2008

The effects of age, computer self-efficacy, comptuer anxiety, and computer experience on training method preference in employees

Jennifer Lee Cremer

THE EFFECTS OF AGE, COMPUTER SELF-EFFICACY, COMPUTER ANXIETY, AND COMPUTER EXPERIENCE ON TRAINING METHOD PREFERENCE IN EMPLOYEES

A Thesis

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

in

Psychology:

Industrial/Organizational

---

by

Jennifer Lee Cremer

March 2008

THE EFFECTS OF AGE, COMPUTER SELF-EFFICACY, COMPUTER ANXIETY, AND COMPUTER EXPERIENCE ON TRAINING METHOD PREFERENCE IN EMPLOYEES

A Thesis

Presented to the

Faculty of

California State University,

San Bernardino

---

by

Jennifer Lee Cremer

March 2008

Approved by:

[redacted]

Kenneth S. Shultz, Ph.D., Chair, Psychology

3/12/08

Date

[redacted]

Matt L. Riggs, Ph.D.

[redacted]

Janelle A. Gilbert, Ph.D.

ABSTRACT

The effects of age, computer self-efficacy (CSE), computer anxiety (CA), and computer experience (CE) upon employee training method preferences (classroom training (CT), online training (OT) or blended training (BT)) were evaluated. Ninety full-time employees from a large utility company completed an electronic survey designed to assess employee preferences for different methods of delivering employee training. The website link was distributed to managers and employees via email, asking for their participation. The participant ages ranged from 19 to 68 years, and the majority of employees held technical and engineering positions. Each participant was asked to choose the training method they preferred most (classroom training (CT), online training (OT) or blended training (BT)). A multinomial logistic regression (MLR) using SPSS software was performed to assess the likelihood of training method preference based upon computer self-efficacy (CSE), computer anxiety (CA) and computer experience (CE) levels. Results indicate that as computer self-efficacy (CSE) increases, employees are more likely to prefer online (OT) and blended (BT) training methods over classroom training (CT)and as levels of computer anxiety (CA) increase,

employees are more likely to prefer classroom training (CT) methods over online (OT) and blended (BT) training. These results support previous research findings. However, results regarding age and computer experience (CE) did not follow some of the pre-existing research, in that age did not significantly predict training method preference. Similarly, non significant results were found in regards to computer experience (CE) predicting employee preference for classroom (CT) versus online training (OT). However, as levels of computer experience (CE) increased, employees were more likely to prefer blended training (BT) over classroom training (CT) methods, which contradicts previous research findings. Evaluating levels of employee computer self-efficacy (CSE) and computer anxiety (CA) levels prior to computer based training implementation by organizations may be informative in determining necessary pre-training intervention considerations.

TABLE OF CONTENTS

ABSTRACT..... iii

LIST OF TABLES..... vii

CHAPTER ONE: INTRODUCTION..... 1

Training Methods..... 4

Computer Self-Efficacy..... 9

Computer Anxiety and Computer Experience..... 12

Age and Training..... 15

Age, Training and Technology..... 22

Hypotheses..... 26

CHAPTER TWO: METHOD

Participants..... 29

Procedure..... 30

Measures and Predictor Variables..... 31

Criterion Variable..... 32

CHAPTER THREE: RESULTS..... 34

Test of Hypotheses..... 40

CHAPTER FOUR: DISCUSSION..... 47

Age..... 48

Computer Experience..... 51

Computer Self-Efficacy..... 53

Computer Anxiety..... 54

Significance of the Present Study..... 55

Practical Implications..... 61

Limitations and Future Directions..... 63

Summary and Conclusion..... 66

APPENDIX A: ORIGINAL - COMPUTER TRAINING CHARACTERISTICS AND PREFERENCE SURVEY..... 68

APPENDIX B: REVISED - COMPUTER TRAINING CHARACTERISTICS AND PREFERENCE SURVEY..... 72

REFERENCES..... 75

LIST OF TABLES

Table 1. Demographics..... 29

Table 2. Reliability and Factor Analysis Results for Multi-Item Scales..... 38

Table 3. Likelihood Ratio Tests for Predictor Variables in Predicting Training Method Preference..... 40

Table 4. Parameter Estimates for Hypotheses 1, 2, 3, and 4..... 45

Table 5. Parameter Estimates for Hypotheses 2a, 3a, and 4a..... 46

CHAPTER ONE

INTRODUCTION

Organizations spend great amounts of time and money each year providing training to their employees. The intention is to create an effective workforce that will result in increased productivity and improved overall organizational performance (Berman, Bowman, West, & Van Wart, 2006). The desired effectiveness is thought to emerge from the employees acquired "skills, rules, concepts, or attitudes" that were presented during training (Goldstein & Ford, 2002). Organizations provide training for various reasons, including the training of new employees, changes in job requirements, and ongoing training to keep skills up-to-date (Aamodt, 2004). Although training costs for organizations can be high, estimated at 54 billion dollars a year, training programs continue to be developed in anticipation of a greater return on their training investment (Dolezalek, 2005).

Organizations are not the only ones who benefit from training however, in that employees benefit as well by increasing the likelihood of higher wages, promotion, or status (Goldstein & Ford, 2002). The skills that employees

acquire through training at one organization can also help them with future employment opportunities. For example, when an employee is hired, specific training is often offered as part of an incentive package for the job. As a result, most employees realize the value of training, but there are many factors that can contribute to an employee's success before, after and during a training program. Providing employees with training does not guarantee they will transfer their new knowledge and skills to their job. Issues such as training method and individual employee characteristics have been found to influence training effectiveness and training motivation (Colquitt, LePine, & Noe, 2000; Gist, Rosen, & Schwoerer, 1988; Iverson, Colky, & Cyboran, 2005; Noe, 1986; Schmeeckle, 2003; Tai, 2006).

Cronbach (1975) proposed that employee personality traits or characteristics will interact with different types of instruction, which he labeled as aptitude treatment interactions (ATI). It is therefore important to pre-assess individual characteristics prior to instruction to ensure each individual is matched with the most appropriate training type for their abilities or traits. Sternberg, Grigorenko, Ferrari & Clinkenbeard (1999) investigated ATI's as described by Cronbach and did indeed

find that students performed better when the instruction type matched cognitive characteristics like analytical ability and creativeness. In addition to cognitive characteristics, examples of other relevant individual characteristics include knowledge and skills, learning styles and personality characteristics.

In regards to an individual's motivation to learn, which has been found to be a component of training motivation, both situational and individual characteristics can influence learning outcomes (Colquitt et al, 2000). Individual characteristics such as age, anxiety levels and self-efficacy have been found to be significantly correlated to one's motivation to learn (Colquitt et al., 2000).

The major objective of the present study was to assess three well established elements of training motivation (i.e., computer experience, computer self-efficacy, computer anxiety), in regards to the domain of computerized training, and their individual influence, as well as their interaction with age, on an employee's preference of training method (i.e., classroom, online, and blended). Therefore, below we review the relevant literature related to these key training related issues.

Training Methods

Much business literature has been produced regarding delivery of training content, although little research has been conducted linking the delivery or method of training used and desired outcomes. This is surprising, considering that organizations in the United States spend upwards of 54 billion dollars a year on formal training (Dolezalek, 2005). Traditional training methods include classroom/lecture, workbooks, and simulations (Aamodt, 2004). Classroom training is typically performed by a qualified employee or outside consultant, usually in a lecture format. It is estimated that over 70% of organizations in the United States currently use classroom training (Dolezalek, 2005). Even though classroom training is the dominant method used, both advantages and disadvantages have been found for this method of training. Advantages include the opportunity for social interaction of trainees (MacKay & Stockport, 2006), ease of communication between trainer and trainees (Tai, 2005), and less opportunity for misinterpretation of material (MacKay & Stockport, 2006). However, researchers have also found that classroom training does not take into account trainee individual differences (e.g., prior knowledge, motivation, self-efficacy, or experience), it

limits immediate feedback to trainees, and is not as effective as other training methods when requiring complex responses, such as the acquisition of new motor skills (Goldstein & Ford, 2002).

