opportunities to be successful in the classroom. Some commonalities with the various delivery systems and a strategy, competency, and the facilitator must be in charge of the classroom. The facilitator is supportive, asks questions, provides tasks, encourages the students to collaborate, and provide appropriate feedback to the student. The learning environment should be friendly and positive, and the technology should be working effectively (Ng, 2001).

Educational technology can greatly enhance the online classroom. The corporation provides the platform and the facilitator must be able both to navigate the course room and to answer student questions in the use of the technology. Features used in the classroom add quite a bit to the learning experience. Student response to an instructor without these skills is usually negative. Several weeks spent in the classroom makes the faculty feel comfortable with the technology and awarding a certification gives to the instructor reinforcement for completing the training course. This feeling of confidence with the faculty reduces the drop out rate in the course (Ginsburg, 1999).

Reviewing studies has led to conclusions concerning the technology requirements for the online classroom. Visualization seems to be a leading requirement that offers the student an opportunity to see visual objects, training material, simulations, slides, and any other curriculum materials. Cataloging presents learning material in an orderly fashion to assist the student with chronology while learning. Several delivery methods exists for this chronology and include calendaring, dated tables, and numbered conferences.

Simulation software can be added to the online classroom for more effective presentations or the company has the option to place simulations or software on a server and allows access to the server for hands on training. An example of this would be a student taking a UNIX course and getting a student UNIX account to last for one semester. Employees could log on to the server and write scripts or practice the commands given in the training course. Table 1 provides researched information on major factors for student motivation.

Table 1: Requirements for Effective Learning

Major Factors for student motivation	Year and author determination study
Communication,	O'Sullivan,1999
Collaboration	Ng, 2001
Teamwork	Geiger, 2002
Problem based learning	Kim, 2002
Symbolism	Clapper, 2002
Critical Thinking	Colon, 2002
Order (Numeric segmentation)	Clapper, 2002
Data Labeling (Indexing)	Clapper, 2002
Data Separation (Learning modules)	Clapper, 2002
Feedback	Duffy, 2002

Market leaders in software for the online classroom include a large assortment of the above-mentioned items. IBM, a market leader, reported results from online classroom

participants asked to complete questionnaires at the conclusion of a seminar. The questionnaires were comprised of five-point Liker scale items, as well as open-ended questions, which allowed the participants to expand on the answers. The questions for the online and classroom experiences were slightly different to reflect the particulars of the delivery format. Structured and open-ended questions were designed to collect participant input around five areas of interest.

A group was questioned about seminar arrangements and the environment for the online participants. The focus was on enrollment; ease of course access, technical support and the general viability of the e-learning environment. For classroom participants the focus was on enrollment, convenience, organization, and procurement of course materials.

Course Delivery Mechanisms

Mechanisms for delivering the required training to address those skill needs are changing with online distance methods being a prime example of new opportunities. Blackboard is a good choice for organizations new to online learning and with potential developers less technically savvy and is a good platform for an online community. Fewer courses needing uploading into Blackboard makes for optimal performance. On the other hand, multimedia-rich, technically complex content or if most of the developers with a lot of experience make this a poor choice. Pricing of Blackboard is $7,000 to $75,000 for annual license (Larson, 2002).

The focus of educational technology tools and processes is to develop a software framework with reusable components to support a specific learning model. It demonstrates how such a software framework is used for building educational software systems that can be adapted easily to different education levels and subjects on top of Internet and web technologies. As a

result, the developed educational environment called "distance-less" allows students to have

instant support from teachers by way of an existing virtual permanent connection (Bantanov,

2003).

Table 2 illustrates the newness of the learning management systems and partnerships that are

forming to compete in this growing industry.

Table 2: Company Profile Comparison of Learning Management Systems

Learn Wise	Granada Learning is a division of Granada Television, the United Kingdom's largest independent television company. Learn Wise Server developed in partnership with the University of Wolver Hampton under the guidance of Professor Steve Molyneux. The Learn Wise team are based in Newcastle, Manchester, Chiswick and at the Telford campus of University of Wolverhampton
Blackboard	Founded in 1997, Blackboard is a privately held by a number of venture investors, media and technology companies. Acquired Course Info, Web-Course-in-a-Box, and Prometheus course management systems
Learning Manager	Originally developed at the Southern Alberta Institute of Technology, the software and its support formed a separate company called The Learning Management Corporation, formerly Synectic Learning Systems.
IntraLearn	IntraLearn Software Corporation founded in 1994 with headquarters in Northboro, Massachusetts. IntraLearn has entered into an agreement with Microsoft that allows IntraLearn to sell solutions through authorized Microsoft VARs, Microsoft Certified Solutions Providers and System Integrators.
Click2learn	Click2learn is a publicly traded company listed on the NASDAQ exchange as CLKS. It was founded by Microsoft cofounder Paul Allen and is headquartered in Bellevue, Washington
CentraOne	Centra, located in Boston, shipped its first product in 1997. A public company trades on the NASDAQ as CTRA.
Angel	The Advanced Research & Technology Institute (ARTI), an independent 501(c)3 corporation affiliated with Indiana University, created Cyber Learning Labs in mid-2000 to develop and market "smart" portal and e-Learning technologies and solutions for educational institutions and training and development markets.
WebCT	WebCT began as a project by a University of British Columbia professor Murray Goldberg as part of a grant project to study the effects of online teaching on learning. Murray founded WebCT in 1997 at UBC, and delivered it as a commercial product at that time. In 1999 the company was acquired by Universal Learning Technology and combined company was renamed WebCT, and headquarters moved to Lynnfield, Massachusetts.

Useful instruction using computer technology begins with thoughtful and appropriate use of technology by instructors not only to support, but also to extend, traditional pedagogies. Important considerations are teaching techniques, student access to the online class, value provided, and the cost. Cost refers to types of instruction in an online environment and to the new types of instruction that become available (O'Sullivan, 1999).

<div align="center">Marketing Goals for the Training Programs</div>

Organizations often invest hundreds of thousands of dollars to develop and introduce online education to employees but often neglect a key element of success, which is marketing, and promotion. Basic marketing techniques attract and retain students, which ensure the success of the corporation.

Integrating online programs into employee development and performance improvement plans and incorporating online education into a structured process is helpful and easy for instructors or facilitators. It offers personal development with measurable and time-specific feedback.

Some marketing techniques in use include holding luncheons that include a short seminar for potential students and professionals. These seminars show organizations how to incorporate online education into development plans and how to use it in student development and performance improvement by showing the attendees how online education can be integrated into developing, coaching, and mentoring activities.

Conducting frequent course evaluations to pinpoint the strengths and weaknesses of the online learning program using formal evaluations or simple surveys to random students upon course completion is still another method. The survey would investigate topics of interest and consider ways to incorporate those interests into the online offering (Hipwell, 2000).

In the learning process, the three goals of knowledge building, skills development, and self-awareness are integrated in the processes of consultation, idea-generating methods, and group decision-making and problem-solving strategies, oral persuasion and how to conduct effective group meetings, integrating and applying knowledge and skills in the learning material and practice. Learning material can be channeled toward real life problems experienced by learners with involvement and a far more significance and relevance for the student (Steyn, 2003).

Colleges and universities are among the pioneers in online education. The Distance Education and Training Council estimated that more than 2.25 million people would learn online at colleges and universities in the 2001-2002 academic year and number that could double by 2006. Driven by a need to reduce costs and time away from business, online training is expected to account for almost 50 percent of the business skills training market by 2004, according to the International Data Corporation that projects the corporate expenditures for online learning will reach $11.4 billion by 2003, a five-year compound annual growth rate of 83 percent.

 Companies that need to train employees at a savings in travel costs and time are enjoying cost savings of 40 percent to 60 percent by putting 80 percent of the training online. IBM reported that online staff education effort saved more than $16 million in 2000 alone. Sun Microsystems reports that the cost per student for an online course is approximately 75 percent

less than that of sending an employee to a traditional site-based, instructor-led class. The federal government is also investing in online education. Federal agencies offer online courses and the U.S. Army is making a major investment of at least $500 million in distance education between 2000 and 2004. The army launched its first online courses in January 2001 and expects enrollment to hit 80,000 by 2005 (La Blanche, 2002).

<div align="center">Face-to-Face vs. Online Study</div>

Problems with online discussions are the demands in the initial connectivity necessary to make a permanent and stable computer pathway. Overload on the online systems are also an issue if the company predicted or modeled incorrectly for student demand. System upgrades are available to continue to stay current with student demand for online courses. One important way in which online discussions differ from face-to-face experiences is that they occur in a delayed, asynchronous fashion, rather than within a given, set period. Students responded positively to the asynchronous aspect of these online class discussions because it allowed students to participate at a convenient time. The general feeling is that asynchronous issues problems were in the minority. Another characteristic of online discussion was the use of the written word to produce a record of the class comments. Written comments also required careful articulation of ideas more than the spoken word. Another potential problem in online discussions was the potential to loose track of the subject of the discussion and to wander in other topics. A small majority disagreed that the online discussion was less focused less than a face-to-face discussion and another marginal majority disagreed experiencing confusion about the order of comments submitted (Tiene, 2000).

One advantage of face-to-face instruction is the interpersonal contact, social contact, and non-verbal communication. Although communication is achieved with writing in the online classroom, students are more likely to participate in discussion in the online setting than when in the traditional classroom. The implication is that online discussions provide the student with some level of control or comfort that result in increased levels of participation. Benefits of increased participation and increased levels of communication outweigh any advantages of traditional environments. Another factor in the computer classroom is the student's ability to go onto the Internet and ignore the class lecture.

