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A Study to Assess Attitudes and Self-Efficacy of Multi-skilled Healthcare Employees Toward Computers

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A STUDY TO ASSESS ATTITUDES AND SELF-EFFICACY OF MULTI-SKILLED HEALTHCARE EMPLOYEES TOWARD COMPUTERS

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CHAPTER I

INTRODUCTION

In healthcare today, processing information using computers increases at a faster pace each year. The new challenge is to use the computer as an efficient and effective tool in providing documentation, quality patient care, and management of human and financial resources.

Pressures to meet the changing healthcare needs involve technological advances. In the future, computers will be linked to patient monitors and hospital medical, insurance, and billing records. Electronic medical records will replace paper records. MRI and CT images will be transmitted by telephone for interpretation by radiologists in larger hospitals. The storage capacity and convenience of CD-ROM technology will bring resources of the medical staff library into the hospital units and physicians' offices (Addleman, 1994).

In the 1990's, computer technology and restructuring healthcare will go hand in hand. Restructuring plans include the need to cross train employees to become multi-skilled. More employees from different central departments will be required to use computers with cross training skills. Coover and Delcourt (1992) reported, "advances in healthcare often are implemented so rapidly that there is little time to evaluate the impact of these changes on individuals' sense of capacity to perform job expectations

that include the use of computers" (p. 653).

Computers are becoming more ubiquitous but this does not indicate there is an increased number of people who are more comfortable using computers. With this growing use of computer technology and cross training, there is a need to assess the attitudes of healthcare multi-skilled employees toward computers and to examine employees' perceptions of competence. There is limited research in this area of attitudes and self-efficacy of multi-skilled healthcare personnel toward computers. There are many investigations with education (McCaslin & Torres, 1992; Hignite & Echternacht, 1992), college students (Kinzie & Delcourt, 1991; Francis, 1993; Shashaani, 1993), nursing (Ball, Snelbecker, & Schecter, 1985; McConnell, O'Shea & Kirchhoff, 1989; Scarpa, Smeltzer, & Jasion, 1992), and children (Riggs & Enochs, 1993). Using the Attitudes Toward Computer Technologies (ATC) and the Self-efficacy for Computer Technologies (SCT) instruments developed by Delcourt and Kinzie (1993), the study examined attitudes toward computers and self-efficacy for healthcare employees.

STATEMENT OF THE PROBLEM

The problem of this study was to assess the attitudes and self-efficacy toward computers for multi-skilled healthcare employees.

RESEARCH GOALS

The goals of this research were:

1. To determine the attitudes of the multi-skilled healthcare employees using computers.
2. To determine self-efficacy of the multi-skilled healthcare employees toward their feelings of competence in their performance of computer skills.

BACKGROUND AND SIGNIFICANCE

Healthcare delivery is growing with more specialized care, prevention, and early intervention. From the August 1992 report of the U.S. Bureau of Labor Statistics, Employment and Earnings, the growth of healthcare jobs between 1990 and 1991 increased from 7,831,200 to 8,177,300. This indicates it is the third largest growing service field.

With this growth, there is a trend for healthcare restructuring to move swiftly to teams and cross training of multi-skilled personnel. What is a multi-skilled healthcare practitioner? According to Blayney, et al. (1989, p. 216):

> A multi-skilled practitioner is a person who is cross-trained to provide more than one function, often in more than one discipline. These combined functions can be found in a broad spectrum of health related jobs ranging in complexity from the non-professional to the professional level, including both clinical and management functions. The additional functions added to the original health care worker's job may be of a higher, lower or parallel level.

This strategy of multi-skilling contains costs, provides greater flexibility and efficiency in managing personnel, and accommodates manpower shortages. More than 70 percent of the multi-skilled workers were employed in a multi-skilled capacity less than five years and 42 percent were employed in a multi-skilled capacity less than two years (Blayney, Vaughan, & Bamberg, 1990).

There is a variety of multi-skilling implemented with restructuring in healthcare. Skills are combined both across and within the disciplines. For example, at Sentara Norfolk General Hospital, Norfolk, Virginia, the new service associate role includes cross training responsibilities from Dietary, Maintenance, Housekeeping, Patient Escort, and Materials Management departments. The administrative associate role includes cross training responsibilities from Admitting, Medical Records, Billing, Unit Secretary and Receptionist departments. The clinical associate role includes responsibilities within licensure limits of Respiratory Therapists, Pharmacists, Nurses, Medical Technologists, or Care Partners.

The increased efficiency in providing the highest quality of patient care with multi-skilled employees has been studied indicating substantial improvements. Some success indicators were measured at Sentara Norfolk General Hospital. Admitting now begins on the unit, reducing patient admission time dramatically. The patient admission

time previously averaged 81 minutes in the central department decreased to an average of 12 - 30 minutes on the units (Bernd & Reed, 1994). The administrative associates were cross trained to do admitting on the units.

In centralized departments, employees generally had little or no experience working with computers. A medical records specialist did not use a computer for daily work. In the multi-skilled adminitrative associate role, the former medical records specialist will be trained to admit patients using computer technologies on the unit. With cross training, the new role includes using computers as an integral component in routine daily operations to provide the best quality care and improve work flow.

With the trend for hospital restructuring to include more computer applications, it is important to obtain research on attitudes toward computers and self-efficacy. Computer literacy will become part of job descriptions as job roles begin to change to multi-skilled roles. Attitudes toward computer technologies may influence their effective and innovative uses.

For assessing attitudes and computer self-efficacy expectations in healthcare, there is a paucity of research for multi-skilled healthcare professionals. These expectations can be reliably measured and that measurement is to be linked to the identification of a certain set of defined skills (e.g., computer skills). Therefore, with the

needed research for attitudes and perceived ability, the health care industry can provide a better environment to prepare multi-skilled employees to succeed with role changes and applications of computer technology.

LIMITATIONS

The limitations of this study were as follows:

1. The groups surveyed were from one hospital, Sentara Norfolk General Hospital, Norfolk, Virginia.
2. The multi-skilled areas the study is confined to are the clinical associates and administrative associates at the hospital.

ASSUMPTIONS

The assumptions in this study were:

1. With cross training employees to become multi-skilled, more employees will be required to use computers on the job.
2. There is a growing number of employees who are not comfortable learning computer skills.
3. The attitudes of adults toward using computers can be a predictor of positive self-efficacy.

PROCEDURES

This study was completed at Sentara Norfolk General Hospital, Norfolk, Virginia, in May, 1994. Delcourt and

Kinzie (1993) developed the two survey instruments, the Attitudes Toward Computer Technologies (ACT) Survey and the Self-efficacy for Computer Technologies (SCT) Survey. Multi-skilled employees identified from two stratified random groups were asked in a cover letter if they would willingly participate in the study. The surveys were returned to the researcher. Data was compiled, interpreted, and documented.

DEFINITION OF TERMS

The definitions of terms used in the study are clarified by the following list.