With the rapid development of new technologies in the past several decades, new training methods have followed the technology trend, with organizations incorporating and/or substituting computers and the web/internet in training programs that had previously used only traditional methods. Although technology-based training (TBT) is seen by the business world as the future of training in the workplace, not much research has been conducted to validate the effectiveness of these new methods (Dolezalek, 2005; Schmeeckle, 2003). In addition, much of the research that has been conducted focuses on students in an academic setting, rather than employees in a work setting (Schmeeckle, 2003). As a result, most research findings in this area have limited generalizability to the workplace.

Another issue with previous research conducted with TBT, is that this medium encompasses a wide variety of mechanisms in which technology can be used. Computer-based training (CBT) generally refers to instructional materials being presented on a computer via CD-ROM. Much of CBT

includes interactive video for trainees to review, and is followed by test questions on the material presented. The benefit to CBT is that an employee has active involvement in the learning process, can view training segments at any location with a computer at anytime, can pace their own training time and the organization does not need to schedule an instructor-led session, all of which can lead to extensive time and cost savings (Aamodt, 2004; Mackay & Stockport, 2006).

Another growing training method under the TBT realm is online learning or E-learning. The terms online learning and E-learning are typically used synonymously by both the public and researchers. The difference between CBT and online learning is that online learning is purely web-based (i.e., company intranet or internet computer network systems). In 2005, it was reported that eight percent of organizations were currently using online learning as a training delivery method, however, its use is expected to rise steadily in coming years as more organizations, both large and small, provide employees with internet access via their company supplied desk and/or lap top computers (Dolezalek, 2005). Online learning is accessible by employees via the internet or company intranet and this

accessibility is seen as a major benefit, along with the same benefits mentioned for CBT, as well as being self-paced by the employee, allowing for repetition of material, and being readily updated by the organization (Aamodt, 2004; Goldstein & Ford, 2002; Mackay & Stockport, 2006).

For example, Schmeeckle (2003) compared two groups of Jail Management trainees in which half were assigned to complete new hire training with an online program and the other in a classroom setting. She evaluated their learning performance with knowledge based tests before and after completing the training and found that both training methods were equally effective, with no significant learning differences between the two groups, however, those in the online group completed their training in half of the time it took the classroom group. These findings show no significant difference in training method in regards to learning effectiveness and have been replicated in educational settings as well (e.g., Iverson et al., 2005).

In regards to the issue of cost comparisons between online and classroom training, there is much debate, in that developing web-based instruction is time consuming. Some estimates of development time range from 200 to 500 hours, in order to produce one hour of online training

instruction and this can cost from $11,000 to $60,000 per hour of training material developed (Aamodt, 2004; Dolezalek, 2005; Goldstein & Ford, 2002). Regardless of the initial costs, many organizations continue to proceed with adapting training programs to this new web-based medium, anticipating that costs will be recouped over time. As a result, instructor-led classroom instruction is estimated to decline over time (Goldstein & Ford, 2002).

Some organizations have refrained from moving solely to online training from the classroom method and instead use what is known as blended learning (MacKay & Stockport, 2006). Blended learning combines both classroom and online methods into a training program and research in educational settings has shown blended instruction may be more effective than online learning alone (Forsyth & Archer, 1997). One potential reason for this is that trainees may feel more comfortable with using a variety of training methods, and this comfort may translate into positive perceptions and performance. Further research is needed, however, to confirm the effectiveness of this method in workplace settings.

Although online and blended training methods may seem promising and in most respects advantageous over classroom

training for organizations and employees, there is a concern that certain individuals may be more apprehensive or have less training motivation in using computerized methods and that this decreased motivation may result in negative learning/training outcomes for these individuals. Noe (1986), for example, found that employee/trainee motivation to learn is critical for training success. Following this research, many factors that influence training motivation have been identified, including personal variables (personality and demographic characteristics), such as self-efficacy, anxiety and age (Colquitt et al., 2000), which are discussed below.

Computer Self-Efficacy

Self-Efficacy is a principal element of Social Learning Theory, which has been found to be an important individual trait pertaining to one's own beliefs with regard to their abilities to perform a given task (Bandura, 1977). Stajkovic and Luthans (1998) conducted a meta-analysis and found a significant relationship between self-efficacy and work-related performance. Self-efficacy beliefs can influence our willingness, attitudes and behaviors, as well as affect the effort and persistence

given to completing a task. Within the training, education, psychology, and technology literature, many studies can be found linking self-efficacy to outcomes including: motivation to learn, training transfer, and performance (Colquitt et al., 2000; Gist, Schwoerer, & Rosen, 1989; Lawless & Brown, 1997). Self-efficacy can be viewed as a cognitive process which influences an individual's motivation, specifically affecting an individual's choices, emotional reactions, and persistence (Gist & Mitchell, 1992). Therefore, in the case of training, self-efficacy can potentially be seen as a driving force in trainee's preferences.

More recently, researchers have moved from studying general self-efficacy beliefs, to a more specific variable with regard to individual attitudes about computer use and technology. Computer self-efficacy refers to "an individual's judgment of their capabilities to use computers in diverse situations" (Compenau & Higgins, 1995, p. 192). Computer self-efficacy beliefs have consistently been found to significantly predict computer usage perceptions and behaviors (Compeau & Higgins, 1995; Czaja, Charness, Fisk & Hertzog, 2006; Hill, Smith & Mann, 1987; Webster & Martocchio, 1992). These research findings

illustrate the need to evaluate the computer self-efficacy beliefs of individuals prior to training when incorporating computer aids. It may be possible, for example, to provide a pre-training intervention for those employees who report low computer self-efficacy to increase their possibility for positive training outcomes.

One factor that has been established as having a strong negative reciprocal relationship to computer self-efficacy is computer anxiety (Colquitt et al., 2000; Compenau & Higgins, 1995; Czaja et al., 2006; Doyle, Stamouli, & Huggard, 2005; Martocchio, 1992; Thatcher & Perrewe, 2002). It has also been concluded that both variables greatly impact overall individual computing beliefs and attitudes (Compenau & Higgins, 1995). Bronsan (1998), for example, demonstrated that individuals with less anxiety before a computer task obtained more correct responses and reported higher self-efficacy levels than those participants with higher levels of anxiety.

Computer Anxiety and Computer Experience

It is estimated that between 30 to 40% of Americans experience fear with regards to computer use (Vician & Davis, 2002). Technophobia and computerphobia are terms often used to describe the negative attitudes many individuals express when using computers or in thinking about using computers. Whether the fear is categorized as a phobia, aversion, or anxiety, the individual's feelings or attitudes can result in negative outcomes in the workplace such as lower performance and decreased training motivation (Bozionelos, 2001; Bronsan, 1998; Colquitt et al., 2000; Vician & Davis, 2002; Webster & Martocchio, 1993). Much research in this area has focused on measuring the construct of computer anxiety, which is defined as "the tendency of individuals to be uneasy, apprehensive or fearful about current or future use of computers" (Igbaria & Chakrabarti, 1990, p. 233). Computer anxiety can create physical responses such as sweaty palms, dizziness, and/or shortness of breath, as well as behavioral reactions which include avoiding computers, making negative comments about computers, excessive care when using computers, and keeping computer contact to a minimum (Doyle et al., 2005).

Although research has provided much support for the detrimental effects of high levels of computer anxiety on various outcomes, findings are not clear as to how computer anxiety is developed in individuals. Some of the factors that have been found to contribute to computer anxiety are age, gender, feelings of control, and experience with computers (Czaja et al., 2006; Todman & Monaghan, 1994). In regards to computer experience, studies find support for both positive and negative relationships with computer anxiety (Heinssen, Glass, & Knight, 1987; Igbaria & Chakrabarti, 1990; Todman & Monaghan, 1994). Generally, it is accepted that as one's experience with computers increases, computer anxiety should decrease, however in some cases increased exposure can result in greater anxiety (Doyle et al., 2005; Rosen, Sears, & Weil, 1987). Vician and Davis (2002) and Czaja et al. (2006) suggest that it is the "nature" of the individual's previous computer experience which contributes to their current state of computer anxiety. Todman and Monaghan (1994), for example, found that when early computer experiences were relaxed and accompanied by feelings of competency and control, lower levels of computer anxiety were reported. Therefore,

environmental controls may need to be taken into account when assessing the construct of computer experience.