Students perform equally well online as they do in the traditional classroom with a more accessible environment that offers potential advantages to student comprehension and ongoing application across teacher preparation curricula. The benefits of online learning environments allow the student to store information for testing purposes. This ability to work with the data after the class has ended is a powerful benefit because students can reflect on responses before posting them to the discussion (Smith, 2000).

Face-to-face conversations may pass information and the facial expressions may reveal the feelings of the speaker and the reaction of the audience. Work is in progress to capture the implied mannerisms in the digital age. Tone suggests the feelings of the author or instructor and universities are encouraging online instructors to pay attention to tone in the classroom (Turner, 2002).

Learning groups are touted as one of the answers for an extended communication in the online classroom. Many studies report higher student interaction with the use of study groups leading to the conclusions that online students can achieve course objectives just as well as

students taking the course in a face-to-face classroom. The two-way interactions among group members foster more class interaction leading to a better understanding of the class goals and assignments. Structure and observation of the learning group is crucial to success.

While the study group is very effective, caution prevails when students are not working with the study group. The instructor that ignores this lack of interaction will end up with student complaints at the end of the course because one or two students performed all of the assignments. Study groups are not the answer for all situations and selective instances may not be appropriate for group work in the online classroom (Card, 2000).

On an interesting note, five years ago the distance education programs were considered a new offering that had several problems needing attention. One problem was technical design of course delivery needed to make distance-learning experiences equivalent to face-to-face experiences. A feeling of dissatisfaction fostered because a stable technology platform was not available and the online classroom suffered from technical issues.

Concern about student attitudes in the learning format was also a factor because of its newness. Several years of successful programs allayed the fear of distance learning. Instructors were reluctant to move into the online classroom causing a shift in the teaching perspective for the students. Organizations did not know how to find qualified teachers and the current staff was not adept in online teaching. Courses and fields of study are available in online teaching and training for trainers (Roblyer, 1998).

Other versions of bringing online and face-to-face together are programs consisting of both. Several class meetings scheduled during the training interval may assist students struggling with the lack of human communication. Many names are used to identify these programs and act

as a stepping-stone to total online coursework. Students see benefit from the acclimation before embarking on a full online classroom.

The trainer in the online classroom must create innovative assignments used to stimulate student interest and encourage creativity. Online classes require creative approaches and faculty find some difficulties being creative as the course progresses. Instructors must constantly strive to design innovative and creative strategies that effectively help students learn effectively, while making the process fun. Some trainers discover themselves being the content expert for the course rather than a text and many long arduous lectures written by the training staff is a new requirement (Brown, 2000).

Trainer professional development is necessary for online programs because of the diverse way to handle problems in the classroom. Some of the same problems exist, but need different methods to dealing with conflict and other issues in the online classroom. Many organizations have staff development courses to explain the policies and procedures for online courses. The guidelines are very useful in dealing with troubled situations in the classroom.

The professional development classes for trainers offer an opportunity to share experiences and methods of resolution among peers and to discuss true meanings of the current polices. Opportunities to try the latest versions of technology are offered for staff to assist students better in the classroom. Staff development is important to help educators consider ways to use technology with students and to feel comfortable introducing it into the classrooms (Treacy, 2002).

Focus groups are used as a form of open discussion with both students and trainers to develop good characteristics for online teaching. Students are especially comfortable if the discussion board used for the focus group is the same as the one used for classes. Having an additional discussion in the same format makes a comfort range for both parties. The facilitator monitors the discussion and remains neutral to ensure a delivery of open and honest opinions.

Structure and purpose foster trust in allowing students anonymous postings about problems and concerns. Time needs limit asynchronous responses and it is important to allow maximum participation from students who may not be able to congregate at a specific time. Good suggestions need a follow up by the organization with prescribed action to inform students that the participation was a worthwhile experience (Rinear, 2002).

The development of an online course can be very time consuming because all explanation must be in written form. Some traditional instructors feel that face-to-face teaching is easier while others enjoy the challenge of the online classroom. The web environment presents a number of educational opportunities and advantages over traditional classes, such as many informational resources integrated into the class. Instructors can assign web pages as required reading and have students do research projects online using online database.

Contrary to belief, many of the web-based courses are labor-intensive, highly text-based, and intellectually challenging, that elicits deeper thinking on the part of the students. With the proliferation of web-based classes, it is important for potential trainers to understand the flavor of online education, to re-assure the intellectual integrity of this teaching environment (Smith, 2002).

Key suggestions for online courses are the encouragement of contact between students and trainers to increase the learning in the online classroom. Development of cooperation among classmates to encourage active learning sparks the fuel for many good discussions. Prompt feedback is useful to allay any ongoing problem areas. An emphasis of staying on tasks keeps subjects from straying onto other non-related classroom topics. Respect for postings of other students coming from diverse backgrounds needs careful monitoring and the expectation is for good communication throughout the course (Keifer-O'Donnel, 2002).

Another important facet of the online classroom, which differs from the face-to-face class, is the benefit of threaded discussions where a student can follow a logical path of information with comments and explanations along the way. Each student has the ability to participate in the threaded discussion, thus potentially clearly up problem areas and making the course clearer. The threaded discussion leads to more aggressive questioning than in the face-to-face classroom with everyone looking at the student (Smith, 2002).

Partnering or group work is accommodated in both the online and face-to-face classrooms with careful attention to students not participating in the group activities. The face-to-face group can use technology to attend group meetings so no additional outside sessions may be necessary. Microsoft NetMeeting and other web-based software can work nicely for a technology meeting (Daubbaugh, 2000).

Organizations not currently using the online structure are cautious about the transference of course material noting that the material will loose depth in the online classroom. Other forms of concern are technical issues, intellectual property, resources, and the ability to evaluate course outcomes. A belief is that a high-quality research methods course might be

taught completely on the Web, but it requires substantial forethought and planning (Willis, 2001).

The final analysis and comparison of the online vs. face-to-face classroom challenges are reflected in Table 3 with fourteen categories of comparison. Technical challenges can exist in both the face-to-face and the online classroom, but with the greater scope of students from many locations comes greater technical challenges.

Table 3: Comparison of technical challenges

Online Classroom	Face-to Face Classroom	Challenge
Computer access	Go to class or make up sessions	Student must have access to a computer
Basic computer literacy	Notes	Student must have basic computer skills
Global access	Local students	An ISP must be available in the student's area
Access to outside speakers	Local speakers	Speaker must have access to the online classroom
Diversity of cultures	Local culture	Cannot use local colloquialisms or regional sayings
24/7 university access	Classrooms must be open	Redundant systems in place to support 24/7 access
Instructor must be trained in classroom software	Hand outs	Training classes for faculty
Instructor must have effective written communication skills	Public speaking skills	Training classes for faculty
Electronic resources available	Visit the library	Online library availability
Technical support staff	Building maintenance	Trained technical support staff to assist students and faculty
Written tone of course delivery	Facial expressions	Training on the value of written tone in the classroom and the significance
Encourage collaboration	Team meetings	Collaboration software
Weather related incident	Cancel classes	Continue on with online classes, make up face-to-face class

In conclusion, many studies have now been completed with comparing the online to the face-to-face classrooms with similar results. Some students do not fare well in the online classroom because of different motivations. The student that works ahead, aggressively pursues knowledge and practices good time management skills has a much better chance for success. The instructor that gives fast and fair feedback greatly assists the online student. Collaborative work is touted to assist the students in the online classroom and careful monitoring supports the effort so one student does not have to carry the load for the group. Creative and visual assignments stimulate the online classroom and help make a better course. Not all of the wonderful advantages of online education come without many technical challenges.

Nature of the Study, or Theoretical/Conceptual Framework

Comparison studies show testing done as a case study to determine the effectiveness of web-based training by using a variety of tests to perform triangulation to determine if the results are the same by doing different test procedures. In another study, the analysis of the structured part of the questionnaire was based on univariate and multivariate statistical analysis and the open-ended part on qualitative content analysis to get an understanding of the data from a different perspective. The testing revealed that the criteria was met looking from different perspectives, which further solidified the study results (Psaromilgkos, 2003).

Summary

A review of the literature reveals thatother organizations have similar training issues and different approaches to solve the problem. Knowing how employees are motivated along with an understanding of how people learn is a good foundation for the creation of a training program.

Employees in today's work place must report to work and stay current on computer skills to be successful.

A web-based classroom is becoming more and more popular for corporate training needs because information can be delivered to remote offices at the same time as the home office. Each employee has the capability of retrieving the same information from a single source. USDA has begun some short-term training on the web with the ethics training, but at this point, the training has not been extensive.

The first step in solving this issue is to determine the current computer skills of the employees to start the process. The current hypothesis is that management feels that more skills are needed. If the hypothesis is true, the study should determine which skills are lacking by specific questions related to software packages. Assuming the hypothesis is true a plan will be developed to bring employees to the same skill level. The plan must include a delivery method that employees find amenable to current computer skills, be efficient, and cost-effective.

The plan must be marketed by management to get employees motivated with the considerations of the learning preferences of the current staff or a willingness to try a different course delivery method. The limitation of the remote offices makes this a more challenging task than an organization with all co-located employees. Follow up work should be done to determine the success of a plan for the employees.