Attitude	Learned predisposition to respond in a consistently favorable or unfavorable manner in respect to a given object.
Administrative Associate	Multi-skilled employee performing tasks traditionally done in Admitting, Billing, Reception and Medical Records.
Attitudes Toward Computer Technologies (ACT) Survey	Survey developed by Delcourt and Lewis to test attitudes; survey is easily adapted for different groups.
Clinical Associate	Multi-skilled employee performing tasks within their licensure requirements and having certain shareable tasks with other associates, e.g., passing trays. Departments include nursing, pharmacy, medical technology, respiratory therapy, and care partners.
Multi-skilled Health Care Worker	Employee who has been cross trained to perform more related roles and responsibilities at a higher, lower, or parallel level of original job.
Sagamore Design Model	Model used as a training model to teach computer technology.

Self-efficacy for Computer Technologies (SCT) Survey	Survey developed by Delcourt and Kinzie to test self-efficacy; survey is easily adapted for different groups.
Self-efficacy	Individual's confidence in his/her ability to perform the behavior for a specific outcome.
Service Associate	Multi-skilled employee performing tasks traditionally done in Dietary, Housekeeping, Materials Management, and Maintenance.
Thinking Styles Theory	Theory developed by Masie and Wolman from research of Madeline Hunter, Jim Bellanca, and Malcolm Knowles to define four learners' styles.

SUMMARY

In Chapter I, the problem, research goals, limitations, and assumptions were explained to bring attention to the importance of studying multi-skilled healthcare employees and their attitudes toward computers and self-efficacy. The other sections covering procedures and definition of terms to support the problem are being studied.

In Chapter II, a Review of Literature is provided to further understand the problem. The Methods and Procedures will be described in Chapter III and the Findings will be documented in Chapter IV. Lastly, Chapter V will include the Summary, Conclusions, and Recommendations of the study.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter was to review pertinent literature related to the goals of this study. In this chapter are sections on computer applications in healthcare, an understanding of one computer training model and thinking styles theory, and the importance of attitude and self-efficacy in the successful use of computer applications. If the attitude of a person toward a given object is measured, it can be used with other variables to explain the person's reactions and one's perceived success. This principle is applied to today's tool for technology, the computer.

Applications of Computers in Healthcare

Computer technology is an integral part of the restructuring process in healthcare. Change is taking place rapidly in the 1990's to create technology driven systems. Healthcare providers are increasingly challenged to develop computer skills to provide quality patient care and contain costs. Computers with scientific software will be tools that provide assessment of treatment and quality of care.

Automated computer systems are used in healthcare today in three applications: (1) administrative, (2) clinical, or (3) special purpose. These applications of computer technology are used in healthcare environments such as

hospitals, research facilities, physician's offices, and specialized service companies.

Administrative Application Systems

The administrative applications system works with computer systems for efficiency that include general accounting functions, financial management functions, facilities management, and materials management (Anderson, 1992). These are examples of the many uses of information systems but unfortunately the systems are frequently not networked for improved efficiency.

The complexity of billing for payment in healthcare is not as simple as a business that delivers goods and collects payment from customers. Before the billing process begins, the identification of insurance carriers, types of insurance, and information from physicians can affect the billing process. Filing insurance claim forms requires correct information present on claim forms in order for the provider to receive proper reimbursement.

Because of the complexity of healthcare billing, coding systems such as Diagnostic Related Groups (DRGs) have been devised that assist in processing of claim forms. Coding by Current Procedures Terminology (CPTs) of laboratory tests, examinations, treatments, and operative procedures is used to also facilitate processing.

Electronic claims processing is becoming a common practice among healthcare providers to reduce time involved

in claims processing. The use of computers with a modem to process paperless claim forms reduces the number of rejected claims and errors. This eliminates duplication of paperwork and creates a more seamless billing system.

Accounting systems are utilized to collect data from a variety of sources that provide input into the system. Hospitals, large teaching facilities, community health programs, and health maintenance organizations use data for budget preparations, forecasting, and decision making.

Computers using word processing and E-mail communication are commonplace in every office for daily correspondence. Computers make access to the most up-to-date information easy and time saving, eliminating duplicate paperwork.

Materials management maintains inventory of frequently used equipment and supplies with computers. Hospitals have a Materials Management Department to serve as a central supply unit transporting supplies to hospital locations when supplies are needed. The central department uses automated systems to keep track of inventory. Bar code readers are used to monitor inventory levels in stock rooms and to process charges to patients for supplies. Supplies are directly charged to the patient's account when an item is used by the hospital for that patient. There are materials management software or inventory control software to successfully handle the volume of supplies used.

Clinical Application Systems

The clinical application systems support patient care. These applications include automated medical records, nursing care, and transmission for requested services (Anderson, 1992).

The computerization of medical records has been challenging because of the volume of data for each patient and documentation of the needed care. It is essential to have proper maintenance and storage of the medical record for many reasons. Documentation can be used for patient accounting functions. Information from medical records is also used in research studies. Further, medical records become legal documents that support the patient care received.

Storage of permanent medical records in the future will most likely use optical disk storage. The information on the disk will be digital and this will promote savings in costs of personnel, storage space, and supplies.

Computers in nursing care and clinical decision support systems are providing better patient care with clinical monitoring. Sensor technology detects minute changes in measurement such as temperature, pressure, or other physiological measurements. The measurements may be used to calculate and produce output for analysis which helps in monitoring quality patient care. One advantage of using this type of technology is that hard copy documentation is

produced and used for entry into the patient's medical record.

Physiological monitoring systems are computer systems that monitor physical processes, such as analyzing blood or other fluids. When these levels reach a need for clinical action, these systems alert staff. Analysis by computerized systems can result in identification of life-threatening problems. The data collected is more reliable and documented by a hard copy for the medical record, eliminating time previously used by nurses to chart all information. This gives nurses more time for direct patient care.

Some bedside management systems allow linkages to larger computer systems. It will be also possible in the near future for physicians to complete their rounds and provide consultations from remote monitor screens without attending the patient at the bedside.

Another type of computerized medical instrumentation is the arrhythmia monitor used in emergency rooms, operating rooms, and intensive care areas. The monitor increases detection of fatal arrhythmias by monitoring heart rates. These systems provide advantages for the nursing personnel because they reduce documenting activities. These systems have demonstrated the potential of reducing the mortality for patients experiencing severe coronary problems.

Computer software packages, as tools to diagnose

illness and determine the most cost-effective treatment and use of resources, are being used by more doctors. One example is the Quick Medical Reference (QMR). This information resource supports physician diagnoses for more than 600 diseases in internal medicine (Addleman, 1994). Physicians enter patient's medical history, laboratory results, as well as their own assessment, into the computer. The computer searches the data bank for the disease from the listed symptoms to assist in verifying diagnoses. This program can also be used in simulation cases as a continuing education process.

Clinical computer applications can also help healthcare in many innovative techniques. Scientists are developing virtual reality surgical simulators to train surgeons on computers rather than on cadavers. Computer technologies will be able to link physicians in remote areas with nearby high tech centers to tap the larger databases for resources (Hines, 1994). Nurses can help patients monitor their illness such as diabetes and heart disease at home with personal computers. Personal computers with fax modems will make communication possible between the patient and hospital. Computers will become part of the educational process for wellness and prevention.

Special Purpose Systems

The special purpose application systems provide services other than strictly medical, nursing, or

administrative. This includes laboratory and pharmacy services (Anderson, 1992).

Laboratory software systems include a reporting system that provides labeling functions, work list schedules, patient statistical reports, and billing. Lab orders can be received directly by the lab and results can be reported directly to nursing stations when requested.