Computer experience has been defined as "the degree to which a person understands how to use a computer" (Potosky & Bobko, 1998, p. 338). A major issue with the research conducted on the construct of computer experience is the varying definitions and measures which are often ambiguous (Potosky & Bobko, 1998). Many researchers focus on the amount of time an individual spends on the computer, the variety of software they have used previously, or number of computer courses taken (Beckers & Schmidt, 2003; Garland & Noyes, 2004; Hasan, 2003). The concern with these measures is that "use" does not necessarily mean an individual is computer literate; one can use a computer for minor tasks such as word processing functions and not have any other relevant computer skills. Software and course experiences can vary greatly for each individual and does not guarantee general computer "know-how". Therefore, computer experience measures should identify both an individual's general computer use for performing a task and computer knowledge (Potosky & Bobko, 1998).

The context in which the computer experience is obtained can influence computers attitudes as well. For

example, Garland and Noyes (2004) found that in determining computer attitudes, computer experience which was acquired by "freely chosen" use, rather than as "required" use, was more relevant. These findings can have serious implications for the workplace, in that employees are not often given a choice in using new technologies or given an opportunity to be involved with such decisions. Further support for the importance of computer experience context shows that some employees who receive training labeled as "play" versus "work" scored higher on training outcomes (Webster & Martocchio, 1992). Thus, the way in which computer training programs are presented to employees initially, may contribute to employee attitudes, motivation, and training outcomes.

Age and Training

In the workforce today there are more than 40 million American employees who are over the age of 40 and this segment is expected to climb to 70 million by 2015 (Callahan , Kiker & Cross, 2003). Unfortunately, this group is not always viewed as a positive human resource for organizations to employ or retain due to negative stereotypes or perceptions which have led and can

potentially lead to discriminatory practices in hiring, training and promotion (Rosen et al., 1987; Taylor, Shultz, & Doverspike, 2005). To prevent such practices, legislation deeming workers 40 and older as a protected class have been established. Although there is a legal safeguard for mistreatment, many covert biases or actions still can be found in regards to older employees in the workplace (Finklestein & Farrell, 2007; Weiss & Maurer, 2004). Some common age related myths include: inflexibility, resistance to change, forgetfulness and being less willing and able to engage in learning activities (Baldi, 1997; Charness, Czaja, & Sharitt, 2007; Finklestein, Burke, & Raju, 1995; Maurer, 2001). The discrimination of older individuals, or "ageism", can cause emotional stress for older employees, not only creating potential legal issues, but effect efficiency on the job (Falkenberg, 1990). The ageist stereotypes that can lead to discriminatory acts against older individuals are resistant to change, and therefore need to be addressed by organizations. Employers should identify conditions that may propagate stereotypes, and design interventions to reduce chances of discrimination between employees (Falkenberg, 1990).

Social Identity Theory (Tajfel, 1982) helps to explain some of the reasons behind age stereotypes. It is helpful for us to categorize, identify, and compare ourselves with other individuals. These cognitive processes give us an increased sense of personal identity, self-esteem, and power in that we tend to identify with those who are more like ourselves and therefore tend to relate to them more positively (Meyers, 2002). This identification creates favoritism toward our own group (ingroup) versus other groups (outgroup) (Huffman, 2002). Social Identity theory has been shown to be relevant in regards to age biases. For example, younger workers rate other young workers more favorably than older workers; and older workers rate other older workers more favorably than younger workers (Hassell & Perrewe, 1995; Gibson, Zerbe & Franken, 1993). The cognitive processes that contribute to these categorizations have been identified as a source of prejudice, discrimination and therefore bias formation (Huffman, 2002).

It has been established that individuals do experience some physical and psychological changes as they age, such as general slowing in functioning, reduced attention capability, and greater limitations in working

memory, however it is not clear as to how these changes actually affect work performance in older adults (Craik & McDowd, 1987; Gutherie & Schwoere, 1996; Kubeck, Delp, Haslett, & McDaniel, 1996; Jex, Wang, & Zarubin, 2007). Studies have often found little relationship between age and productivity (Charness & Czaja, 2006). However, in a meta-analysis conducted by Waldman and Avalio (1986) on age differences in job performance, it was concluded that performance ratings of older workers did tend to be lower than those of younger workers. The interesting discovery was that age differences in performance appraisal scores depended upon the type of rating being used (supervisory, peer, or individual productivity). The supervisory ratings showed declines as the age of the employee increased, whereas peer ratings and individual productivity levels actually increased with age. This meta-analytic review illustrates the potential biases that managers may have toward older workers.

Biases and stereotypes can especially influence the decisions made by management in regards to training and development practices for older workers. Because older adults experience general slowing of mental abilities over time, it is then assumed that they are not capable of

learning new skills and would therefore be less interested in participating in training opportunities (Wrenn & Maurer, 2004; Maurer, 2007). This outlook by managers has been found to influence the way in which older workers view themselves, by acting as a self-fulfilling prophecy and reinforcing the negative stereotype that they are unable to learn during training (Baldi, 1997; Kite & Johnson, 1988; Maurer, 2001). In surveying managers, Caponski et al. (1994) found that 59% of businesses state that older workers are resistant to training and only three out of ten companies included older workers in training programs. Because older workers continue to makeup a larger segment of the workforce, it can be seen as advantageous to organizations to retain and retrain these employees, rather than force early retirement and have to spend additional finances on finding younger workers to replace them if in fact they are capable of successfully completing necessary training programs (Gutherie & Schwoere, 1996; Lindbo & Shultz, 1998; Taylor et al., 2005).

Although research has shown that overall older workers demonstrate less mastery of training material than younger workers, this does not confirm that older workers actually learn less during the training process (Kubeck et al.,

1996). Kubeck et al. (1996) points out that there are some major issues with the way studies have been conducted when examining older worker training performance. For example, laboratory studies find greater performance differences between older and younger workers than field studies and often greater differences are found when the age range of participants is extreme. Other concerns are related to the length of training periods and performance measures, which can cause an issue with fatigue in older individuals. It is possible that once some minor accommodations are made for older workers in the training setting, they would show similar performance results as their younger counterparts (Kubek et al., 1996).

Much research has uncovered the need for older workers to have additional time to complete training and training assessments (Callahan et al., 2003; Charness & Czaja, 2006; Charness et al., 2001). Researchers have tried to pinpoint the reasons older workers need additional time in training and have uncovered several possibilities. One issue may be that older workers prefer accuracy over speed in training scenarios, contrary to their younger counterparts, which may slow down their processing speed of the training material (Butchko, 2001; Charness & Czaja, 2006; Waldman &

Avalio, 1986). Another hypothesis is that older workers have a shorter attention span and can be more easily distracted than younger workers, possibly causing them to miss important information during training and in turn slow down the training process (Callahan et al., 2003). Charness et al. (2001) discovered that although older workers do show age-related slowing in training scenarios, there are only minimal age differences in performance when comparing them to younger workers.

Another growing area of research that deals with the potential causes of training performance and learning differences in older workers focuses on pre-training individual differences that may contribute to older worker training motivation and directly affect their training performance and learning even before the training program is started (Colquitt et al., 2000). Variables that have been reviewed earlier, such as self-efficacy, anxiety and previous experience have been found to be related to older worker training motivation and perceptions of training utility (Colquitt et al., 2000; Gutherie & Schwoere, 1996; Marakas , Yi & Johnson, 1998). Clark , Dobbins & Ladd (1993), for example, found that utility perceptions significantly predicted employee training motivation.

Research is still needed, however, to investigate these pre-training variables to determine their full impact on older worker training performance outcomes and preferences, as well as their effect on initial training attitudes and perceptions.

Age, Training and Technology

The public and business world not only stereotype older workers as unable to participate productively in training programs as discussed earlier, but with emerging technologies now being brought into the realm of training as well, this can be thought of as a double-edged sword for older employees because of the prevalent stereotype that older adults are unable and/or unwilling to use new technologies such as computers, software programs, and the internet (Colquitt et al., 2000). With new technologies and new training applications being introduced to employees on a regular basis, issues with older worker success in costly training programs can be seen as a major organizational challenge (Berman, Bowman, West & VanWart 2006).