CHAPTER 3. METHODOLOGY

Introduction

Chapter 3 begins by restating the problem that was being studied at the USDA, and offers

an approach for solving the problem. A discussion of the overall research methodology and

design is followed by a description of the population, the sample, and the instrument being used

for this study. Finally, the chapter concludes with a discussion of the data collection and analysis

procedures.

Restatement of the Problem

The USDA believes that employees in its field offices cannot perform their assigned

tasks properly due to their deficient skills in using required computer systems. The information

that has been collected in preliminary interviews suggests that USDA Management is correct in

its opinion that the field office employees are uncomfortable with their personal computer skills.

To devise a plan to correct the problem, Management needs information about both the nature of

the deficiencies and the factors that could influence the success of programs to correct them.

Therefore, this research aimed at determining what those deficiencies are and at gathered

information for the USDA Management to decide how to remedy them.

This particular project investigates the Fruit and Vegetable Division; the USDA has five

other divisions with similar concerns. This initial project is viewed by USDA Management as a

pilot for possible additional investigations in the other divisions.

The research questions being addressed are:

1. What is the employee level of discomfort using the current computer applications?

2. What is the level of employee satisfaction with previous computer training courses?

3. What are the concerns of field office reporters about online training compared to the traditional face-to-face training?

4. What are the preferences of the field office reports for training amounts and delivery methods?

Research Design

The nature of this study was primarily quantitative, as the study will consisted of gathering information via a questionnaire from human participants involved in field office reporting for the USDA. This quantitative data was analyzed using primarily descriptive statistics, since the study aimed to investigate employee feelings about their current computer skills and needed improvements. The USDA commissioned the project for having the analysis identifies specific software skills needed by employees to perform work assignments and assist customers with computer needs and queries.

The study employed qualitative data gathering in two ways. First, the questionnaires allowed the employees the opportunity to make comments at the end of the survey about other concerns relating to their computer skills. Second, the researcher conducted open-ended telephone interviews with 10 selected participants after the survey data has been collected and analyzed.

This mixed data gathering approach utilized the strengths of both quantitative and qualitative methods. The quantitative data provided the identification and frequency of needs and preferences, and the qualitative data provided deeper insight into the nature of the problems, needs, and preferences of the respondents. Taken together, they gave USDA Management a richer and more complete picture than would either approach if used alone.

Population and Sample

The theoretical population for this research consists of those USDA employees who use computer systems for field reporting. This purposive sample, drawn from the Fruits and Vegetables Division, included 61 males and 20 females. USDA Management selected all the participants specifically for this study. They are located in field offices distributed throughout the United States.   These particular field office employees were selected for the study because they are located in remote locations and generally work without local information systems support. Management felt that these would be the employees most in need of additional skills to become self-sufficient users of the computer systems.

The age range of these employees is from 18 to 65. No children under the age of 18 were involved in the study. The participants contacted for telephone interviews were chosen after the survey responses are tabulated. The selection was driven by the need to explore specific patterns in the data. If no patterns in the data suggest any selection criteria, then the participants were selected randomly.

Instrumentation

This project employed a questionnaire specifically designed for this context. The questionnaire was developed as a collaborative effort between the researcher and USDA Management. Initially, the researcher did a roundtable interview with USDA Management to understand USDA concerns and requirements. The researcher then suggested some possible survey questions, based on the understanding and review of the current literature. The draft was discussed with the Branch Chief and two selected attendees. Following the meeting, the proposed questions were sent to the Branch Chief to distribute to senior staff for comments and

approval. Specific applications used by USDA, such as Market News Communication System, used to dial into other locations and the in-house database, were added to the survey. Microsoft Outlook calendaring was removed from the survey because USDA did not consider the use of this feature significant. After several rounds of comments, the finalized survey was approved by USDA Management and made ready for distribution to the selected Market News reporters located at all of the field offices. Appendix B shows the draft of the questionnaire.

Section 1 was designed and approved to assess the thoughts of the employees on their current computer skills, past training; type of training they thought would be most effective, ability to assist customers with problems, and use of the existing email system. The questions in sections 1 and 2 allow the respondent to place an X in the appropriate box. Section 2 investigates specific applications to understand where skills may be lacking. The applications are listed in these questions, and the employees can select more than one application. The third section is for comments on issues that were not listed in the first and second sections of the questionnaire.

The telephone interviews were conducted using a list of questions, found in Appendix D, aimed at validating the preliminary results of the survey and delving into the thoughts of the field office employees. A list of questions was developed to start the dialogue with the Market News reporters, for the purpose of establishing triangulation in the survey. The questions are similar to those in the questionnaire. Selected questions from each section are designed to use for comparison with the findings in the questionnaire. Whenever appropriate, however, the researcher departed from the prepared questions to explore a promising area in more depth with an interviewee.

Data Collection Procedures

Field office employees received a copy of the survey found in Appendix B, along with the cover letter in Appendix A. USDA Management encouraged the employees to participate in the survey. To protect the rights of the employees, results were not presented in a way that would identify individuals.

The returned questionnaires were collected into an email folder created for this survey, to allow both electronic and hard copy storage. The names were removed to ensure that the rights of the participants are protected in the survey collection process. The sorted, printed results were made ready for input into database software, which allowed the researcher the ability to maintain, analyze, and tabulate results.

Telephone interviews were the researcher's only contact with the field office employees concerning the survey, with the exception of one site visit to the Jessup, Maryland, field office. This visit was required by USDA for the researcher to see the software and the work environment used by the single employee. In all cases, the interviewer recorded the respondents' statements in notes as the interview proceeds, and transcribed the notes into Microsoft Word for further analysis.

Data Analysis Procedures

The data analysis was designed to provide answers to the research questions by assessing the employee satisfaction with computer training, both past and present. The individual questions group into five areas: computer usage patterns; current skills self-assessment; perceived training needs; prior training experience, and training preferences, both amount and delivery method.

Questions 1, 15, 22, and 23 addressed the participants' computer use patterns and align with all of the specific research questions. The answers to these questions show the amount of time employees spend using the systems, as well the specific systems they use. Question 15 specifically asked about a secondary use of the systems in answering customer queries about them. Analysis of these questions and the supporting qualitative data were beneficial for USDA to assess the magnitude of the problem; specifically, does the problem involve much or little employee time? Are there a few or many systems involved?

Questions 2, 3, 4, 16, and 18 asked the participants to self-assess their current skill levels with the USDA systems.   The answers to these questions correspond with research question 4 by assessing the discomfort of the employees, and any supporting qualitative data aided USDA Management realize a different dimension of the problem.

Questions 5, 24, and 25 asked the participants about the training they perceive they need and about their concerns with the delivery of training, comparing face-to-face to web-based training, as stated in research question 2. Question 5 asked them to generally rate the intensity of their training needs; questions 24 and 25 build on the usage questions by asking for the specific systems for which they need training. This information helped USDA Management design training that addresses the problems uncovered via the first two groups of questions.

Questions 6, 8, 10, 11, 12, 13, 14, and 26 asked the participants about their prior training experience, aligning with research question 1 and assessing both their reactions to it and its effectiveness. This information was beneficial in identifying aspects of training that may be more or less effective in any newly designed program.

Finally, the remaining questions (7, 9, and 13) asked about preferences for training, specifically the amount and delivery method with which they would be comfortable. This information helped in the design of new training programs, and aligned with research question 3. The analysis procedure followed several steps. First, the answers to the individual questions were tabulated. Second, overall patterns within each of the five areas were developed, and any free form comments received in section 3 of the questionnaire will be considered. Third, the telephone interviews were conducted based in part on the results of the patterns developed in step 2. Finally, the information gathered from the interviews was matched to the questionnaire data providing richer answers to the research questions. The final quantitative statistics were compiled from the results in the section 1 and 2 data.

Summary

Collection and analysis of the survey questionnaires completed by the employees and of the telephone interviews revealed the level of employee computer skills, and identified the amount of time employees spend using computer applications. The questionnaire determined the following: outside factors influencing employee computer skills, the effect of previous computer training, the employee's ability to assist customers, the applications that are regularly being used, and the applications for which employees need more training.

The information from the telephone survey, along with any comments collected on the survey forms, supported the results of the questionnaire. The telephone interview allowed time for the interviewees to comment on all other facets of computer skills. The results of the survey questions were graphed using a table presentation for enhanced viewing capability by the researcher and the USDA. Finally, the quantitative answers to the survey questions and the

accompanying qualitative data were organized and summarized to show how they address the

four research questions.

CHAPTER 4. DATA COLLECTION AND ANALYSIS

Summary of Research Design and Methods

This research employed a mixed methods approach to help USDA management determine field user needs for computer training. The first data collection was done via a questionnaire that was electronically distributed. The data collection consisted of email addressed to the researcher that was placed in a special folder for electronic retention. The researcher manually counted and tallied the responses to each question with the appropriate letter in the three sections of the questionnaire. The complete raw data totals were entered into the statistical software for results and analysis. In some instances, the participants were allowed to make more than one choice, as is reflected in the following tables. The decision to allow more than one choice was made by USDA to achieve maximum benefit from the responses.

The survey used in the study was distributed to USDA field office employees during the summer of 2004. Of 76 originally distributed questionnaires, participants returned 50 questionnaires to the researcher. USDA felt this was a normal return rate for the field office employees. From the group of participants that returned the surveys, ten employees were asked to participate in telephone interviews, which represented 20% of the population that had returned surveys.