Pharmacy systems can monitor drug treatment dosages, drug interactions, and regulate intravenous preparations. Linked to patient accounts, charges can be added from the pharmacy. Computerization can screen for potential problems when some patients see different specialists regularly and are prescribed medications based on problems monitored by these different specialists.

Computer application systems are being utilized to provide better quality of patient care and productivity. Use of computers will continue to grow with breakthroughs in computer memory capacity and applications that will support patient care. The success for applications of computer technology is linked to computer training and the workers' attitude toward computers and how this will affect their perception of competence.

Development of Computer Training

With the increasing number of computer application systems, there is a need for organizations to provide

computer training. Formal computer training for successful implementation of new software is a relatively new field. Since the middle of the 1970's, training development has improved along with software package developments to better teach computer learners. The development of one model for teaching computers, the Sagamore Design Model, and one model to define the different types of learners, the Thinking Styles Theory, give more insight into computer training development and attitudes of learners.

The Sagamore Design Model

Learners come to training with their own learning styles, individual expectations about training, and their capacity to learn. Whether these experiences are based on past experiences or rumors, learners can be influenced by many sources in the way they behave in a training setting.

A foundation in methodology for computer training was developed in the mid 1970's. The National Training and Computers Project developed an instructional framework for the development and analysis of computer training, the Sagamore Design Model (Masie and Wolman, 1989).

The Sagamore Design Model, named after the Sagamore Institute (one of the project's sponsors), is based on principles of three adult learning experts--Madeline Hunter, Jim Bellanca, and Malcolm Knowles (Masie and Wolman, 1989). Madeline Hunter's theory provides one integral part of the Sagamore Design Model foundation. Hunter's teacher

decision-making theory involves identifying what objectives will be taught, what learners will do to demonstrate their learning, and what the teacher will use for teaching strategies. The teacher chooses objectives based on the degree of difficulty for the students to accomplish the lesson. Beginning with an anticipatory set, the teacher builds information from what was learned previously. Active student participation is achieved by choosing appropriate group activities. Using reinforcement and closure will encourage students to assimilate and organize new information. During the lesson, the teacher uses informal or formal evaluations to ensure transfer of knowledge is taking place. For computer training, the teacher will know if the students are ready for the next skill level if they can perform basic skills.

Jim Bellanca's neuro-linguistic programming research provides the second integral part of the Sagamore Design model foundation. In the classroom, neuro-linguistic programming stresses the importance of gaining people's cooperation by making them feel good, not bad. Communication is based on our three dominant senses, visual, auditory, and kinesthetic. Visuals communicate by saying, "Do you see?" or "Is that clear?" Auditories would say, "Do you hear what I'm saying?" Kinesthetic or feeling people use expressions like, "What do you feel like doing?" or "We need a hands-on approach." Most people have a dominant

sense even though we use all three modes. With neuro-linguistic programming, teachers can get to know people and get to speak their language for better communication.

Adult learning theories by Malcolm Knowles are the third integral part of the Sagamore Design Model foundation. According to Knowles, adults are more self-directed learners and bring lifelong experiences to the class. They are motivated when they see relevance and immediate use of the new information. By understanding these principles, a teacher can provide reinforcement of the relevance of computer technologies for the adult learners in the classroom.

By using a computer training model such as the Sagamore Design Model, teachers can provide more effective adult computer training for all types of learners. The six segments in the Sagamore Design Model are the: (1) set, (2) information transfer, (3) check for confusion, (4) guided practice, (5) unguided practice, and (6) check for understanding (Masie and Wolman, 1989). All six occur in some order when adults are learning to use computers. By applying this model to training, trainers can ensure the learning is done in productive patterns. The six activities need not occur in the same order. However, all activities should be included in any learning situation at some interval during the training.

The set is initiated at the beginning of each segment

by stating the course objectives, establishing a context for the course material, and motivating learners. The set will take approximately five minutes. The written objectives (on a flip chart or handout) give the practical thinkers a direct guideline to gain their commitment. Learners can grasp new procedures by seeing how they relate to the old ones in a context. Motivation is set by asking questions to deduce value of lessons to be learned. Adults tend to make judgements about course content and value so it is important to encourage positive judgement with stories to show benefits of software being taught.

In the information transfer segment, the course content is delivered to the learners. Training can be done by an instructor, video or audio tape or printed materials in a self-learning packet. Information should be presented in 20 minute segments for information to be logically digested.

Soliciting questions is the key component in the checking for confusion segment. Some learners will not ask questions during segments. Asking learners to paraphrase what was explained informally is one check for confusion. This will ensure the transfer of learning is taking place.

Guided practice is the segment for keyboard practice applying knowledge in segments. The suggested time for practice is in ten minute time frames. Written instructions give the learners a reference after oral instructions are given. The trainer has a chance to circulate through the

class during the guided practice to observe any difficulties and to be available for questions.

Unguided practice provides an opportunity to practice newly learned skills that are more job-related. Learners select from a variety of problems or bring some work to class. By providing a sense of accomplishment, unguided practice helps cement new skills into learners' memories. Unguided practice can also be done in cooperative learning groups. Time allotted can range from 20 minutes to one hour. The trainer is again the facilitator during this segment.

Checking for understanding is essential before a new chunk of information is delivered. This gives instructors the opportunity to do some quality control. The learners should be required to perform some activity, not just say they understand the information. This segment is important to reinforce the new information.

The six segments are part of the learning process and transfer of learning. The choice of how to teach the segments can depend on the trainer, the class and the thinking styles of the learners. One trainer may choose to teach concepts first and then procedures. Other trainers like to start with procedures and fill in the conceptual explanations as they teach the lesson.

Thinking Styles Theory

Assessment of the thinking styles of the learners can

lead to a more productive computer class. The thinking styles theory involves approaches to learning and using information categorized into four styles - reflective, practical, conceptual, and creative (Masie and Wolman, 1989). This theory is a synthesis of work done by researchers and educators. Most people shift back and forth between two or more styles but predominantly use one style. They use this style to express confusion, the kinds of questions they ask, and the kind of support they find helpful.

Reflective thinkers are relating new information to their own experience and considering how they feel about what they are doing. Their common question is, "Why?" They participate actively in large and small group discussions and dislike passive instructional methods. They want to see examples that are specifically related to their organization rather than generic examples.

Conceptual thinkers want the see the whole picture. They need to see what is going on behind the screen and visualize the workings of the software. Their common question is, "What is it?" They take meticulous, organized notes and ask the instructor to repeat information to make sure they have enough written. They tend to be more tolerant of lecture than any other learners, as long as it is sequential, logically organized and interesting.

Practical thinkers are looking for just the simplified

version of training. They do not need any extra information if they are not going to use it. Their common question is, "What does that do for me?" "Is this the quick version?" Practical thinkers are often the most successful learners in computer training because they concentrate on getting "just the facts". They take edited notes and prefer guided activities to lectures.

Creative thinkers thrive on change and enjoy testing the limits of a software package program. They prefer unguided practice to any other instructional activity. They have a difficult time within an established structure. Creative thinkers thrive better in a class with practice time to avoid boredom.