To remain competitive in the national and global markets, organizations need to continually provide up-to-

date information that often involves transmission through a computer medium or involves content about how to use new software programs on the job (Charness & Czaja, 2006). Although well intended, technology implementation or the introduction of new computer equipment and/or programs to employees through a training program, often meets with dismal results (Rizzuto, 2005). Little research in the area of innovation implementation has been conducted to date, but it is anticipated that failures do not occur in development phases, but in the technology adoption phase due to lack of commitment from employees (Klein, Conn, & Sorra, 2001).

The complex scenario of training, technology, and specific individual characteristics, such as age, computer anxiety, computer experience, and computer self-efficacy, have lead to a wide array of studies trying to establish the reasons for complications and failure of training programs (Czaja et al., 2006). As mentioned earlier, when evaluating training performance of older workers, time is an important factor to consider. When older workers are asked to train via a computer, they consistently take more time to complete training than younger workers (Baldi, 1997; Charness et al., 2001). In addition, Charness (2001) found

that the relationship between successful training for older workers is sometimes mediated by their typing speed and this may result in more errors and lower overall performance. One way to possibly accommodate for this negative effect is to allow older workers to set their own pace during the training process. Callahan et al. (2003), for example, found that self-pacing explained a significant portion of the variance in the training performance of older workers. With the gradual shift toward such training methods as e-learning or online training, older workers may see more self-paced training options offered by organizations which may prove to be a beneficial method for older worker training performance.

To ensure the training success of older workers when using new training technologies, many researchers recommend a pre-training evaluation of employee attitudes and individual characteristics in order to conduct a training intervention prior to training to attend to any negative technology perceptions. However, no research has been found establishing a direct link between older worker attitudes toward computerized training and training performance outcomes to date (Charness et al., 2007; Gist et al., 1988; Harrison & Rainer, 1992). The current research on older

worker attitudes toward training technologies has been mixed.

Rizzuto (2005; 2007) reported that older employees expressed more positive attitudes toward computerized training than did younger employees and Trentin (2004) reported that 78 percent of the older workers in his study were satisfied with an online training experience. Although these studies reflect the positive attitudes older workers have toward training and technology, older adults have been found to consistently experience lower levels of computer self-efficacy and higher levels of computer anxiety as compared to younger adults (Colquitt et al., 2000; Czaja et al., 2006; Marakas et al., 1998). Researchers have begun to investigate possible causes for these differences and the variable that appears to interact with these levels is computer experience.

Although older adults are continually increasing their usage of computers and the internet at home and at work, their level of usage lags far behind that of younger adults and depending upon the age groups being compared, can reveal more than a 50 percent use disparity (Charness & Czaja, 2006: Czaja et al., 2006). This lack of computer contact can result in the reported increased computer

anxiety levels and lower computer self-efficacy levels for older workers (Baldi, 1997; Butchko, 2001).

Hypotheses

In this study our major goal was to predict employee preference for training method (classroom, blended, or online) based on age, level of computer experience, computer self-efficacy, and computer anxiety.

Hypothesis 1

Increasing age will be associated with a stronger preference for classroom training (CT) over blended (BT) and online training (OT) methods.

Hypothesis 2

Participants with higher levels of computer experience (CE) will prefer online (OT) and blended training (BT) methods over classroom training (CT) methods.

Hypothesis 2a

There will be a significant interaction between computer experience (CE) and age in predicting training method preference, where older workers with more computer experience will be more likely to prefer blended training (BT) or online training (OT) over classroom training (CT), whereas older workers with less computer experience will be

more likely to prefer classroom training (CT) over blended training (BT) or online training (OT).

Hypothesis 3

Participants with higher levels of computer self-efficacy (CSE) will prefer blended (BT) and online training (OT) methods over classroom training (CT).

Hypothesis 3a

There will be a significant interaction between computer self-efficacy (CSE) and age, where older workers with more computer self-efficacy will be more likely to prefer blended training (BT) or online training (OT) over classroom training (CT).

Hypothesis 4

Participants with higher levels of computer anxiety (CA) will prefer classroom training (CT) over blended (BT) and online training (OT) methods.

Hypothesis 4a

There will be a significant interaction between computer anxiety (CA) and age in predicting training method preference, where older workers with less computer anxiety will be more likely to prefer blended training (BT) or online training (OT) over classroom training (CT), whereas older workers with more computer anxiety will be more

likely to prefer classroom training over blended training (BT) or online training (OT).

CHAPTER TWO

METHOD

Participants

Ninety-one employees from a large utility company in southern California participated in this study. The participant ages ranged from 19 to 68, with a mean of 39 years of age. Sixty-six percent of participants held jobs as engineers, 13% were technical specialists, and the remainder of the sample reported holding supervisory or administrative positions. Seventy-six percent of participants were men and the average number of years participants worked for the organization was 12, with a range of 1 to 35 years (see Table 1 for a more detailed demographic breakdown).

Table 1. Demographics

Demographic	*Percentage (Rounded)*
Job Title	
Engineer 1	21%
Engineer 2	25%
Engineer 3	6%
Engineer 4	14%
Technical Specialist 2	2%
Technical Specialist 3	4%

Technical Specialist 4	7%
Professional Aide 1	4%
Other	17%
Gender	
Male	67%
Female	33%
Age	
Mean = 39 years	
Range = 19-68 years	
19 to 28 years	27%
29 to 38 years	24%
39 to 48 years	25%
49 to 58 years	16%
59 to 68 years	8%
Year with organization	
Mean = 12 years	
Range = 1-35 years	
1 to 5 years	59%
6 to 10 years	15%
11 to 15 years	0%
16 to 20 years	9%
21 to 25 years	0%
26 to 30 years	7%
31 to 35 years	10%

Procedure

An electronic survey was designed on surveymonkey.com and the website link was distributed to approximately 220 managers and employees via email, asking for their participation. The entire survey took approximately 20 minutes to complete and was comprised of 27 questions (see

Appendix A). Before beginning the survey all participants were required to acknowledge that they had reviewed the informed consent form. Basic demographic information including age, gender, position, and number of years working for the company were collected. After completion of the survey, the debriefing statement was provided electronically. Participant responses were immediately sent to the survey monkey website and only the researcher had access to these results.

Measures and Predictor Variables

Two dimensions from the Subjective Computer Experience Scale (SCES) developed by Smith, Caputi, and Rawstorne (2007) were used to assess employee computer self-efficacy and computer anxiety levels. Responses were scored on a five point Likert scale, ranging from strongly disagree (1) to strongly agree (5), with a neutral (3) option provided as well. To assess computer anxiety, factor/sub dimension one from the SCES, which was labeled as "Anxiety-Frustration" was used and relabeled as "Computer Anxiety" (see Appendix A for specific items). This measure consists of five items and the reported alpha value for this subdimension is .68.

Factor/sub dimension two of the SCES which is labeled "Autonomy-Assistance" was used to assess employee computer self-efficacy and was renamed accordingly (see Appendix A for specific items). This sub dimension relates favorably to other computer self-efficacy scales reviewed (e.g., Compeau & Higgins, 1995), in that the items pertain to one's belief in their ability to complete computer activities independently. The alpha value for this sub dimension is also .68.

In order to assess participant computer experience, the Computer Understanding and Experience Scale (CUE), which is a 12 item measure designed by Potosky and Bobko (1998) (see Appendix A for specific items) was used. This measure takes into account an individual's general computer use for performing a task, as well as computer knowledge and has an alpha value of .93. Participants rated their computer experience on a scale of one to five (1 = very minimal; 5 = extensive).

Criterion Variable

To measure training method preference, each employee responded to a single survey item, asking them to choose their most preferred training method (classroom training

(CT), blended training (BT), or online training (OT)). This single item was given after all the predictor measures were completed. A brief description of each training method option was provided to give employees a general understanding in order to better decide which option represented their preference (see Appendix A).