The first segment of the survey asked participants to assess their computer skills. The questionnaire was emailed to all of the employees for response. The researcher reviewed all of the responses and saved a printed copy of the email messages sent by the participants. The

telephone interview provided additional information about the field office employees, and added triangulation to give the survey additional validity

Appendix A contains a matrix summarizing the quantitative responses to the survey. In many cases, respondents chose not to answer all questions, and in other cases, they chose more than one response to a single question.

The answers were collected to address four basic research questions:

1. What is the level of employee discomfort in using the current computer applications?

2. What is the level of employee satisfaction with previous computer training courses?

3. What are the concerns of field office reporters about online training compared to the traditional face-to-face training?

4. What are the preferences of the field office reporters for training amounts and delivery methods?

The remaining sections of this chapter present the analyses of the data that address each of these questions.

<p align="center">Level of Employee Discomfort with Current Applications</p>

 Questions 2, 3, 4, 17, 19, 21, 22, 23, and 24 asked the participants either to assess their current skill levels using the USDA systems, thus providing an indication of their level of discomfort with the current applications, or to state their actual comfort level with general or particular application systems.

Question 2 asked the respondents to self-assess their overall computer skills.   Fifty respondents answered this question, as shown in table 4.

Table 4: Distribution of responses to survey question 2

Response	Number in this category	%
Expert User	2	4.00%
Advanced User	16	32.00%
Average User	28	56.00%
Novice	4	8.00%
Non-User	0	0.00%
No response	0	0.00%
Total	50	100.00%

The respondents felt that they had average or better computer skills, with only four indicating

that they were novices.

Question 3 asked the respondents whether they felt that using a computer at home improved their

computer skills. Table 5 shows the 50 responses to this question.

Table 5: Distribution of responses to survey question 3

Response	Number in this category	%
Greatly Improves	17	34.00%
Improves	10	20.00%
Somewhat Improves	9	18.00%
Does not Assist	9	18.00%
No computer at home	5	10.00%
No response	0	0.00%
Total	50	100.00%

Again, the majority of the responses were positive, with only 14 respondents indicating that they

had no computer at home, or received no benefit from the one they did have.

Question 4 asked whether the respondent felt that his or her skills were sufficient for using the

computer systems at work. Table 6 summarizes the 50 responses to this question.

Table 6: Distribution of responses to survey question 4

Response	Number in this category	%
More than sufficient	8	16.00%
Sufficient	28	56.00%
Slightly insufficient	9	18.00%
Insufficient	4	8.00%
Very insufficient	1	2.00%
No response	0	0%
Total	50	100.00%

While generally positive, respondents were somewhat less so than in their answers to previous

questions, with 14 reporting at least some degree of perceived insufficiency.

Question 17 asked the respondents how comfortable they felt in responding to their customers'

computer-related needs as they attempted to use USDA systems. Table 7 summarizes the 50

responses to this question.

Table 7: Distribution of responses to survey question 17

Response	Number in this category	%
Very comfortable	12	24.00%
Comfortable	19	38.00%
Fairly comfortable	15	30.00%
Uncomfortable	2	4.00%
Very Uncomfortable	2	4.00%
No response	0	0.00%
Total	50	100.00%

This question also yielded a positive response, with fewer than 10 percent of the respondents

indicating any level of discomfort with assisting customers.

Question 19 addresses the new web-based portal and the employees' comfort range in accessing

information and assisting their customers with this information. Table 8 summarizes the result

that only 40 % of the employees felt comfortable with the new application and customer

assistance.

Table 8: Distribution of response for survey question 19

Response	Number in this category	%
Very comfortable	7	14.00%
Comfortable	13	26.00%
Fairly comfortable	15	30.00%
Uncomfortable	9	18.00%
Very Uncomfortable	5	10.00%
No response	1	2.00%
Total	50	100.00%

Questions 20 and 21 asked respondents how comfortable they felt using Microsoft Outlook and

file attachments in Outlook, respectively. Tables 9 and10 summarize the answers to these

questions.

Table 9: Distribution of responses to survey question 21 (Outlook)

Response	Number in this category	%
Very comfortable	16	32.00%
Comfortable	18	36.00%
Fairly comfortable	15	30.00%
Uncomfortable	1	2.00%
Very Uncomfortable	0	0.00%
No response	0	0.00%
Total	53	100.00%

Table 10: Distribution of responses to survey question 22 (attachments)

Response	Number in this category	%
Very comfortable	19	38.00%
Comfortable	16	32.00%
Fairly comfortable	12	24.00%
Uncomfortable	2	4.00%
Very Uncomfortable	1	2.00%
No response	0	0.00%
Total	50	100.00%

Consistent with their answers to other questions in this section, the responses were generally

positive concerning these two specific items, with very few respondents expressing any level of

discomfort.

Questions 23 and 24 asked respondents to identify the primary and secondary applications being

accessed on the computer, and gave the participants an opportunity to make more than one

selection, which accounts for larger totals in these findings. Tables 11 and 12 summarize the

findings for these questions.

Table 11: Distribution of responses to survey question 23

Response	Number in this category	%
Internet	13	17.33%
Oracle Database	25	33.33%
Communication System	11	14.67%
Dial-Up Networking	0	0.00%
Outlook	11	14.67%
EXCEL	5	6.67%
WORD	10	13.33%
PowerPoint	0	0.00%
Total Selections	75	100.00%

Table 12: Distribution of responses to survey question 24

Response	Number in this category	%
Internet	15	23.44%
Oracle Database	7	10.94%
Communication System	8	12.50%
Dial-Up Networking	4	6.25%
Outlook	16	25.00%
EXCEL	5	7.81%
WORD	6	9.37%
PowerPoint	3	4.69%
Total Selections	64	100.00%

The respondents' qualitative comments relevant to this question of comfort level provided some additional insights. Leading the list of software applications with which respondents felt comfortable was Oracle, along with the Internet and Outlook, individualized reporting, file copying and management, virus protection, and Microsoft applications in general. The staff appears to use the MNIS Oracle Database and the Internet most frequently.

Employee Satisfaction with Previous Training

Questions 1, 6, 7, 10, 11, 12, and 13 asked the employees to comment about their previous training experiences, along with the amount of time spent using the computer and the value of being very fluent in computer applications.

The question 1 summary found in table 13 shows that 64% of the employees spend more than half of their time using computer applications in their workday. Only one person taking the survey felt that time spent on the computer was less than 20%.

Table 13: Distribution of responses to survey question 1

Response	Number in this category	%
More than 80%	18	36.00%
60% - 80%	14	28.00%
40% - 60%	11	22.00%
20% - 40%	6	12.00%
Less than 20%	1	2.00%
No response	0	0.00%
Total	50	100.00%

Question 6 queries the employees about improved computer skills, asking whether

possessing such skills would enhance their work performance. Table 14 summarizes the finding

that 86% of the employees participating in the questionnaire were convinced or definitely

convinced that improved computer skills would assist in their job performance.

Table 14: Distribution of responses to survey question 6

Response	Number in this category	%
Definitely convinced	27	54.00%
Convinced	16	32.00%
Unsure	4	8.00%
Not fully convinced	3	6.00%
Not convinced	0	0.00%
No response	0	0.00%
Total	50	100.00%

Question 7 shows the previous type of training provided by management. Table 15

summarizes the previous delivery methods, even if the employees had more than one delivery

method in the past. The greatest percentage of respondents listed instructor-led classroom or

reading a manual as the most common type of training.

Table 15: Distribution of responses to survey question 7

Response	Number in this category	%
Classroom, instructor led	32	34.41%
Web-based, instructor led	4	4.30%
Web based, on my own	18	19.35%
Read a manual	27	29.04%
Watch a video	6	6.45%
Interactive CD/DVD	6	6.45%
Total	93	100.00%

In question 10, participants acknowledged their comfort range regarding participation in online or web-based training. Table 16 summarizes that more than half, or 62%, of the employees feel comfortable with a web-based delivery of training, while 18% feel moderately comfortable.

Table16: Distribution of responses to survey question 10

Response	Number in this category	%
Very comfortable	12	24.00%
Comfortable	19	38.00%
Moderately comfortable	9	18.00%
Slightly Uncomfortable	5	10.00%
Very Uncomfortable	5	10.00%
No response	0	0.00%
Total	50	100.00%

Questions 11, 12, and 13 ask for detailed information about the previous training of the participants. Question 11 inquires into the enhancement of computer skills; question 12 is concerned with the delivery of previous training, while question 13 discusses the marketed objectives of the training. The summary in question 11 shows that 60% of the employees believe that previous training either enhanced or greatly enhanced their skills. Question 12 summaries indicate that 62% of the participants believe that their previous training delivery method was

appropriate or very appropriate for their learning style, and 62% believe the training delivered

the marketed training objectives, as summarized in the table of question 13.