Using the concept of the four types of learners' thinking styles, trainersmust incorporate all four styles into teaching and make adaptations in their delivery. How does a trainer look for learners' styles? Learners' questions and confusion give trainers an opportunity to accommodate different thinking styles. If information has been delivered in one style, trainers can choose another style to clarify the information back to the learners. Trainers can also observe note taking of individuals in a class. Note taking reflects the different learning styles.

Each segment of the Sagamore Design Model is designed to meet the needs of the learners. This can make the difference between keeping or losing the learner's attention

during a class. Bridging the trainer and learner contributes to the success of computer training. According to Masie and Wolman (1989), the salient points in the delivery of training is to match the thinking styles of learners with the Sagamore Design Model are shown in Table 1 (p. 42).

Table 1

Sagamore Design Model and Thinking Styles

Sagamore Design Model and Thinking Styles	
Stage of the Model	**Thinking Style Stimulated**
Set: Context Motivation Objective	Conceptual Reflective Practical
Information Transfer: Organization Diversity of Style	 Conceptual Creative
Check for Confusion:	All
Guided Practice:	Practical
Unguided Practice:	Creative
Check for Understanding:	All

Trainers tend to have predominant thinking styles reflecting how they train. Trainers who are reflective thinkers are very social and empathetic in the classroom. They care that every learner succeed and like it. As trainers, conceptual thinkers want learners to understand how software works and they want to cover the entire system

with little applications in the beginning. Trainers who are practical are most concerned that learners be able to use the course content. They may oversimplify the material. The learners know keystrokes but not the concepts behind them. The creative trainer is eager to show learners the whole system and vary training designs. This can at times lead to frustration for learners.

Getting adults to change their styles is difficult so the trainer must be aware of the challenges to change his/her style and reach all styles. Many learners come to class because it is mandatory for their job security as organizations change to remain competitive. Their attitudes toward computers must be addressed to reach another key component in the learning process.

Attitudes and Self-efficacy

There is a great need for understanding the importance of assessing attitudes and perceptions of competence of the learners using computers to develop successful training and applications. With computer technology changing healthcare, healthcare workers must be able to use computers proficiently on a daily basis. To embrace technology, employees must have positive attitudes about technology and feel self-efficacious in using them.

A simple definition of attitude is the way an individual feels toward a person or object. There is not

one universally accepted definition of attitude. Fishbein and Ajzen (1975) explained that an attitude can be described as "a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object" (p. 6). Attitudes appear to be learned through interaction in social events or situations.

What is the relationship of attitudes to behaviors? Shaw and Wright (1967) viewed attitudes as the antecedent of behavior. The measurement of attitudes becomes an integral part in gaining an understanding of an individual's behavior (Stronge & Brodt, 1985). This can be applied to learning computers and the learning environment.

The interwoven pattern of attitudes and self-efficacy are reflected in perceptions of capabilities. Self-efficacy is an estimation of one's ability to successfully perform target behaviors to produce outcomes (Bandura, 1986). It is responsible for expectations of eventual success.

According to Bandura, self-efficacy has four categories of direct influence. These categories are: (1) previous successes or failures; (2) seeing others succeed or fail; (3) verbal persuasion; and (4) emotional (affective) arousal (Miura, 1986).

The first direct influence is that self-efficacy links the perceptions of past performance and subsequent behavior and outcomes. Any previous success or failure reveals a certain level of competence and challenges people to

overcome the failure or continue the success. For example, Hill, Smith and Mann (1987) determined that computer self-efficacy of college students was a factor in determining their decisions to use computers in college. The students who had successful experiences were inclined to use computers more than students who did not have positive experiences with computers. Increased confidence influences students' general positive attitudes toward computer use.

The second influence, seeing others fail or succeed, affects perceived self-efficacy. This is common in high schools with few female role models teaching science or math courses. According to one study, there are numerous successful male role models in math-related careers while for females there are relatively few (Miura, 1986). Gist, Schwoerer, and Benson (1989) reported that modeling training can influence others failing or succeeding more compared to tutorial training because there is less positive reinforcement in tutorial training.

The third direct influence, verbal persuasion, can easily affect self-efficacy. An example is parental encouragement for computer-related majors in college. It is an indicator for both men and women in the selection of a computer science major in which parents give sons more encouragement than daughters (Hess & Miura, 1984).

The fourth direct influence is the development of emotional arousal contributing to self-efficacy

expectations. The students who are very anxious do not feel efficacious. Anxiety can be a deterrent. Students who perform poorly in math show math anxiety and this may be transferred to the computer on high school or college levels (Winkle & Mathews, 1982). Furst-Bowe and Smith (1993) found that the students at the University of Wisconsin-Eau Claire and the University of Wisconsin-Stout with greater amounts of computer experience reported less anxiety in their computer abilities.

Attitudes toward computers will affect in a positive or negative way our behavior to learn computer applications. Computer technologies are relatively "new" to some employees and these employees typically show a reluctance to learn the applications for various reasons. Measuring attitudes and self-efficacy of healthcare employees during restructuring will enable a smoother transition in required daily applications of new computer technologies.

Summary

In Chapter II, the Review of Literature provided an explanation of the importance of computer applications in healthcare, the Sagamore Design Model for computer training, Thinking Styles Theory, attitude, and self-efficacy. In healthcare, computer technologies are used on a daily basis to provide the highest quality of care. To embrace computer technologies, employees must have positive attitudes and

feel self-efficacious in using them. Chapter III will provide the Methods and Procedures in using a computer attitude scale and self-efficacy scale for healthcare multi-skilled employees.

CHAPTER III

METHODS AND PROCEDURES

The purpose of Chapter III was to explain the methods and procedures used to obtain data for this study. The Population, Instrument Design, Data Collection, and Data Analysis are addressed in this chapter. The information will be interpreted in later chapters to determine the multi-skilled employees' attitudes and their perceptions of self-efficacy regarding computer technologies.

POPULATION

The healthcare participants in this study were employed at a medium sized 644 licensed bed hospital in Norfolk, Virginia. The participants represented a random sample of the clinical associate and administrative associate population in the Cancer Operating Center. Thirty-one surveys were sent to full time clinical associates which represented 50 percent of the full time Cancer Center clinical associates. Fourteen surveys were sent to full time administrative associates which represented 100 percent of full time Cancer Center administrative associates. The survey also included background information about the multi-skilled employees, including their age, sex, and previous computer experience.

INSTRUMENT DESIGN

The instrument used to measure attitudes regarding computer technologies was the 19 item Attitudes Toward Computer Technologies (ACT) Survey (see Appendix A). Delcourt and Kinzie (1993) developed the instrument and it has been used successfully across disciplines. This instrument included equally balanced positively and negatively phrased items. The two main types of attitudes were: (a) 11 items measured Usefulness and (b) 8 items measured Comfort/Anxiety. A Likert scale with a 4-point response format was chosen, utilizing descriptors ranging from (1) strongly disagree, (2) disagree, (3) agree, and (4) strongly agree. To score the ACT, responses to negatively phrased items are first recoded (1 = 4, 2 = 3, 3 = 2, and 4 = 1). Item responses are then summed for each scale. Respondents with high scores on these scales view computer technologies as valuable tools for their work in healthcare and feel a high degree of comfort about using computer technologies. Delcourt and Kinzie established a reliability estimate of .89 for the entire instrument (.90 for Comfort/Anxiety and .83 for Usefulness scales).