CHAPTER THREE

RESULTS

Prior to analysis, data was screened for outliers, normality, collinearity, and missing data. One univariate outlier was identified on the computer experience (CE) variable which had a z score greater than 3.00. This outlier was removed from the data set. Age, computer self-efficacy (CSE) and computer anxiety (CA) exhibited normal distributions, while computer experience (CE) had a slight negative skew. No transformation was performed because these scores hold intrinsic meaning in relation to this specific sample being evaluated in this study. No multicollinearity among variables was found, with the highest correlation at $r = .33$. Less than 5% of total data was missing from the data set, so no imputation to replace missing data was needed.

An exploratory factor analysis was conducted using SPSS software to assess the dimensionality of the Computer Training Characteristics and Preference Survey (Appendix A) using a principal axis factoring method and varimax rotation. Each of the three measure subdimensions/variables (computer self-efficacy, computer

anxiety and computer experience) was factor analyzed and the corresponding factor matrices were reviewed for value strength.

The computer self-efficacy (CSE) scale originally consisted of six items and had a reliability coefficient of .49. In reviewing the scree plot and eigenvalues for this scale, two factors were identified. Four items loaded on factor one, including CSE1 (.499), CSE2 (.821), CSE3 (.460) and CSE6 (.544). These items consisted of statements that evaluated how comfortable participants were in learning and solving problems on a computer. Items CSE4 (.388) and CSE5 (.460) loaded on factor two. These two items asked about how comfortable one would be with asking an expert for help with a computer problem that could not be resolved and if one would feel more comfortable using a computer alone, rather than in a group setting. After deleting both items in factor two (CSE4, CSE5), the reliability coefficient of the remaining four items (CSE1, CSE2, CSE3, CSE6) was improved to .66 for the single factor computer self-efficacy scale (See Table 2 and Appendix B). It seems that items pertaining to an individual working with others on the computer or asking for help may not be related to computer self-efficacy beliefs, but to some

other factor. Possibly in a work-setting, an employee may not want associates to know they are unable to work out computer related issues on their own.

EFA revealed a reliability coefficient of .73 for the original computer anxiety (CA) scale. The five items in this scale loaded on two factors with items CA1 (.731), CA2 (.784) and CA3 (.768) loading on factor one. These three items included statements that referred to an individual's frustration and anxiety when using computers and software. Items CA4 (.680) and CA5 (.480) loaded on factor two and were concerned with a participant feeling "scared" and "isolated" when using computers. By deleting items CA4 and CA5, the reliability coefficient of this scale increased to .83, leaving one factor consisting of three items representing the computer anxiety scale (See Table 2 and Appendix B). The two deleted items seemed to involve more extreme "feelings" than those that loaded on factor one and may actually be measuring something other than computer anxiety.

Three factors were identified by EFA in regards to the computer experience (CE) scale, which originally consisted of 12 items and had a reliability coefficient of .83. Items CE3 (.824), CE4 (.797), CE6 (.812), CE7 (.458), CE8 (.861),

CE9 (.832), CE10 (.729) and CE12 (.781) all loaded onto factor one. This group of items pertained to an individuals basic computer knowledge and if they feel they are "good" at using computers. Factor two consisted of items CE1 (.421), CE2 (.400) and CE5 (.517) and asked if the participant knew how to write computer programs, recover lost data, and if they read computer magazines frequently. Factor three consisted of item CE11 (.125) only, which asked if participants frequently use a mainframe computer system. By removing four items, CE1, CE2, CE5 and CE11, the overall scale reliability coefficient improved to .92 (See Table 2 and Appendix B). The items that comprised factor two may not be essential components of experience, in that to use a computer successfully and have basic computer knowledge, one does not need to read magazines, write programs, or know how to recover data. And, item CE11 seems to be an outdated question in that individuals may not know what a mainframe computer is.

Table 2. Reliability and Factor Analysis Results for Multi-Item Scales

	Original variable Scale		New variable Scale	
Subdimension	Item	alpha level	Item	alpha level
Computer self-efficacy (CSE)	CSE 1	.49	CSE 1	.66
	CSE 2		CSE 2	
	CSE 3		CSE 3	
	CSE 6		CSE 6	
	CSE 4	deleted		
	CSE 5	deleted		
Computer anxiety (CA)	CA 1	.73	CA 1	.83
	CA 2		CA 2	
	CA 3		CA 3	
	CA 4	deleted		
	CA 5	deleted		
Computer experience (CE)	CE 3	.83	CE3	.92
	CE 4		CE4	
	CE 6		CE6	
	CE 7		CE7	
	CE 8		CE8	
	CE 9		CE9	
	CE10		CE10	
	CE12		CE12	
	CE 1	deleted		
	CE 2	deleted		
	CE 5	deleted		
	CE 11	deleted		

A Multinomial Logistic Regression (MLR) analysis was performed with SPSS NOMREG in order to assess the pattern of participant responses to the four continuous predictors (age, computer experience, computer anxiety, and computer self-efficacy) and their influence on the categorical dependent variable of training method preference (classroom,

online, or blended). The four predictor variables as a group significantly predicted participant training method preference ($\chi 2$ (8, N = 90) = 32.90, $p < .05$). The Goodness-of-Fit results reveal that the four predictor variables in the model show a good fit when examining the Pearson criterion, $\chi 2$ (158, N = 90) = 167.55, $p > .05$, and the Deviance criterion, $\chi 2$ (158, N =90) = 145.15, $p > .05$. The Cox and Snell pseudo r2 revealed a satisfactory improvement in fit when comparing the fitted model to the null model (pseudo r2 = .324).

The Likelihood Ratio Tests (see Table 3) for the model containing the four predictor variables showed that three of these variables reliably distinguish participant training method preference, which includes computer experience (CE) ($\chi 2$ (2, N = 90) = 6.38, $p < .05$), computer self-efficacy (CSE) ($\chi 2$ (2, N = 90) = 10.30, $p < .05$), and computer anxiety (CA) ($\chi 2$ (2, N = 90) = 14.25, $p < .05$). The age variable did not reliably distinguish participant training method preference ($\chi 2$ (2, N = 90) = 5.03, $p > .05$).

Table 3. Likelihood Ratio Tests for Predictor Variables in Predicting Training Method Preference

N = 90, df =2	X2	-2 log likelihood	Cox & Snell	Nagelkerke	McFadden
Age	5.03	150.18			
Computer Experience	6.38*	151.53			
Computer Self-Efficacy	10.30*	155.45			
Computer Anxiety	14.25*	159.40			
			.324	.368	.185

p < .05

Test of Hypotheses

Hypothesis 1: Age

Hypothesis one stated that as age increases, participants will show a stronger preference for classroom training (CT) over online (OT) and blended training (BT) methods. This hypothesis was not supported, in that age did not significantly distinguish training method preference in participants ($\chi 2$ (1, N = 90) = 3.68, p > .05, Exp(B) = 1.06)(See Table 4).

Hypothesis 2: Computer Experience

Hypothesis 2 stated that as computer experience (CE) levels increase, participants will prefer online (OT) or blended (BT) training over classroom training (CT). This hypothesis was also not supported. Computer experience (CE) did not significantly predict preference for online training (OT) over classroom training (CT) ($\chi 2(1, N = 90) = .182$, $p > .05$, $Exp(B) = .710$), however computer experience (CE) did significantly distinguish training method preference between blended (BT) and classroom training (CT), but it occurred in the direction opposite of what was predicted. That is, as computer experience (CE) increases, participants prefer classroom (CT) over blended training (BT). For every one unit increase in computer experience (CE), participants were 74 percent more likely to prefer classroom training (CT) over blended training (BT) ($\chi 2$ (1, N = 90) = 4.41, $p < .05$, $Exp(B) = .262$) (see Table 4).

Hypothesis 2a: Interaction of Computer Experience and Age

This hypothesis stated that there will be a significant interaction between age and computer experience (CE), in that as computer experience (CE) and age increase,

participants will be more likely to prefer online (OT) or blended training (BT) over classroom training (CT). The results in this case were not significant and thus this hypothesis was not supported ($\chi 2$ (1, N = 90) = .22, p > .05, Exp(B) = .97) and ($\chi 2$ (1, N = 90) = .05, p > .05, Exp(B) = .99) (see Table 5).