Table 17: Distribution of responses to survey question 11

Response	Number in this category	%
Greatly enhanced	8	16.00%
Enhanced	22	44.00%
Somewhat enhanced	15	30.00%
Very little enhancement	3	6.00%
Not at all	1	2.00%
No response	1	2.00%
Total	50	100.00%

Table18: Distribution of responses to survey question 12

Response	Number in this category	%
Very appropriate	4	8.00%
Appropriate	27	54.00%
Slightly inappropriate	12	24.00%
Inappropriate	4	8.00%
Very inappropriate	2	4.00%
No response	1	2.00%
Total	50	100.00%

Table 19: Distribution of responses to survey question 13

Response	Number in this category	%
Delivered more than the objectives	6	12.00%
Delivered the objectives	25	50.00%
Lacked some objectives	13	26.00%
Lacked many objectives	3	6.00%
No value	2	4.00%
No response	1	2.00%
Total	50	100.00%

These findings suggest that the employees are generally satisfied with previous training,

the delivery method, the marketed objectives, and believe that more training assisted their work

performance effectiveness. The qualitative comments supported the findings with regard to these questions.

<div align="center">Concerns about Training Delivery</div>

Questions 8, 15, 16, and 20 delve deeper into the concerns of the participants about the delivery of the training, because management wanted to understand these concerns so as to make the delivery methods appropriate to the employees' needs, in order to maximize the return on its training investment. Question 8 reveals the amount of time that each employee could dedicate to training during the workday without compromising the mission of the organization. Table 20 reveals that 46% of the participants believe they could spend 0-2 hours per day, with 32% of the surveyed employees believing that 2-4 hours would be plausible.

<div align="center">Table 20: Distribution of responses to survey question 8</div>

Response	Number in this category	%
8 hours	4	8.00%
6-8 hours	0	0.00%
4-6 hours	7	14.00%
2-4 hours	16	32.00%
0-2 hours	23	46.00%
No response	0	0.00%
Total	50	100.00%

Question 15 determines the number of times that employees attended non-USDA training programs to enhance their computer skills. Table 21 summarizes that 40% of participants attended training more than one time, while 32% have never attended outside training, and 25% attended only one time.

Table 21: Distribution of responses to survey question 15

Response	Number in this category	%
Many times	5	10.00%
Several times	7	14.00%
A few times	8	16.00%
One time	14	28.00%
Never	16	32.00%
No response	0	0.00%
Total	50	100.00%

Question 16 deals with the customers of the participants asking for assistance and the

confidence of the staff in giving assistance. Table 22 summarizes that the participants received

requests for assistance in a range from often to very frequently 88% of the time.

Table 22: Distribution of responses to survey question 16

Response	Number in this category	%
Very frequently	13	26.00%
Frequently	17	34.00%
Often	14	28.00%
Very infrequently	6	12.00%
Never	0	0.00%
No response	0	0.00%
Total	50	100.00%

Question 20 asks the respondents about the new Market News Web Portal, to determine

whether they had accessed the website, and to identify which location had provided the

encouragement. Table 23 summarizes the fact that 44% had accessed the website independently,

while 12% had accessed the website at a conference or focus group session.

Table 23: Distribution of responses to survey question 20

Response	Number in this category	%
Yes, at the conference	4	8.00%
Yes, at a focus group	6	12.00%
Yes, independently	22	44.00%
No	18	36.00%
No response	0	0.00%
Total	50	100.00%

Preferences for Training

Questions 5, 9, 18, 25, and 26 further determine the preferences for computer training, to assure management that the proper training method and delivery material is being provided to the employees.

Question 5 asked the respondents whether they had had the opportunity for any computer training, and if so, to identify the location of the offering. Table 24 summarizes that 50% of the participants had training on their own time, while 20% had training during work hours, either at the workplace or at another sponsored location.

Table 24: Distribution of responses to survey question 5

Response	Number in this category	%
Yes, at the work place	25	50.00%
Yes, outside sponsored by my employer	10	20.00%
Yes, on my own time	9	18.00%
None at all	6	12.00%
No response	0	0.00%
Total	50	100.00%

Question 9 inquired about web-based training and asked the number of courses that had been delivered to the employee. Table 25 summarizes that 52% of the participants had taken

several web-based training courses, while 20% of respondents said they had not taken any web-

based training.

Table 25: Distribution of responses to survey question 9

Response	Number in this category	%
Many courses	2	4.00%
Several courses	24	48.00%
One course	12	24.00%
Partial course	2	4.00%
Never	10	20.00%
No response	0	0%
Total	50	100.00%

Question 14 allowed the participants to select the actual training method or a method that

was most effective, from a list of six choices. Table 26 summarized that 52% of the employees

found instructor-led classroom training that included lecture and lab to be the most effective.

Web-based training, with or without an instructor, was the second choice.

Table 26: Distribution of responses to survey question 14

Response	Number in this category	%
Classroom, instructor led with lecture and lab	26	52.00%
Web-based, instructor led	9	18.00%
Web-based, on my own	9	18.00%
Read a manual on my own	2	4.00%
Watch a video	3	6.00%
Interactive CD/DVD	1	2.00%
No response	0	0.00%
Total	50	100.00%

Question 18 asked the participants for their impressions of the new Market News Web

Portal by inquiring about easier access to the information. Table 27 summarizes that 70% of the

participants are definitely convinced or convinced that the Market News Web Portal made the

information easier to access.

Table 27: Distribution of responses to survey question 18

Response	Number in this category	%
Definitely convinced	14	28.00%
Convinced	21	42.00%
Unsure	11	22.00%
Not fully convinced	3	6.00%
Not convinced	1	2.00%
No response	0	0%
Total	50	100.00%

Questions 25 and 26 allowed the participants to choose more than one application that

they would like to improve. Question 25 dealt with primary applications for improvement, while

question 26 dealt with the secondary applications for improvement. Table 28 summarizes that

24% of employees wanted to improve their PowerPoint skills, with EXCEL the second highest

choice, at 27%. Table 29 summarizes that 32% of employees wanted to improve their

PowerPoint skills as a secondary application, with 19% of the respondents selecting EXCEL as

the second choice.

Table 28: Distribution of responses to survey question 25

Response	Number in this category	%
Internet	2	3.70%
Oracle Database	4	7.41%
Communication System	5	9.26%
Dial-Up Networking	5	9.26%
Outlook	3	5.56%
EXCEL	16	29.63%
WORD	6	11.11%
PowerPoint	13	24.07%
Total Selections	54	100.00%

In questions 25 and 26, the participants were asked to select all relevant applications

Table 29: Distribution of responses to survey question 26

Response	Number in this category	%
Internet	3	5.26%
Oracle Database	8	14.04%
Communication System	4	7.02%
Dial-Up Networking	3	5.26%
Outlook	6	10.53%
EXCEL	11	19.30%
WORD	4	7.02%
PowerPoint	18	31.57%
Total Selections	57	100.00%

Comments and Answers to Open-Ended Questions

Specific comments made in response to the open-ended questions on the survey, combined

with the telephone interview responses, elicited recurring themes from the participants. The

commonly recurring themes, in order of frequency, were:

1.   Need more overall training

2.   Need EXCEL training in graphs and charts

3.   Need PowerPoint training for presentations

4.   Need hardware training

5.   Need portal training

Reliability of the Instrument

In-depth testing was done to determine and assess the reliability of the survey. The first

question dealt with the comfort level of the employees using computer applications. Using

Cronbach's alpha as a test method for questions 2,3,4,17,19, 21, and 22 to assess an internal

consistency measure for these questions, testers found a result of .8 for the seven items listed, which suggests that the questions are relate and measure this factor. Questions 23 and 24 were excluded from this result.

Questions 1, 6, 10, 11, 12, and 13 asked the employees to comment on their previous training experiences and discuss the amount of time spent using the computer and the value of being very proficient in computer applications. The accuracy seemed to vary considerably in this area of the questionnaire. The variations in responses concerning previous training experiences, according to the interview process, were dependent on previous training given to the employees. Per the survey and the discussion between researcher and field office employees, a standardized training plan was not given to employees equally. Some of the employees did not have any formal training opportunities, which made it impossible to get as much credibility in this area of questioning. Cronbach's alpha reveals a result of .6, with the exclusion of question 7. The instrument favorably measures previous training, but not as reliably as it measures the level of discomfort. Question 7 was excluded from this result.

Questions 8, 15 16, and 20 delve deeper into the concerns of the participants about the delivery of the training. A lower degree of reliability was found in this section, with the Cronbach's alpha reading of .46, implying that less reliability was achieved in this section of the questionnaire due to several factors. Very little outside training was provided for the field office employees, and the training was done selectively. The Internet portal was very new, and very few of the employees had sufficient overall experience.

The final questions 5, 9, and 18 dealt with training preferences, while questions 25 and 26 dealt with specific applications; therefore, questions 25 and 26 are not correlated with questions

5, 9, and 18. Table 33 displays the results of this analysis. The Cronbach's alpha result for the issue of training preference was .76, implying reliability for this section of the questionnaire. The indications are that this information has a high degree of reliability, as noted from the testing results number of .66, which is generally considered an acceptable value.

Patterns in the Data

To review and determine the patterns of the survey, more in-depth testing was performed. Group 1 contains the results of participants that were more than 60% comfortable, while Group 2 contains the results of the participants that were less than 60% comfortable with overall computer skills. The results of questions 2, 3, 4, 17, 19, 21, and 22 were placed in Group 1 and Group 2 to test for patterns comparing the two groups.   Table 31, or Group 1, represents the participants that are 60% or more comfortable about their overall computer skills, while Group 2 represents the group that is less than 60% comfortable with their over computer skills.

Breakdowns of the findings are represented in Table 30 and Table 31. Comparison items measured were overall skill level, comfort with home computer use, comfort with customer requests, comfort with the portal, comfort with Microsoft Outlook, and comfort with the attachments found in Microsoft Outlook.