The instrument used to measure perceived self-efficacy regarding computer technologies was the Self-efficacy for Computer Technologies (SCT) Survey (see Appendix B). Delcourt and Kinzie (1993) developed the instrument and later made revisions (Kinzie, Delcourt, & Powers, in press)

to include six sections -- word processing (10 items), communication via electronic mail (9 items), searching CD-ROM data bases (6 items), spreadsheets (7 items), management of data bases (7 items), and use of statistical packages (7 items). Two sections, word processing and data base management systems, were used in this study. The other four sections were not used since daily computer use in the hospital would not include those skills for searching CD-ROM data bases, use of statistical packages, electronic mail and management of data bases. A Likert scale with a 4-point response format was chosen, utilizing descriptors ranging from (1) strongly disagree, (2) disagree, (3) agree, and (4) strongly agree. Scores were reported separately for each section. High scores represent a high degree of perceived ability to use each type of computer technology.

Other questions for data collection included sex, age, and computer experience. Respondents indicated frequency of using work processing, spreadsheets and other computer technologies using a 5 point scale (1 = never, 2 = at least once/year, 3 = at least once/month, 4 = at least once/week, 5 = daily).

METHODS OF DATA COLLECTION

The surveys were sent to multi-skilled employees on a multi-skilled operating center in one hospital. A letter of introduction was attached to the survey explaining the

purpose of the study and enlisted support and cooperation of the employees (see Appendix C). The time frame for collecting data was done between the third and fourth weeks of May, 1994. After one follow-up, eighty-one percent of the returns were received.

STATISTICAL ANALYSIS

The data from the surveys will be analyzed by using mean scores for clinical and administrative associates. The information pertaining to age, sex and computer experience was documented as variables.

SUMMARY

In this chapter, a description of the methods and procedures used to collect data are described. The Population, Instrument Design, Methods of Data Collection, Statistical Analysis, and the Summary were reviewed. In Chapter IV, findings of data collected were analyzed.

CHAPTER IV

FINDINGS

The purpose of this chapter was to present the findings compiled from data collected to assess the attitudes and self-efficacy toward computer technologies of multi-skilled healthcare employees. A survey was administered randomly to two groups of multi-skilled healthcare employees at the medium sized hospital in southeastern Virginia. The two multi-skilled groups were clinical associates and administrative associates. The survey included data collection for attitudes, self-efficacy, and background information that included sex, age, and computer experience.

Fifty-one surveys were sent to multi-skilled employees on one operating center (see Table 2). Employees returned 82 percent (37) of the surveys. Clinical associates

Table 2

Responses to Survey

Employees Surveyed	Employees Responding	Employees Not Responding
Clinical Associates	26 (84%)	5 (16%)
Administrative Associates	11 (79%)	3 (21%)
Total Multi-skilled Employees	37 (82%)	8 (18%)

returned 84 percent (26) of the surveys. Administrative associates returned 79 percent (11) of the surveys.

The survey included selected background information--age, sex, and computer experience for the multi-skilled employees. Table 3 presents a summary of the characteristics for age and sex of multi-skilled employees. The mean

Table 3

Variables - Age and Sex

Multi-skilled Employees (34 women; 3 men)					
Women	50-59	1 (3%)	Men	40-49	2 (5%)
	40-49	8 (22%)		30-39	0
	30-39	19 (51%)		20-29	1 (3%)
	20-29	6 (16%)			
		Mean age: 35.9			
Clinical Associates (23 women; 3 men)					
Women	40-49	5 (19%)	Men	40-49	2 (67%)
	30-39	16 (62%)		30-39	0
	20-29	2 (8%)		20-29	1 (33%)
		Mean Age: 36.3			
Administrative Associates (11 women)					
Women	50-59	1 (9%)			
	40-49	3 (27%)			
	30-39	3 (27%)			
	20-29	4 (36%)			
		Mean Age: 35.5			

age for the multi-skilled employees was 35.9 years. Participants ranged in age from 20-54 years. Of the 37 employees responding, 92 percent (34) were women and 8

percent (3) were men.

The multi-skilled healthcare employees had a variety of experience levels with computer technologies (see Table 4).

Table 4

Variables - Computer Experience

	Word Processing	Spread-sheets	Other
No experience:			
Clinical Associates	9 (35%)	18 (69%)	3 (12%)
Administrative Associates	1 (1%)	6 (55%)	0
Use computers at least once/year:			
Clinical Associates	3 (12%)	0	0
Administrative Associates	0	0	0
Use computers at least once/month:			
Clinical Associates	5 (19%)	0	0
Administrative Associates	0	1	1
Use computers at least once/week:			
Clinical Associates	2 (8%)	0	0
Administrative Associates	2 (18%)	0	0
Use computers daily:			
Clinical Associates	0	0	13 (50%)
Administrative Associates	7 (64%)	0	9 (82%)

Of the 37 multi-skilled employees, 35 percent (9) of the clinical associates reported no word processing experience and one percent (1) of the administrative associates had no

experience with word processing. Sixty-nine percent (18) of the clinical associates had no spreadsheet software experience and 55 percent (6) of the administrative associates had no experience with spreadsheet software. Fifty percent (13) of the clinical associates reported experience with other medical software packages and 82 percent (9) of the administrative associates had experience with other medical software packages (Medipac, Technicon, or CHIPS).

The employees rated their attitudes toward computer technologies using the Attitudes Toward Computer Technologies (ACT) Survey. Table 5 summarizes the mean scores for the ACT Survey.

Table 5

Mean Scores for ACT Survey

	Sections		
	Comfort/ Anxiety	Useful- ness	Total Survey
Multi-skilled Employees	3.17	3.43	3.30
Clinical Associates	2.98	3.03	3.00
Administrative Associates	3.36	3.82	3.59

Note. Scores range from 1 (strongly disagree), 2 (disagree), 3 (agree), to 4 (strongly agree).

The mean score of the ACT Survey for multi-skilled healthcare employees was 3.30. The higher the mean score, the more positive the attitudes, with survey scores ranging from 1 (strongly disagree) to 4 (strongly agree).

There was a difference in the mean scores between administrative and clinical associates. Administrative associates (M = 3.59) were more positive about their attitudes toward computer technologies than clinical associates (M = 3.00). Tables 6 and 7 summarize the results for all 19 items for administrative and clinical associates using the ACT Survey.

The respondents rated their perceived abilities to use word processing and spreadsheet software in the Self-efficacy of Computer Technologies (SCT) Survey. Table 8

Table 8

Mean Scores for SCT Survey

I feel confident using -	Word Processing	Spreadsheet	Total Survey
Multi-skilled Employees	2.98	2.16	2.57
Clinical Associates	2.33	1.58	1.95
Administrative Associates	3.63	2.33	2.98

Note. Scores range from 1 (strongly disagree), 2 (disagree), 3 (agree), to 4 (strongly agree).