Hypothesis 3: Computer Self-Efficacy

Hypothesis 3 stated that as the computer self-efficacy (CSE) of participants' increase, they would prefer online (OT) and blended (BT) training methods over classroom training (CT). Results support this hypothesis, in that computer self-efficacy (CSE) does significantly predict training method preference. Specifically, as computer self-efficacy (CSE) increases participants are more likely to prefer online (OT) and blended (BT) training over classroom (CT) training methods ($\chi 2$ (1, N = 90) = 7.56, p < .05, Exp(B) = 5.30) and ($\chi 2$ (1, N = 90) = 5.89, p < .05, Exp(B) = 3.20). Specifically, for every one unit increase in computer self-efficacy (CSE), participants are 5.3 times more likely to prefer online training (OT) over classroom training (CT) and 3.2 times more likely to prefer blended training (BT) over classroom training (CT) (see Table 4).

Hypothesis 3a: Interaction of Computer Self-Efficacy and Age

This hypothesis states that there would be a significant interaction between computer self-efficacy (CSE) and age in the prediction of training method preference, in that as computer self-efficacy (CSE) and age increase, preference for online (OT) and blended training (BT) will increase. Results showed that this interaction did not significantly predict participant training method preference, hence this hypothesis was not supported ($\chi 2$ (1, N = 90) = .75, p > .05, Exp(B) = 1.06) and ($\chi 2$ (1, N = 90) = 1.62, p > .05, Exp(B) = .94) (see Table 5).

Hypothesis 4: Computer Anxiety

This hypothesis states that as participant computer anxiety (CA) increases, they will be more likely to prefer classroom training (CT) over online (OT) and blended (BT) training methods. Significant results support this hypothesis, in that for every one unit increase in computer anxiety (CA), participants were 81 percent more likely to prefer classroom (CT) training over online (OT) training ($\chi 2$ (1, N = 90) = 8.6, p < .05, Exp(B) = .19). In addition, for every one unit increase in computer anxiety (CA), participants were 70 percent more likely to prefer

classroom (CT) training over blended (BT) training ($\chi 2$ (1, N = 90) = 7.98, $p < .05$, Exp(B) = .30) (See Table 4).

Hypothesis 4a: Interaction of Computer Anxiety and Age

This hypothesis stated that there would be a significant interaction between computer anxiety (CA) and age in the prediction of training method preference, in that as computer anxiety (CA) and age increase, participants will prefer classroom (CT) training over online (OT) and blended (BT) methods. Results indicate that this interaction did not significantly predict participant training method preference, hence this hypothesis was not supported ($\chi 2$ (1, N = 90) = .04, $p > .05$, Exp(B) = 1.01) and ($\chi 2$ (1, N = 90) = 1.26, $p > .05$, Exp(B) = 1.01) (See Table 5).

Table 4. Parameter Estimates for Hypotheses 1, 2, 3 and 4.

Referent group = Classroom Training (N = 90, df = 1)	B	Wald z2	Exp(B)	95%CI for Exp(B)
Online Training				
Age	.062	3.676	1.064	.999 - 1.133
CE	-.342	.182	.710	.147 - 3.428
CSE	1.669	7.561*	5.309	1.65 - 17.45
CA	-1.665	8.595*	.189	.062 - .576
Blended Training				
Age	.050	3.672	1.051	.999 - 1.107
CE	-1.338	4.412*	.262	.075 - .914
CSE	1.166	5.894*	3.208	1.252 - 8.221
CA	-1.208	7.983*	.299	.129 - .691

* $p < .05$

Table 5. Parameter Estimates for Hypotheses 2a, 3a and 4a.

Referent group = Classroom Training (N = 90, df = 1)	B	Wald z2	Exp(B)	95%CI for Exp(B)
Online Training				
Age* CE	-.034	.224	.966	.838 -1.114
Age*CSE	.054	.753	1.055	.935-1.191
Age*CA	.009	.037	1.009	.918-1.110
Blended Training				
Age*CE	-.013	.052	.987	.880-1.107
Age*CSE	-.058	1.6115	.944	.863-1.032
Age*CA	-.010	.082	1.010	.944-1.080

- $p < .05$

CHAPTER FOUR

DISCUSSION

This study extends upon previous research completed involving age, training, and computer related variables. Unlike previous literature, this study focuses on employee training method preferences (Colquitt et al., 2000). Also, this study sampled employees of an organization, unlike previous research which was predominantly conducted in educational settings (Iverson et al., 2005; Schmeeckle, 2003). The variables of computer self-efficacy (CSE), computer experience (CE), and computer anxiety (CA) have seen much investigation within the past decade (Bozionelos, 2001; Colquitt et al., 2000; Sam, Othman & Nordin, 2005). These variables have been strongly linked to training attitudes and outcomes. In the present study the relationship between computer self-efficacy (CSE), computer anxiety (CA) and training method preference were confirmed. However, age and computer experience (CE) did not have the hypothesized relationship with training method preference. Below we discuss the results regarding each of the predictor variables of this study.

Age

It was hypothesized that employee age would influence training method preference, but the results of this study were found to be non significant. Past research has found that age does influence aspects of training and computer usage, however in regards to training method preference this may not be the case (Charness & Czaja, 2006; Czaja et al., 2006). With nearly half of the participants in the sample being over the age of 40, there would seem to be no issue with under representation of the older worker age category in this study.

Recently there have been a few studies conducted (Rizzuto, 2005; 2007) that suggest older workers do report positive attitudes toward technology and training, countering previous research and long-standing stereotypes. They suggest that previous results confirming age differences were not done in an organizational setting and did not take into account contextual influences, such as social, environmental and personal factors (e.g., perceived job utility or organizational commitment), which may affect worker attitudes toward technology and training.

For example, Morris and Venkatesh (2000) found that attitudes more strongly influence employee technology usage

decisions than did age. They also found that younger workers were more influenced by personal attitude than older workers, who were more motivated by social factors. They suggest that older workers are more inclined to conform to social pressures, such as following the status quo and feeling the need to please others in the workplace. This could potentially explain the non significant results found in this study, in that if this sample of employees is aware that the organization is moving toward the implementation of blended or online training methods in the future, they will respond in a socially desirable way to related questions.

In regards to perceived utility, Simpson, Greller and Stroh (2002) found that individuals late in their careers were only half as likely to participate in training as compared to younger workers. However, when specific types of training were evaluated, they found that older workers were more likely to participate in training opportunities if the training was job related and could aid in career advancement. In the current study, it may be that this group of older workers would view training as necessary to their future employment goals or job security, specifically by having the experience of using various training methods

(online and blended), they may be more likely to perceive the training as useful or beneficial. Studies have supported the concept that perceptions of utility in individual's increases training motivation (Clark et al., 1993).

Environmental factors can also potentially override the impact of age on training preferences. For example, downsizing pressures, the economy, and increasing life span may influence employee willingness to use new methods of training. Thus, older workers may feel that they need to keep their jobs longer for financial reasons and worry that finding another job may be more difficult due to their age and availability of jobs (Rizzuto, 2007). In this respect, they may be more motivated to embrace new technologies and training opportunities to increase their long-term job security. Those that remain in the workforce past retirement age may also represent a more motivated group in terms of willingness to change and use technology in general (Charness et al., 2007), therefore not demonstrating or reporting a strong preference for classroom (CT), online (OT), or blended (BT) training methods.

Computer Experience

The hypothesis predicting that as computer experience (CE) increases, employees would be more likely to prefer online (OT) and blended (BT) training methods over classroom (CT) training, was not supported. Computer experience (CE) did not significantly predict preference of online training (OT) over classroom training (CT), and the reverse relationship between blended (BT) and classroom (CT) training preference was observed as significant, whereby as computer experience (CE) levels increase it is more likely that employees will prefer classroom (CT) training over blended (BT) training. Overall, employees in this study preferred blended (BT) training (46%) methods over classroom (CT) training (33%) and online (OT) training (21%) methods. There also was no significant interaction between age and computer experience (CE) found.