Table 30: Group 1

	Overall Skill Level	Home Computer Use	Skills Sufficient	Comfort with Customer Requests	Comfort with portal	Comfort with Outlook	Comfort with attachments
Overall Skill level		45%	43%	54 %	29%	52%	48%
Home Computer Use	46%		28%	13%	20%	24%	34%
Skills Sufficient	43%	28%		44%	35%	40%	51%
Comfort with Customer Requests	54%	13%	44%		33%	35%	47%
Comfort with Portal	29%	20%	35%	33%		37%	42%
Comfort With Outlook	52%	24%	40%	55%	37%		82%
Comfort with Attachments	48%	34%	51%	47%	42%	82%	

Table 31: Group 2

	Overall Skill Level	Home Computer Use	Skills Sufficient	Comfort with Customer Requests	Comfort with portal	Comfort with Outlook	Comfort with attachments
Overall Skill level		44%	27%	37 %	24%	33%	48%
Home Computer Use	44%		35%	18%	34%	31%	33%
Skills Sufficient	27%	35%		40%	38%	32%	48%
Comfort with Customer Requests	37%	19%	40%		40%	51%	48%
Comfort with Portal	24%	34%	37%	40%		40%	50%
Comfort With Outlook	33%	31%	32%	51%	40%		75%
Comfort with Attachments	33%	48%	45%	48%	50%	75%	

Of the overall participants that were comfortable with their skill level in Group 1, 45% used a home computer, while only 43% felt that they had sufficient skills. Group 2 results indicate that 44% used a home computer, while only 27% felt that they had sufficient skills. Group 1 results indicated that 54% were comfortable with customer requests, while only 29% had a comfort level with the portal. Group 2 results indicated 37% of the participants were comfortable with customer requests, while only 24% had a comfort level with the portal. The newness of the portal factored greatly into this figure. Group 1 results revealed that 52% of the participants were comfortable with the Microsoft email package Outlook, and 48% were

comfortable with the attachment portion of the email package, compared to Group 2, of whom 33% were comfortable with the Microsoft email package Outlook, and 33% were comfortable with the attachment portion of the email package. Group 2 findings revealed insufficient overall computer skills in the areas of sufficient skills with a 16% difference, comfort with customer requests with a 17% difference, use of Microsoft Outlook with a 19% difference, and use of Microsoft Outlook attachments with a 15% difference.

Of the participants who owned home computers in Group 1, 46% felt comfortable with their skill level, while only 28% felt that their skill level was sufficient, compared to Group 2, in which 44% felt comfortable with their skill level, while only 35% felt that their skill level was sufficient. Thirteen percent of Group 1 participants were comfortable with customer requests, and only 20% were comfortable with the new Internet portal. Nineteen percent of Group 2 participants were comfortable with customer requests, and only 34% were comfortable with the new Internet portal. Twenty-four percent of Group 1 was comfortable with Microsoft Outlook, while 34% were comfortable with the attachments. Thirty-one percent of Group 2 was comfortable with Microsoft Outlook, while 48% were comfortable with the attachments. It is interesting to note that the participants with home computers regarded themselves in a lower capacity, although they had more computer exposure than those that had no home computer, and computer ownership did not seem to significantly factor into the overall competency level in either Group 1 or Group 2.

Of the participants in Group 1 that felt they had sufficient skills to perform their daily work routines, 43% felt that their overall skill level was sufficient and only 28% owned a home computer. Of the participants in Group 2 that felt they had sufficient skills to perform their daily

work routines, 27% felt that their overall skill level was sufficient, and only 35% owned a home computer. Forty-four percent of Group 1 participants were comfortable with customer requests, and thirty-five percent were comfortable with the new Internet portal. Thirty-nine percent of Group 2 participants were comfortable with customer requests, and thirty-seven percent were comfortable with the new Internet portal. Forty percent of the participants in Group 1 were comfortable with Microsoft Outlook, and 51% were comfortable with the attachment features of this product. Thirty-two percent of the participants in Group 2 were comfortable with Microsoft Outlook, and 46% were comfortable with the attachment features of this product. The most significant variation between Group 1 and Group 2 was in the category of overall skill level, showing a 17% variation between the groups.

Of the field office employees in Group 1 that were more comfortable with the Internet portal, only 29% felt that their overall skill level was sufficient, and only 20% regularly used a home computer. Of the field office employees in Group 2 that were more comfortable with the Internet portal, only 24% felt that their overall skill level was sufficient, and only 36% regularly used a home computer. Thirty-five percent of the Group 1 participants believed that their skills were sufficient to do their daily tasks, which correlates with thirty-three percent feeling comfortable with customer requests. Thirty-seven percent of the Group 2 participants believed that their skills were sufficient to do their daily tasks, which correlates with a 40% comfort range with customer requests. Thirty-seven percent of Group one participants were comfortable with Microsoft Outlook as the email package, and 42% were comfortable with the attachment features. Forty percent of Group two participants were comfortable with Microsoft Outlook as the email package, and 50% were comfortable with the attachment features. No significant

variations existed in category of comfort with the Internet portal, with variations slightly higher and lower in various categories.

In the customer request category, 54% of Group 1 had a good overall skill level, and 13% owned a home computer. Group 2 revealed 37% had a good overall skill level, and 19% owned a home computer. Forty-four percent of Group 1 reported that they had sufficient skills, and 33% were comfortable with the new Internet portal. Group 2 results revealed 40% reported sufficient skills, and 40% were comfortable with the new Internet portal. Fifty-five percent of Group 1 reported comfort with Microsoft Outlook, and 47% are comfortable with the attachment features. Group 2 had a 51% comfort rate with Microsoft Outlook, and a 48% comfort rate in the use of the attachments. The largest variation was reported with a 17% difference in the overall skill level of Group 1.

In the next category, comfort with Microsoft Outlook, the percentages started increasing, with 52% of Group 1 participants believing to have a good overall skill level, but only 24% having a home computer. Meanwhile, Group 2 had 37% participants reporting a good overall skill level, but only 31% owned a home computer. Forty percent of Group1 participants felt that their skills were sufficient, but 55% were comfortable with customer requests. Thirty- two percent of Group 2 participants felt that their skills were sufficient, but 51% were comfortable with customer requests. Thirty-seven percent of Group 1 was comfortable with the portal, but 82% were comfortable with Microsoft Outlook attachments. Forty percent of Group 2 was comfortable with the portal, but 75% were comfortable with Microsoft Outlook attachments. The largest variation in this section was the 19% difference between Group 1 and Group 2 in overall skill level.

Of the participants in Group 1 comfortable with Microsoft Outlook attachments, 48% were comfortable with their overall skill level, while only 34% used a home computer. Of the participants in Group 2 comfortable with Microsoft Outlook attachments, 33% were comfortable with their overall skill level, while only 48% used a home computer. Fifty-one percent of Group 1 felt that their skills were sufficient, and forty-seven percent were comfortable with customer requests. Forty-six percent of Group 2 felt that their skills were sufficient, and 48% were comfortable with customer requests. Forty-two percent of Group 1 was comfortable with the new Internet portal, and 82% were comfortable with Microsoft Outlook. Fifty percent of Group 2 was comfortable with the new Internet portal, and 75% were comfortable with Microsoft Outlook. Once again, the largest variation reported between Group and Group 2 was 19% in the overall skill level.

Home computer use does not appear to be significant for the overall feeling of competency for the participants, or for their feeling comfortable with their skills in assisting with customer requests. The Internet portal was noted as an area of discomfort at the time of the survey. Results conclude that this information has a high degree of accuracy from the questionnaire measurement.

 Another pattern search looked for significance among groups. The first pattern search is question 2, looking for a pattern by gender with the Mann-Whitney test. Table 34 reveals no specific pattern in this search, using a sample size of 26 males and 24 females.

Question 2, recoded into a search pattern, used all of the responses in the 60% as Group 1 and below 60% as Group 2, and reveals the results in Table 32.

Table 32: Comparing males and females on overall skill level

Overall Skill Level More than 60%	Males	Females	Mean Percentage
	26		28%
		24	23%

In this instance, the male and female results were similar, with 28% of the men considering their overall computer skills to be adequate, while 23% of the women considered their overall skills to be adequate. The next table reflected larger variation in the results by evaluating the percentage of time employees spent on the computer, therefore implying that employees who spent larger amounts of time on the computer had a greater overall comfort level than those spending less time. Employees that spent 60% or more time on the computer were more than twice as likely to feel adequate about their computer skills. Table 33 identifies the variations between users spending 60% or less time on the computer.

Table 33: Percent of time on the computer

Percent of time on the computer	Group 1 Less than 60% on computer	Group 2 60% or more on the computer	Mean percentage
	32		17%
		18	42%

The field office employees spending 60% or more of the day on the computer reported that they felt twice as competent as those spending less time on the computer. These two specifics are mentioned because the latter reveals that a pattern may exist among the users spending more than 60% of the day on the computers, while gender does not appear to be a pattern in the findings.

Another look into the information for question 19 using the Mann-Whitney, non-parametric test reveals that 32% employees are either comfortable or very comfortable with the web-based portal and with assisting customers. Table 34 explores the results and findings.

Table 34: Comfort with assisting customer requests on the new web portal

Comfort assisting customers	Group 1 Less than 60% on computer	Group 2 60% or more on the computer	Mean percentage
	32		22%
		18	29%

The results reveal, once again, that the participants that spent more time on the computer had a greater level of comfort assisting customers and using the new web portal.