Table 6

Attitudes Toward Computer Technologies Survey - Clinical Associates

		SD	%	D	%	A	%	SA	%	M
"Comfort/Anxiety"										
3.	I am confident about my ability to do well in a task that requires me to use computer technologies.	2	7.7	2	7.7	13	50.0	9	34.6	3.04
6.	I feel at ease learning about computer technologies.	0	0.0	4	15.4	11	42.3	11	42.3	3.27
8.[a]	I am not the type to do well with computer technologies.	12	46.2	4	15.4	10	38.4	0	0.0	3.08[b]
11.	The thought of using computer technologies frightens me.	11	42.3	7	26.9	8	30.8	0	0.0	3.12
12.	Computer technologies are confusing to me.	7	26.9	3	11.5	14	53.8	2	7.8	2.58
14.	I do not feel threatened by the impact of computer technologies.	2	7.7	2	7.7	13	50.0	9	34.6	3.12
15.	I am anxious about computer technologies because I don't know what to do if something goes wrong.	6	23.0	4	15.4	12	46.2	4	15.4	2.46
18.	I feel comfortable about my ability to work with computers.	0	0.0	6	23.1	9	34.6	11	42.3	3.19
"Usefulness"										
1.	I don't have any use for computer technologies on a day to day basis.	13	50.0	4	15.4	4	15.4	5	19.2	2.96
2.	Using computer technologies to communicate with others over a computer network can help me to be more effective in my job.	4	15.4	1	3.8	4	15.4	17	65.4	3.31

(table continues)

Table 6

Attitudes Toward Computer Technologies Survey - Clinical Associates

		SD	%	D	%	A	%	SA	%	M
4.	Using computer technologies in my job will only mean more work for me.	9	34.6	13	50.0	4	15.4	0	0.0	3.19
5.	I don't think that computer technologies will be useful in my profession.	19	73.1	5	19.3	1	3.8	1	3.8	3.62
7.	With the use of computer technologies, I can create materials to enhance my performance on the job.	2	7.7	0	0.0	13	50.0	11	42.3	3.27
9.	If I can use word processing software, I will be more productive.	1	3.8	4	15.4	13	50.0	8	30.8	3.08
10.	Anything that computer technologies can be used for, I can do just as well some other way.	9	34.6	9	34.6	5	19.3	3	11.5	2.92
13.	I could use computer technologies to access many types of information sources for my work.	1	3.8	2	7.7	12	46.2	11	42.3	3.27
16.	Computer technologies can be used to assist me in organizing work.	0	0.0	1	3.8	13	50.0	12	46.2	3.42
17.	I don't see how I can use computer technologies to learn new skills.	11	42.3	9	34.6	5	19.3	1	3.8	3.15
19.	Knowing how to use computers won't be helpful in my future work.	15	57.7	8	30.8	3	11.5	0	0.0	3.46

Note. Likert scale for survey - Strongly Disagree (SD) = 1, Disagree (D) = 2, Agree (A) = 3, and Strongly Agree (SA) = 4.

[a]Underlined item numbers reflect negatively phrased stems. [b]Mean scores reversed for negatively phrased items.

Table 7

Attitudes Toward Computer Technologies Survey - Administrative Associates

		SD	%	D	%	A	%	SA	%	M
"Comfort/Anxiety"										
3.	I am confident about my ability to do well in a task that requires me to use computer technologies.	1	9.1	0	0.0	2	18.2	8	72.7	3.55
6.	I feel at ease learning about computer technologies.	1	9.1	0	0.0	3	27.3	7	63.6	3.45
8.[a]	I am not the type to do well with computer technologies.	8	72.7	2	18.2	1	9.1	0	0.0	3.64[b]
11.	The thought of using computer technologies frightens me.	9	81.8	0	0.0	1	9.1	1	9.1	3.55
12.	Computer technologies are confusing to me.	6	54.5	4	36.4	1	9.1	0	0.0	3.45
14.	I do not feel threatened by the impact of computer technologies.	2	18.2	1	9.1	3	27.3	5	45.4	3.00
15.	I am anxious about computer technologies because I don't know what to do if something goes wrong.	5	45.4	2	18.2	2	18.2	2	18.2	2.91
18.	I feel comfortable about my ability to work with computers.	1	9.1	1	9.1	2	18.2	7	63.7	3.36
"Usefulness"										
1.	I don't have any use for computer technologies on a day to day basis.	11	100	0	0.0	0	0.0	0	0.0	4.0
2.	Using computer technologies to communicate with others over a computer network can help me to be more effective in my job.	1	9.1	0	0.0	5	45.45	5	45.45	3.27

(table continues)

Table 7

Attitudes Toward Computer Technologies Survey - Administrative Associates

		SD	%	D	%	A	%	SA	%	M
4.	Using computer technologies in my job will only mean more work for me.	9	81.8	1	9.1	1	9.1	0	0.0	3.73
5.	I don't think that computer technologies will be useful in my profession.	11	100	0	0.0	0	0.0	0	0.0	4.0
7.	With the use of computer technologies, I can create materials to enhance my performance on the job.	0	0.0	0	0.0	3	27.3	8	72.7	3.73
9.	If I can use word processing software, I will be more productive.	0	0.0	0	0.0	1	9.1	10	90.9	3.91
10.	Anything that computer technologies can be used for, I can do just as well some other way.	10	90.9	1	9.1	0	0.0	0	0.0	3.91
13.	I could use computer technologies to access many types of information sources for my work.	0	0.0	0	0.0	4	36.4	7	63.6	3.63
16.	Computer technologies can be used to assist me in organizing work.	0	0.0	1	9.1	0	0.0	10	90.9	3.82
17.	I don't see how I can use computer technologies to learn new skills.	11	100.0	0	0.0	0	0.0	0	0.0	4.00
19.	Knowing how to use computers won't be helpful in my future work.	11	100.0	0	0.0	0	0.0	0	0.0	4.00

Note. Likert scale for survey - Strongly Disagree (SD) = 1, Disagree (D) = 2, Agree (A) = 3, and Strongly Agree (SA) = 4.

[a]Underlined item numbers reflect negatively phrased stems. [b]Mean scores reversed for negatively phrased items.

summarizes the results. The mean score of the multi-skilled employees was 2.57. The multi-skilled employees rated their perceived ability to use word processing (M = 2.98) significantly higher than their perceived ability to use spreadsheet software (M = 2.16).

Results indicated differing responses between the clinical associates and administrative associates in the two sections. Administrative associates (M = 3.63) felt more self-efficacious in using word processing than clinical associates (M = 2.33). Using spreadsheet software, administrative associates (M = 2.16) perceived their self-efficacy at a higher level than clinical associates (M = 1.58). Tables 9 and 10 show results for all 17 items for administrative and clinical associates on the SCT Survey.

SUMMARY

The information obtained in surveys and background information from multi-skilled employees in one operating center was presented in this chapter. The data included the Computer Technologies Survey, the Attitudes Toward Computer Technologies Survey, and background information that included sex, age, and computer experience. A summary of the study, conclusions, and recommendations based on this data are presented in Chapter V.