As explained previously, computer experience (CE) appears to be an ill defined construct (Butchko, 2001; Garland & Noyes, 2004). Terms such as computer literacy, computer confidence, and computer competence are often used interchangeably (Garland & Noyes, 2004). Components of the computer experience (CE) construct can vary from measure to measure. Some research evaluates an individual's skill

level in using computers, others evaluate individual usage in terms of time spent on the computer, and some research asks individuals about their general computer knowledge (Potosky & Bobko, 1998). Often time research does not evaluate the "nature" of previous computer experiences, and whether the individual had a positive or negative experience with using computers in the past. In this study, a 1998 measure constructed by Potosky and Bobko was used, in which participants were evaluated on knowledge and use. It is possible that this measure was not comprehensive enough to capture employee computer experience (CE), producing the unexpected results. Employee knowledge and use does not take into account the valence of previous computer experiences. If an employee's previous use was negative, this may do more to determine computer attitudes and behavior than their overall computer knowledge or use (Garland & Noyes, 2004).

Also with continuous changes in technology, a more current measure consisting of additional internet use items may be more effective, especially when examining attitudes regarding online and blended training techniques which would require participants to interact with the internet. Researchers have suggested that their may be differences in

computer experience in regards to experience related to word processing functions and experience relating to internet functions (Garland & Noyes, 2004).

Although, issues with the computer experience (CE) measure used in this study may have contributed to the unexpected results, previous research has indicated that contextual factors such as organizational climate may play a more predominant role in influencing computer attitudes or preferences. Rizzuto (2007) found that departmental climate regarding technology attitudes affected technology implementation attitudes, in that employees in departments reporting positive attitudes towards technology, also reported more satisfaction with technology implementation.

Computer Self-Efficacy

As predicted, employees with higher levels of computer self-efficacy (CSE) were more likely to prefer online (OT) and blended (BT) training methods over classroom (CT) training. This finding supports previous literature which consistently illustrates the predictive value of computer self-efficacy (CSE) in relation to both attitudinal and behavioral outcomes, such as computer task performance and intentions to use computers (Czaja et al., 2006; Gist et

al., 1989; Hill et al., 1987). Computer self-efficacy (CSE) has also been found to reliably predict employee persistence and effort in working with new software programs (Brosnan, 1998). Therefore, increased computer self-efficacy (CSE) should be associated with training method preference and may later translate into increased performance during online (OT) or blended (BT) training scenarios.

This study's results regarding computer self-efficacy (CSE) further reinforce the strength of this variable in affecting employee attitudes and preferences. Those who feel confident in their usage of computers were more likely to choose training methods that involved the use of computer technology. However, no significant interaction between computer self-efficacy and age was found, indicating that age does not moderate the relationship between employee computer self-efficacy (CSE) levels and training method preferences.

Computer Anxiety

Our results also confirmed the hypothesis that as employee levels of computer anxiety (CA) increase, they will be more likely to prefer classroom (CT) training

methods over online (OT) and blended (BT) methods. The notion would be that with greater anxiety, individuals would be less willing to try online (OT) and blended (BT) training methods. This does follow the established research in this area in that computer anxiety (CA) has been found to influence performance on computer related tasks. Specifically, those with higher levels of anxiety took longer to complete computer related tasks (Thatcher & Perrewe, 2002). It is been found that anxiety distracts individuals, taking the focus away from the task at hand. For example, in a study conducted by Vivican and Davis (2002) students enrolled in a college computing course with higher levels of computer anxiety (CA) had lower test scores. Anxiety toward computers, as seen by the results of this study, affect employee training preference as well, but the lack of interaction with age points to the position that computer anxiety (CA), regardless of age, is a better predictor of attitudes.

Significance of the Present Study

Employees and organizations can both benefit from work-related training opportunities. However, measuring the actual benefit or effectiveness of training programs

can be difficult (Dolezalek, 2005). Training motivation is a recurring construct in the training literature which has been found to significantly contribute to the effectiveness or performance of individuals in a training program (Colquitt et al., 2000). This study focused on variables that have been found to influence training motivation in regards to computer related training, specifically computer self-efficacy(CSE), computer anxiety(CA), computer experience(CE) and age.

Often organizations focus on the technology being used in new training methods, such as e-learning or online training, rather than on the personal characteristics of employees which can contribute to overall training success (Rizzuto, 2007). By evaluating employee characteristics and preferences prior to new training method implementation, an intervention can be conducted to increase training success or performance (Gist et al., 1989). For instance, an organization can assign those employees with lower levels of computer self-efficacy (CSE) and higher levels of computer anxiety (CA) to pre-training courses in which computer self-efficacy (CSE) levels can be increased and computer anxiety (CA) levels decreased. By allowing employees to become familiar with computer hardware and

software while being guided by an instructor, as well as having an opportunity to ask questions of the instructor in a comfortable setting, computer self-efficacy (CSE) and computer anxiety (CA) issues can be attended to.

This study extended upon and confirmed previous research which had established a link between computer self-efficacy(CSE) and employee attitudes toward computer related tasks, such as online training (Schmeeckle, 2003). Employees in this study with higher levels of computer self-efficacy (CSE) did prefer both online (OT) and blended (BT) training methods over traditional classroom training (CT) methods. Past research has indicated that computer self-efficacy (CSE) beliefs are positively correlated with computer usage, technology perceptions and future performance (Czaja et al., 2006; Gist et al., 1989). In this case we extended upon the previous research by establishing that the construct of computer self-efficacy (CSE) is also specifically related to training method preferences. This indicates that if an individual believes they have the ability to work successfully with computers, they will also have the belief that they can effectively complete computer based training programs.

The relationship between computer anxiety (CA) and employee attitudes established by previous research was also confirmed in this study, in that as employee levels of computer anxiety (CA) increased, the less likely they were to prefer computer related training methods (Bozionelos, 2001; Vician & Davis, 2002). Much research pertaining to computer anxiety (CA) has been done in the past decade, although little is known about how computer anxiety (CA) is developed in individuals (Czaja et al., 2006). Some researchers have proposed that computer experience (CE) may affect computer anxiety (CA) levels and its development. However, findings in this study do not confirm a link between higher levels of computer experience (CE) and a preference for computer related training options. Actually, in the case of blended training (BT), employees with more computer experience preferred classroom training (CT) instead.

This finding goes against some of the previous literature, which concludes that computer experience (CE) is indeed a good predictor of computer technology attitudes (Butchko, 2001). In the case of online training (OT), no significant preference for this training method was found in this study, based on computer experience (CE) levels.

This follows some of the computer experience (CE) research, which has indicated that this variable is a poor predictor of computer attitudes (Garland & Noyes, 2004). Further research is needed to confirm or refute the predictive value of computer experience (CE) in relation to training method preference.

This study also examined the influence of employee age on training method preference. Some previous research has found that older adults tend to have more computer anxiety (CA) and apprehension toward computer use, as compared to younger adults (Colquitt et al., 2000; Czaja et al., 2006). While other researchers have found contrary results, reporting that older adults exhibit positive attitudes toward computerized training (Rizzuto, 2007; Trentin 2004). The results of this study indicated no significant training method preference based on employee age, as well as no significant interactions between age and the other three training characteristic variables examined here. These findings may illustrate the point that other individual characteristics, such as computer self-efficacy (CSE) and computer anxiety (CA), are better predictors of training attitudes such as training method preference, than age.

This study builds on the established literature regarding the predictive value of computer self-efficacy (CSE) and computer anxiety (CA) in relation to computer attitudes, while countering some of the age and computer experience (CE) literature in regards to such outcomes, suggesting further investigation is needed in order to better understand these relationships. This study also specifically evaluated employee training method preferences, whereas other researchers have focuses on such criterion variables as computer usage and computer task performance, which do not directly tap into both training and computer issues (Czaja et al., 2006; Venkatesh & Davis, 1996). Finally, most research involving the variables evaluated here have been conducted in an educational setting (i.e., colleges or universities), which diminishes the generalizability of their results to organizational settings. By using a sample of employees from an organization, this study adds to the body of training and technology literature by having been conducted in an organizational setting.

Practical Implications

The results of this study should be somewhat useful to organizations in that employee computer self-efficacy (CSE) and computer anxiety (CA) levels were found to influence training method preference and that these levels can be assessed prior to training in order to allow both employees and businesses a chance to intervene before the implementation of a new training program. By increasing employee levels of computer self-efficacy (CSE) and decreasing levels of computer anxiety (CA), overall training motivation and the possibility for training performance when working with computerized training methods, should increase as well (Colquitt et al., 2000). In addition, attitudes have been found to be connected to performance outcomes. For example, Gist et al. (1989) found that pre-training computer self-efficacy levels predicted levels of training content mastery, and in the case of online training (OT) methods, employee preference would be expected to translate to training performance.