<div align="center">Summary</div>

The study observed the beliefs about computer skills for the field office employees in the USDA. The characteristics of the employees with more confidence about their computer skills show that they spend more time on the computer and are willing to learn the applications by reading manuals, taking outside training classes, or through other opportunities for professional growth. A comparison of beliefs and actions for computer skill knowledge showed the general trend of new learning and trying new applications in free time. The users with fewer skills were more dependent on other employees and were slightly hesitant to try new applications without personal reinforcement. The trends identified that all levels of field office employees felt that better computer skills would enhance their work performance, and all wanted additional training opportunities from the organization both web-based and face-to-face classes.

The researcher observed a strong commitment among the workers for improvement and a willingness to learn new applications that would assist in the daily work performance for the market news reporters. Whether web-based or face-to-face, the researcher believes that further training in EXCEL and Power Point are highly desired by the field office workers, and that classes need to be planned according to mission requirements. A theory believed to be true is that, if computer skills are planned as a part of the mission strategy, then the field office workers at all levels will understand how their role and actions toward customers contribute to the achievement of the USDA mission. Chapter Five presents the results, conclusions, recommendations, and implications for this study.

CHAPTER 5. RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

The research study for USDA was conducted in 2004 for the purpose of developing an understanding of the computer skills of the field office employees. The belief was that a training plan could be established using the information gathered from the questionnaire. Specifically, the study identified the employees' perceptions about computer skills and identified areas that could be targeted for improvement through a training program.

The USDA selected the employees who were asked to participate in a written survey and a telephone interview. These individuals represented the field offices around the United States working for the fruit and vegetable division of the USDA. The summary, major findings, conclusions, recommendations and limitations from the study follow.

Summary of the Study

The study had a twofold purpose. The first was to verify the belief that the employees' skills were based on individual perceptions of comfort with using the applications. A second purpose was to identify specific applications and training methods that could be used to address any employee skill shortfall found through the study. Armed with the information provided by the study, the USDA would be able to make more meaningful decisions about programs that were successful for the employees working in the field offices. Professional growth plans could be developed that would enhance the skills necessary for each employee to accomplish the mission of the organization. The theory behind the study held that employees did not routinely tell

management of their inadequate skill levels.   Thus, by identifying the comfort range, methods of training, and employees' assessments of previous training and deficient applications, the study could provide information that would form the basis for actions that would be useful for improvement in employee performance.

The design of the study, as presented in chapter three, is a new approach to these issues, since no previous studies have been done to identify the computer skills of the field office employees. The design is grounded in a qualitative analysis of subordinate relationships of ten employees, implemented via telephone interviews through the words and phrases of individuals located in various states, who have a common mission for the USDA.   Additionally, the conceptual framework for the study is designed to determine the effectiveness and adequacy of previous training and the need for additional programs.

Collection and analysis of the survey questionnaires completed by the employees, and of the telephone interviews, revealed the level of employee computer skills, and identified the amount of time employees spend using computer applications. The questionnaire determined the following: outside factors influencing employee computer skills, effects of previous computer training, employees' ability to assist customers, applications that are regularly being used, and applications for which employees need more training.

The information from the telephone survey, along with any comments that are collected on the survey forms, supported the results of the questionnaire. The telephone interview allowed time for the interviewees to comment on all other facets of computer skills. The results of the survey questions were charted for enhanced viewing capability by the researcher and the USDA. Finally, the quantitative answers to the survey questions

and the accompanying qualitative data were organized and summarized to show how they address the four research questions.

<div align="center">Conclusions</div>

The true level of employee expertise emerged in the survey and the comments. Several conclusions can be drawn regarding the level of expertise required to assist the customers and accomplish the mission of the department.

First, the employees who had the opportunity to participate in the study view the current computer training development positively. It appears that not all employees had the same training opportunity. Furthermore, Market News Reporters expressed a high level of interest in developing additional skills and felt that previous training methods were appropriate and effective. A high degree of consistency across the offices in terms of computer development was not apparent for all of the required skills.

Second, the disks delivered in the mail and accompanied by a training manual are viewed more negatively by the employees, as evidenced in their responses to questions about how they receive new applications. This observation is critical, since it highlights the fact that management beliefs in the past supported the mail-delivered disks and manual as adequate for providing information to make the employees successful.

The third conclusion is that no basis for computer skills development for the employees is present. The inhibiting factor here is that the exact competencies required to accomplish any given commitment cannot be determined. Computer training, where it exists, tends to be based on personal preference instead of on a strategic action that is directed toward the USDA mission.

Discussion

In this study, four major findings contribute to the current knowledge about the Market News Reporters.

1. The employees are generally comfortable doing their day-to-day tasks because they have taken outside training, read manuals, and practiced applications, and because they have a support person to contact to assist them.

2. The employees were satisfied with their prior training classes, although not all employees had training opportunities. Some employees remarked that they had very limited opportunities for training, and they usually only received a computer disk in the mail.

3. The amount of time required away from the workday is a factor for the web-based training; another factor is feedback from the individual monitoring the class. The lack of feedback tends to make the employees lose interest in the class. The class needs to be asynchronous and include a hands-on segment, because employees live in various time zones, are busy at varying times, and feel the need to try the applications rather than just reading about them. An overall interest exists in face-to-face and hands-on training away from the office, so that employees can concentrate fully on the course material without work restrictions. Employees would like to receive training on an application before it is phased in so they can be fully prepared to assist their customers.

4. PowerPoint slide presentations and the EXCEL program are the leading applications of interest for the employees. The formulas and the graphing capability of EXCEL were mentioned repeatedly in the written comments and the telephone interviews.

Recommendations for General Practice

The recommendations for practice are derived from the new knowledge about the nature of employee computer skills. Several important recommendations are listed for the implementation of development programs within the field office environment.

1. From the information gathered, the first recommendation is to pursue hands-on training for employees in EXCEL and PowerPoint, through either web-based or face-to-face delivery. An instructor should provide feedback, along with some individualized training, for specific USDA applications.

2. The second recommendation is to provide more training with the Internet portal, so that employees have the confidence to assist their customers.

3. The third recommendation is to funnel all computer questions through a single source or group, such as a help desk, to eliminate the dependency on "another employee" as a means of assistance with computer applications. This group could tally the number and type of questions, so that target training could be delivered to employees to meet the customer need. Management may be unaware of the true training needs because the dependency on other employees may be disguising the true training needs from the field offices.

4. The fourth recommendation is to disseminate and link a better follow-up survey after the training has been completed to ensure that funds are being used for the most effective training techniques to fulfill the overall USDA mission for the Fruit and Vegetable Market.

Recommendations for Future Research

This study reveals the current level of employee computer skills, which is subject to change with an effective training program. Follow-up research should be done to ensure that the training program is making the desired difference in the computer skills, by asking the following questions.

1. What are the goals associated with developing an effective training program for the Market News Reporters? Specifically, how will the transition affect the accomplishment of the USDA mission?

2. What key assumptions are embedded in the program and are the obstacles standing in the way of employees acquiring the necessary computer skills. What is the value added for improving the skills, and what is the standard skill level for each employee?

3. What are the required competencies for Market News Reporters, and how are they measured?

4. What are the similarities and differences with regard to management beliefs and actions among individuals in the field offices? What are the similarities and differences in employees' computer skills? The methodology used in this study can be replicated to provide the data for analysis. Future research should focus on the goal of closing the gap, made visible by the study, between management beliefs and actions.

Limitations

The results of the study clearly show that management beliefs about computer skills and employee training needs are not always observable.

1. The employees may feel that their skills are adequate as a result of their only using a very limited number of the available applications, since the study did not have a standard of comparison for the questionnaire.

2. The mission outcome is not fixed for customer assistance instead; it continuously changes with the direction given by consumer needs, local market mandates, and economic conditions.

3. The computer applications extend beyond the specific ones mentioned in the survey, and they could change as technology progresses into new areas. A person could be considered skilled today, and the introduction of a new application could make that user unskilled, without sufficient training to keep the same status.

<div align="center">Conclusion</div>

The results of the survey show a group of employees who are very interested in their computer skills, and who take their employment and the mission of the Fruit and Vegetable Market very seriously. They have used means such as reading manuals, attending outside training classes, and contacting other employees to share information to learn the skills that they feel are needed to perform their work assignments. These employees have indicated that additional training would be beneficial and would further assist them in meeting the needs of their customers.

This research adds important new knowledge to the existing information possessed by USDA management about the skills of the field office employees. The study has disclosed a critical gap in beliefs about the skills required for successfully meeting customer needs in the field office locations.

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APPENDIXES

Appendix A

Survey Participant Recruitment Letter

Dear Field Office Employee,

I would like to solicit your help with a study concerning your feelings about computer skills necessary to perform your job. You were selected was made by management because of the direct contact with customers and ability to provide excellent service.

Participating in the study requires answering a relatively short questionnaire with a-e choices. The survey should not take more than 20 minutes to complete and would greatly assist me with my study. The choices are coded for ease of response. It is possible that you will not directly benefit from your responses, but modifications may be a result of your choices.

I would greatly appreciate your opinion and small amount of time required to answer the survey. If you choose to participate, please read the Informed Consent Form accompanying with the questionnaire and thank you in advance for your support.