Table 9

Self-efficacy Survey Results - Clinical Associates

		SD	%	D	%	A	%	SA	%	M
Word Processing										
I feel confident . . .										
1.	Using a word processing program to write a letter or report.	8	31	3	11	13	50	2	8	2.35
2.	Accessing previous files with a word processing program.	8	31	4	15	10	39	4	15	2.39
3.	Making corrections in word processing.	8	31	5	19	10	39	3	11	2.30
4.	Formatting text (e.g., underlining, bold).	8	31	5	19	10	39	3	11	2.30
5.	Moving blocks of text in word processing.	8	31	7	27	8	31	3	11	2.23
6.	Using the spell check.	8	31	3	12	8	31	7	27	2.23
7.	Using the searching feature.	8	31	6	23	8	31	4	15	2.30
8.	Printing files I've written.	8	31	1	4	10	39	7	27	2.62
9.	Saving documents I've written.	8	31	4	15	9	35	5	19	2.42
10.	Renaming a word processing file.	8	31	9	35	5	19	4	15	2.19

(table continues)

Table 9

Self-efficacy Survey Results - Clinical Associates

		SD	%	D	%	A	%	SA	%	M
Spreadsheet Software										
I feel confident . . .										
1.	Formatting data fields in a database.	17	65	6	23	2	8	1	4	1.58
2.	Naming data fields in a database.	17	65	6	23	2	8	1	4	1.58
3.	Entering records in a database.	17	65	5	19	3	12	1	4	1.54
4.	Searching records in a database.	17	65	5	19	2	8	2	8	1.58
5.	Sorting records in a database.	17	65	5	19	2	8	2	8	1.58
6.	Printing records in a database.	17	65	5	19	1	4	3	12	1.62
7.	Saving database files.	17	65	5	19	1	4	3	12	1.62

Note. Scale for survey - Strongly Disagree (SD) = 1, Disagree (D) = 2, Agree (A) = 3, Strongly Disagree (SA) = 4.

Table 10

Self-efficacy Survey Results - Administrative Associates

		SD	%	D	%	A	%	SA	%	M
Word Processing										
I feel confident . . .										
1.	Using a word processing program to write a letter or report.	0	0	0	0	4	36	7	64	3.64
2.	Accessing previous files with a word processing program.	0	0	0	0	1	9	10	91	3.91
3.	Making corrections in word processing.	0	0	0	0	2	18	9	82	3.82
4.	Formatting text (e.g., underlining, bold).	1	9	0	0	3	27	7	64	3.45
5.	Moving blocks of text in word processing.	2	18	0	0	3	27	6	55	3.09
6.	Using the spell check.	0	0	0	0	1	9	10	91	3.90
7.	Using the searching feature.	0	0	2	18	5	46	4	36	3.18
8.	Printing files I've written.	0	0	0	0	1	9	10	91	3.91
9.	Saving documents I've written.	0	0	0	0	1	9	10	91	3.91
10.	Renaming a word processing file.	0	0	1	9	4	36	6	55	3.45

(table continues)

Table 10

Self-efficacy Survey Results- Administrative Associates

		SD	%	D	%	A	%	SA	%	M
Spreadsheet Software										
I feel confident . . .										
1.	Formatting data fields in a database.	4	36	0	0	4	36	3	28	2.55
2.	Naming data fields in a database.	4	36	0	0	3	28	4	36	2.64
3.	Entering records in a database.	3	27	1	9	4	36	3	28	2.64
4.	Searching records in a database.	2	18	2	18	2	18	5	46	2.64
5.	Sorting records in a database.	2	18	2	18	4	36	3	28	2.73
6.	Printing records in a database.	2	18	1	9	3	28	5	45	3.00
7.	Saving database files.	2	18	1	9	2	18	6	55	3.00

Note. Scale for survey - Strongly Disagree (SD) = 1, Disagree (D) = 2, Agree (A) = 3, Strongly Disagree (SA) = 4.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter reported the summary of the study, the conclusions, and the recommendations made as a result of the research data obtained from surveys. The results will be used to provide better training environments for multi-skilled healthcare employees since computer literacy is becoming essential for new healthcare roles.

SUMMARY

The problem of this research study was to assess the attitudes of multi-skilled healthcare employees toward computers and their feelings of confidence in their performance of computer skills. The goals of the study were (1) to determine the attitudes of the multi-skilled healthcare employees using computers and (2) to determine self-efficacy of multi-skilled healthcare employees.

Restructuring healthcare delivery reflects the demand for multi-skilling employees and the demand for more use of computer technologies. This will ensure the highest quality patient care, contain costs, and improve delivery of care. Healthcare is rapidly changing to technology driven systems.

For successful transition to a computer based work environment, employees need effective computer training and applications. By understanding the framework of one

computer training model, the Sagamore model, instructors will be able to facilitate better instruction for participants in computer training.

A study of attitudes and self-efficacy toward computer technologies is important because it can influence the effective and innovative use of computer applications for employees. Employees can embrace computer technologies with a positive attitude for successful applications of new technologies that are changing the healthcare field dramatically every year.

This study was conducted on a multi-skilled operating center in a medium sized hospital in southeastern Virginia. Delcourt and Kinzie (1993) developed the two affective measures used for data collection in this study, the Attitudes Toward Computer Technologies (ACT) Survey and the Self-efficacy for Computer Technologies (SCT) Survey. Scores were based on a 4-point Likert scale from 1 (strongly disagree), 2 (disagree), 3 (agree) to 4 (strongly agree). A random group of clinical and administrative associates received the surveys and 81 percent returned the surveys. The surveys included additional background variables--sex, age, and computer experience.

CONCLUSIONS

The data was analyzed from the surveys to assess attitudes and self-efficacy toward computer technologies of

multi-skilled healthcare employees. The results of this study indicated there are different levels of usefulness and comfort/anxiety for computer technologies and different levels of perceived self-efficacy.

The first goal of the study was to determine the attitudes toward computer technologies of multi-skilled healthcare employees. The multi-skilled employees reported a positive comfort level (M = 3.43) toward computer technologies and they saw a usefulness for computer technologies (M = 3.30). The difference in attitudes between the administrative associates and clinical associates was significant in rating the usefulness of computers. Administrative associates strongly agreed (M = 3.82) about the usefulness of computer technologies, whereas the clinical associates only agreed (M = 3.03) about the usefulness of computer technologies. Administrative associates had 32 percent more experience with computer technologies and this could easily affect positively their attitudes. Low anxiety and positive attitude toward computer use are related to higher computer skills.

The second goal of the study was to determine self-efficacy toward computer technologies of multi-skilled healthcare employees. There was a significant difference between clinical and administrative associates. The clinical associates disagreed with their perceived ability (M = 1.95) while the administrative associates agreed with

their perceived ability (M = 2.98). This difference could include the nature of the job responsibilities that exist or past negative experience with computer technologies. This supports Bandura's theories of self-efficacy and direct influences.

Even though more clinical associates are required to use computers on a daily basis, they do not believe in their ability to perform well on computers (M = 1.95). They also reported a lower score for their general attitudes toward computer technologies (M = 3.00) compared to administrative associates (M = 3.59). They may try to avoid using computer technologies or avoid practicing to gain more confidence. This demonstrates the importance of considering attitudes as important learner characteristics and precursors of self-efficacy since more clinical associates will need to become computer literate.

RECOMMENDATIONS

The results of this study indicate that attitudes and self-efficacy toward computer technologies play an integral part in computer training and successful applications. The researcher offers recommendations and directions for future research based on the findings in this study.

A recommendation to use an attitude and self-efficacy survey for employee pre- and post- computer training will be beneficial in many ways. Learners can formally assess their attitudes before class. Based on findings, there are

expected relationships among computer attitudes and computer experience of adult learners. Therefore, employees who perceive themselves as self-effacious in computer technologies would be more likely to have some computer experience (Howard, Murphy and Thomas, 1987).