Sincerely,

Sharon Gagnon

Appendix B:

Employee Survey Agreed-upon with USDA

USDA Research Questions

Please make the appropriate selection.

_____Section 1_____

1. In your current position, what percent of time do you spend on the computer?

   ☐ a) More than 80%
   ☐ b) 60% - 80%
   ☐ c) 40% - 60%
   ☐ d) 20% - 40%
   ☐ e) Less than 20%

2. Regarding your overall computer skills would you classify yourself as an

   ☐ a) Expert User
   ☐ b) Advanced User
   ☐ c) Average User
   ☐ d) Novice User
   ☐ e) Non-User

3. Do you feel that the use of your home computer improves your computer skills?

   ☐ a) Greatly improves
   ☐ b) Improves
   ☐ c) Somewhat improves
   ☐ d) Does not assist
   ☐ e) No computer at my home

4. When using your computer at work, do you feel that your skills are sufficient?

   ☐ a) More than sufficient
   ☐ b) Sufficient

☐c) Slightly Insufficient
☐d) Insufficient
☐e) Very Insufficient

5. Do you believe having better computer skills would assist you in your job performance?

☐a) Definitely convinced
☐b) Convinced
☐c) Unsure
☐d) Not fully convinced
☐e) Not convinced

6. What type of computer training have you received?

☐a) Classroom, Instructor-led lecture and lab
☐b) Web-based, Instructor led
☐c) Web-based, on my own
☐d) Read a manual on my own
☐e) Watch a video
☐f) Interactive CD\DVD

7. How many hours could you devote to new learning per week and still accomplish your work mission?

☐a) 8 hours
☐b) 6-8 hours
☐c) 4-6 hours
☐d) 2-4 hours
☐e) 0-2 hours

8. How often have you participated in Web Based training (e.g. Ethics Training)?

☐a) Many courses
☐b) Several courses
☐c) One course
☐d)Partial course
☐e) Never

9. What is your comfort range in participating in an online web-based training program to improve your computer skills?

- ☐ a) Very comfortable
- ☐ b) Comfortable
- ☐ c) Moderately comfortable
- ☐ d) Slightly uncomfortable
- ☐ e) Very uncomfortable

10. Has your previous computer training enhanced your computer skills?

- ☐ a) Greatly enhanced
- ☐ b) Enhanced
- ☐ c) Somewhat enhanced
- ☐ d) Very little enhancement
- ☐ e) Not at all

11. Did your previous computer training have an appropriate delivery method for your learning style?

- ☐ a) Very appropriate
- ☐ b) Appropriate
- ☐ c) Slightly inappropriate
- ☐ d) Inappropriate
- ☐ e) Very inappropriate

12. Did your computer training meet the marketed objectives for the training?

- ☐ a) Delivered more than the objectives
- ☐ b) Delivered the marketed objectives
- ☐ c) Lacked some objectives
- ☐ d) Lacked many objectives
- ☐ e) No value

13. What learning style is the most effective for your computer learning needs?

- ☐ a) Classroom, Instructor-led lecture and lab
- ☐ b) Web-based, Instructor led
- ☐ c) Web-based, on my own
- ☐ d) Read a manual on my own
- ☐ e) Watch a video
- ☐ f) Interactive CD\DVD

14. Have you attended non-USDA external training to enhance your computer skills?

☐ a) Many times
☐ b) Several times
☐ c) A few times
☐ d) One time
☐ e) Never

15. How often do customers ask for computer assistance in navigating our website or archived reports etc…?

☐ a) Very frequently
☐ b) Frequently
☐ c) Often
☐ d) Very infrequently
☐ e) Never

16. How comfortable do you feel in assisting your customer's current computer needs?

☐ a) Very comfortable
☐ b) Comfortable
☐ c) Fairly comfortable
☐ d) Uncomfortable
☐ e) Very uncomfortable

17. Do you believe that having information available through a Market News Web Portal will make the information you provide easier to access?

☐ a) Definitely convinced
☐ b) Convinced
☐ c) Unsure
☐ d) Not fully convinced
☐ e) Not convinced

18. With the deployment of the web-based portal, how comfortable would you feel in assisting customers needs accessing the information provided by the portal?

☐ a) Very comfortable
☐ b) Comfortable
☐ c) Fairly comfortable
☐ d) Uncomfortable
☐ e) Very uncomfortable

19. Have you accessed the Market News Portal?

- ☐ a) Yes, at the conference
- ☐ b) Yes, at a focus group
- ☐ c) Yes, independently
- ☐ d) No

20. How comfortable do you feel with the use of Microsoft Outlook?

- ☐ a) Very comfortable
- ☐ b) Comfortable
- ☐ c) Fairly comfortable
- ☐ d) Uncomfortable
- ☐ e) Very uncomfortable

21. How comfortable do you feel with file attachments in Microsoft Outlook?

- ☐ a) Very comfortable
- ☐ b) Comfortable
- ☐ c) Fairly comfortable
- ☐ d) Uncomfortable
- ☐ e) Very uncomfortable

_____Section 2_____

22. What is the main application that you utilize on your computer?

- ☐ a) Internet
- ☐ b) MNIS-Oracle Database
- ☐ c) MNCS-Market News Communication System
- ☐ d) Dial-Up Networking
- ☐ e) Outlook
- ☐ f) MS Excel
- ☐ g) MS Word
- ☐ h) MS PowerPoint
- ☐ i) Other (specify)_____

23. What is the secondary application that you utilize most often on your computer?

☐ a) Internet
☐ b) MNIS-Oracle Database
☐ c) MNCS-Market News Communication System
☐ d) Dial-Up Networking
☐ e) Outlook
☐ f) MS Excel
☐ g) MS Word
☐ h) MS PowerPoint
☐ i) Other (specify)_____

24. Please, select the most important application for which you would like to improve your skills.

☐ a)Internet
☐ b) MNIS-Oracle Database
☐ c) MNCS-Market News Communication System
☐ d) Dial-Up Networking
☐ e) Outlook
☐ f) MS Excel
☐ g) MS Word
☐ h) MS PowerPoint
☐ i) Other (specify)_____

25. For which secondary application would you most like to improve your skills?

☐ a) Internet
☐ b) MNIS-Oracle Database
☐ c) MNCS-Market News Communication System
☐ d) Dial-Up Networking
☐ e) Outlook
☐ f) MS Excel
☐ g) MS Word
☐ h) MS PowerPoint i) Other (specify)_____

26. Have you received any computer training (answer all that applies)?

☐ a) Yes, at the work place
☐ b) Yes, outside, sponsored by my employer
☐ c) Yes, on my own time
☐ d) None at all

_____Section 3_____

Section 3: Please comment on any other issues regarding your computer skills that you feel applicable.

Thank you very much for taking the time to respond to this survey.
Sharon Gagnon

Appendix C

Questions for Telephone Interview

1. When using your computer at work, do you feel that your skills are sufficient?

- ☐ a) More than sufficient
- ☐ b) Sufficient
- ☐ c) Slightly Insufficient
- ☐ d) Insufficient
- ☐ e) Very Insufficient

2. Do you believe having better computer skills would assist you in your job performance?

- ☐ a) Definitely convinced
- ☐ b) Convinced
- ☐ c) Unsure
- ☐ d) Not fully convinced
- ☐ e) Not convinced

3. What is your comfort range in participating in an online web-based training program to improve your computer skills?

- ☐ a) Very comfortable
- ☐ b) Comfortable
- ☐ c) Moderately comfortable
- ☐ d) Slightly uncomfortable
- ☐ e) Very uncomfortable

4. What learning style is the most effective for your computer learning needs?

- ☐ a) Classroom, Instructor-led lecture and lab
- ☐ b) Web-based, Instructor led
- ☐ c) Web-based, on my own
- ☐ d) Read a manual on my own
- ☐ e) Watch a video
- ☐ f) Interactive CD\DVD

.5. How comfortable do you feel in assisting your customer's current computer needs?

☐ a) Very comfortable
☐ b) Comfortable
☐ c) Fairly comfortable
☐ d) Uncomfortable
☐ e) Very uncomfortable

6. How comfortable do you feel with the use of Microsoft Outlook?

☐ a) Very comfortable
☐ b) Comfortable
☐ c) Fairly comfortable
☐ d) Uncomfortable
☐ e) Very uncomfortable

7. What is the main application that you utilize on your computer?

☐ a) Internet
☐ b) MNIS-Oracle Database
☐ c) MNCS-Market News Communication System
☐ d) Dial-Up Networking
☐ e) Outlook
☐ f) MS Excel
☐ g) MS Word
☐ h) MS PowerPoint
☐ i) Other (specify)_____

8. Please, select the most important application for which you would like to improve
    your skills.

☐ a)Internet
☐ b) MNIS-Oracle Database
☐ c) MNCS-Market News Communication System
☐ d) Dial-Up Networking
☐ e) Outlook
☐ f) MS Excel
☐ g) MS Word
☐ h) MS PowerPoint
☐ i) Other (specify)_____

9. Please, select the most important application for which you would like to improve
   your skills.

☐ a)Internet
☐ b) MNIS-Oracle Database
☐ c) MNCS-Market News Communication System
☐ d) Dial-Up Networking
☐ e) Outlook
☐ f) MS Excel
☐ g) MS Word
☐ h) MS PowerPoint
☐ i) Other (specify)_____

10. Please comment on any other issues regarding your computer skills that you feel
applicable.