Teachers can measure the pre-computer and self-efficacy attitudes of learners before class begins which will help establish objectives related to the needs of the students. Pre-training intervention can be designed to enhance self-efficacy prior to training. This will be beneficial for those who score low in self-efficacy. In the case of computer phobias, intervention aimed at reducing computer anxiety may help these learners to take full advantage of the training content. Increasing the amount of class time available for experimentation and computer practice could help alleviate some employees' fears about computer use and help build some confidence in their abilities.

In future research, formal studies are needed to suggest strategies to determine the effects of the importance of the teacher's role modeling with learners. This could contribute to the formation of a more positive role modeling. In some organizations, the computer training teachers have no formal experience in education or computer training.

More studies are needed to examine the effectiveness of different computer training approaches such as modeling and

tutorial approaches. Modeling is done with an instructor and learners in a classroom setting. A video of the instructor can be used as the learners make progress through a lesson. The class instructor acts as a facilitator to stop the video for application of new skills by the learners. A tutorial represents programmed instruction and structured drills, and gives feedback and reinforcement contingent on the students' responses. Tutorials can represent a type of computer-aided instruction. Modeling compared with tutorial training is expected to better enhance self-efficacy. With computer training, this may be even more evident with documented studies.

Additional studies are needed to document the impact of computer training programs on more multi-skilled healthcare employees. A duplication of this attitudinal study in other institutions is needed to continue collection of data. This will allow for comparison of studies conducted under different circumstances and would generate data regarding ability for generalization of the findings. One possibility can indicate the attitudes towards computer technologies from the different backgrounds of clinical associates, such as pharmacists, RNs, medical technologists, or respiratory therapists. Another possibility is to analyze data by nursing unit or shift. Studies should be conducted for hospital employees other than clinical employees to determine the appropriate training needs throughout the

organization. Thus, staff development departments could more effectively concentrate their educational endeavors in areas of greatest need.

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APPENDICES

Appendix A

Attitudes Toward Computer Technologies Survey

COMPUTER TECHNOLOGIES SURVEY

The purpose of this survey is to find out how healthcare workers feel about computer technologies. The term computer technologies is defined as the use of computers and related hardware and software to perform specific tasks.

Return this form to Cindy Kratzke, Operational Support, in the enclosed envelope as soon as possible. Thank you for your participation.

Please respond to each of the following items:

1. Sex (circle one) male female

2. Age: _____

3. Indicate your role as an associate:

    _____ administrative associate _____ service associate _____ clinical associate

4. How often do you use a computer?

	Never	At least once/year	At least once/month	At least once/week	daily
1. Word Processing (WordPerfect)	1	2	3	4	5
2. Spreadsheet Software (Lotus, Excel, etc.)	1	2	3	4	5
3. Other ____________________	1	2	3	4	5

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PART I: ATTITUDES TOWARD COMPUTER TECHNOLOGIES

This survey has 19 statements about computer technologies. Please circle the number to the right of each statement to indicate the extent to which you agree or disagree. There are no correct or incorrect responses.

		Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree
1.	I don't have any use for computer technologies on a day to day basis.	1	2	3	4
2.	Using computer technologies to communicate with others over a computer network can help me to be more effective in my job.	1	2	3	4
3.	I am confident about my ability to do well in a task that requires me to use computer technologies.	1	2	3	4
4.	Using computer technologies in my job will only mean more work for me.	1	2	3	4

		Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree
5.	I don't think that computer technologies will be useful in my profession.	1	2	3	4
6.	I feel at ease learning about computer technologies.	1	2	3	4
7.	With the use of computer technologies, I can create materials to enhance my performance on the job.	1	2	3	4
8.	I am not the type to do well with computer technologies.	1	2	3	4
9.	If I can use word processing software, I will be more productive.	1	2	3	4
10.	Anything that computer technologies can be used for, I can do just as well some other way.	1	2	3	4
11.	The thought of using computer technologies frightens me.	1	2	3	4
12.	Computer technologies are confusing to me.	1	2	3	4
13.	I could use computer technologies to access many types of information sources for my work.	1	2	3	4
14.	I do not feel threatened by the impact of computer technologies.	1	2	3	4
15.	I am anxious about computer technologies because I don't know what to do if something goes wrong.	1	2	3	4
16.	Computer technologies can be used to assist me in organizing work.	1	2	3	4
17.	I don't see how I can use computer technologies to learn new skills.	1	2	3	4
18.	I feel comfortable about my ability to work with computer technologies.	1	2	3	4
19.	Knowing how to use computer technologies won't be helpful in my future work.	1	2	3	4

Appendix B

Self-Efficacy Toward Computer Technologies Survey

PART II: SELF-EFFICACY WITH COMPUTER TECHNOLOGIES

This survey has 17 questions about your confidence with computer technologies. Please indicate the extent to which you agree or disagree by circling the number to the right of each sentence. **There are no correct or incorrect responses. Please respond to all statements, even if you have not had a great amount of experience with a particular type of computer technology. For example:**

	Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree
I feel confident:				
Formatting a computer diskette.	1	2	(3)	4

When you circle 3, you are indicating that you have some degree of confidence in formatting a diskette.

	Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree
Word Processing				
I feel confident . . .				
1. Using a word processing program to write a letter or report.	1	2	3	4
2. Accessing previous files with a word processing program.	1	2	3	4
3. Making corrections in word processing.	1	2	3	4
4. Formatting text (e.g., underlining, bold).	1	2	3	4
5. Moving blocks of text in word processing.	1	2	3	4
6. Using the spell check.	1	2	3	4
7. Using the searching feature.	1	2	3	4
8. Printing files I've written.	1	2	3	4
9. Saving documents I've written.	1	2	3	4
10. Renaming a word processing file.	1	2	3	4
Spreadsheet Software:				
I feel confident . . .				
11. Formatting columns and rows in a spreadsheet.	1	2	3	4
12. Naming the columns and rows in a spreadsheet.	1	2	3	4

		Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree
I feel confident . . .					
13.	Entering appropriate formulas for calculation.	1	2	3	4
14.	Entering data in a spreadsheet.	1	2	3	4
15.	Editing previous spreadsheet files.	1	2	3	4
16.	Printing out the spreadsheet.	1	2	3	4
17.	Saving spreadsheet file.	1	2	3	4

Appendix C

Sample of Cover Letter

SENTARA.
Norfolk General Hospital

600 Gresham Drive
Norfolk, Virginia 23507

MEMORANDUM

DATE: May 18, 1994

TO: Cancer Operating Center Employees

FROM: Cindy Kratzke, Operational Support

RE: **SURVEY**

As part of my Old Dominion University graduate program in Education, I am completing my thesis this semester. The purpose of my study is to determine the attitude of multi-skilled healthcare workers toward computer technologies.

Your responses are important by showing how computers are perceived and used in healthcare. The survey was developed by Dr. Delcourt and Dr. Kinzie at the University of Virginia. Computer technologies are rapidly changing healthcare delivery for everyone!

Please take 5 - 7 minutes to answer the questions. Return the survey in an interoffice envelope to Cindy Kratzke, Operational Support, as soon as possible. All responses will be confidential and no names are needed.

Thank you for your participation!