Once individual employee levels of computer self-efficacy (CSE) and computer anxiety (CA) are assessed, an intervention, that is a consultation with employees to enact a change in their attitudes, thoughts, or behaviors,

can be planned as needed and on a case-by-case basis. Because computer self-efficacy (CSE) and computer anxiety (CA) have been found to have a strong reciprocal relationship, improving the effects of one should improve the other (Colquitt et al., 2000). Gist and Mitchell (1992) have several suggestions for increasing levels of self-efficacy. For instance, providing small and simple tasks to employees that allow them to directly increase their abilities and understanding of the training process, thereby increasing computer self-efficacy (CSE) levels and decreasing computer anxiety (CA) levels, resulting in increased training motivation.

Because this study did not show age and computer experience (CE) as good predictors of training method preference, these variables should be used cautiously in assessing employee attitudes until further study is completed. Based on the non significant results for age, organizations should be aware of misleading stereotypes that may cause managers and employees alike to make inaccurate presumptions about older workers' training potential. Also, presumptions based on level of past computer experience should be guarded against. If an employee were to profess that he or she had taken many

computer courses and is an "expert" in working with computers, this may not have as great of an impact on computerized training performance as it would seem to, as suggested by Garland and Noyes (2003).

Limitations and Future Directions

There are two potential concerns with this study. The first is the reliability and validity of the scales used, specifically the computer experience (CE) scale and the computer self-efficacy (CSE) scale. Although the reliability coefficient of the computer experience scale was high (.92), the outcome of the regression analysis showed inconsistencies with the projected hypothesis in that employees with greater levels of reported computer experience(CE) preferred classroom training(CT) over the blended training(BT) method. While this was the case for the blended training (BT) comparison, no significant preference for online training (OT) was found. It is therefore questionable that this scale accurately captures the construct of computer experience (CE).

This was not the case for the computer self-efficacy (CSE) scale, which did follow the reported hypothesis and comparisons between types of training preferences. However,

the reliability coefficient of this scale was .66, which is below the minimum standard of reliability estimate which is .70 (Shultz & Whitney, 2005). Further evaluation of both these scales is necessary to increase reliability and validity estimates.

The second concern or limitation of the current study is the representativeness or generalizability of the sample. Because this sample consisted primarily of employees in the field of engineering, which can be viewed as a group requiring higher levels of education and computer competencies, the results found here may not be applicable to samples who occupy less technical positions.

Further research is needed to define and determine if computer experience (CE) is indeed related to employee attitudes and computer related activities because of the mixed results found in previous studies as well as the current results. As technology continues to advance, the perceptions of older workers in regards to work-related computer activities may advance as well. Longitudinal studies examining age related perceptions about technology should be conducted to explore these issues and there effect on employees and organizations. Also, additional contextual variables such as organizational commitment may

explain both computer related employee attitudes and behaviors, and should be evaluated for potential influences on computer self-efficacy (CSE), computer anxiety (CA), computer experience (CE) and age. Multiple studies reviewed mentioned the need for evaluating the effects of job utility on technology attitudes and outcomes (Czaja et al., 2006; Morris & Venkatesh, 2000; Simpson et al., 2002; Tai, 2006). Simpson et al. (2002) found that older workers were more likely to participate in training activities if they felt the training content was job related.

Because age did not significantly predict training method preference or interact with the other predictor variables in this study, further investigation in regards to determining the effect of age on computer attitudes should be conducted. Previous research has found that age significantly influences technology adoption and usage (Czaja et al., 2006; Morris & Venkatesh, 2000). Other demographic variables, such as participant gender should also be evaluated for their potential impact on technology attitudes. A few studies were found that address gender, and results indicate that there are indeed significant differences between men and women. However, we conducted

post hoc t-tests and found no gender differences in regards to our four predictor variables.

Czaja et al. (2006) did find that older women reported greater anxiety and more negative attitudes toward technology use in comparison to both older men and younger women. Also, Schmeeckle (2003) found that women had lower learning performance after both online and classroom training versus men, and women reported more positive attitudes toward classroom training versus online training. Future investigation into gender differences would be needed to establish if gender differences exist.

Summary and Conclusion

This study evaluated four variables relating to individual employee characteristics (age, computer experience, computer self-efficacy, and computer anxiety) that have been found by previous research to contribute to training motivation. It was predicted that these variables would influence employee training method preferences (classroom, blended, and online training). Age was not found to significantly predict training method preference. The results for computer experience (CE) countered our hypothesis, in that as employees report higher levels of

computer experience, they prefer classroom training over blended training methods. There is a concern that the computer experience (CE) measure used in this study did not accurately capture the domain of computer experience (CE). Our hypothesis for computer self-efficacy (CSE) and computer anxiety (CA) were confirmed. That is, as employee computer self-efficacy (CSE) levels increased, they were more likely to prefer online (OT) and blended (BT) training methods over classroom training (CT).

As the use of technology in organizational training programs continues to increase, organizations will undoubtedly have a need to assess the effectiveness and benefits of such programs. To ensure the success of training programs, such as e-learning or online learning, a thorough needs assessment prior to training implementation should be conducted. Individual employee characteristics, such as computer self-efficacy (CSE) and computer anxiety (CA) can be measured to determine the pre-training attitudes toward computerized training. This step will give organizations the ability to conduct a pre-training intervention in order to help increase computer self-efficacy (CSE) and decrease computer anxiety (CA) levels which should translate into increased training performance.

APPENDIX A

ORIGINAL - COMPUTER TRAINING CHARACTERISTICS AND PREFERENCE SURVEY

Age _____ Male/Female_____ Years with company_____

Job Title_____

Computer Anxiety (alpha = .73)

1. I usually get frustrated when using a computer.
2. I usually get frustrated when using certain software.
3. In the past I have felt anxious when required to use certain software.
4. I often feel scared when using a computer.
5. I often feel isolated from other people when using a computer.

Computer Self-Efficacy (alpha = .49)

6. Instead of asking for assistance with a computer-related problem, I prefer to try and solve it myself.
7. From past experience, I would prefer to learn a new computer software package on my own.
8. I am reluctant to ask for help when using a computer.
9. When I encounter a computer related problem that I cannot resolve myself, I feel comfortable about asking an expert.
10. I feel more at ease using a computer when alone than with a group of people.
11. When using a computer, I prefer to learn through trial and error.

Computer Experience (alpha = .83)

12. I frequently read computer magazines or other sources of information that describe new computer technology.

13. I know how to recover deleted or "lost data" on a computer or PC.

14. I know what a LAN is.

15. I know what an operating system is.

16. I know how to write computer programs.

17. I know how to install software on a personal computer.

18. I know what e-mail is.

19. I know what a database is.

20. I am computer literate.

21. I regularly use a PC for word processing.

22. I often use a mainframe computer system.

23. I am good at using computers.

Training Preference

Please read the following descriptions regarding potential training methods before answering the last question on this survey.

Classroom Training: This method involves group instruction with the training information being delivered by a qualified lecturer/instructor to the entire group of trainees at one time.

Online Training: This method requires trainees to work on a computer, using a web-based company intranet or the internet to review and complete training information individually.

Blended Training: This method combines some classroom training by an instructor as well as some online training time.

24. I would prefer to complete work-related training sessions using classroom methods.

25. I would prefer to complete work-related training sessions using online methods.

26. I would prefer to complete work-related training sessions using blended methods.

27. If I had to choose just one method, I would prefer to complete work-related training sessions using (choose only one):

    A. Classroom methods
    B. Online methods
    C. Blended methods

APPENDIX B

REVISED - COMPUTER TRAINING CHARACTERISTICS AND PREFERENCE SURVEY

Age _____ Male/Female_____ Years with company_____

Job Title_____

Computer Anxiety (alpha = .83)

1. I usually get frustrated when using a computer.
2. I usually get frustrated when using certain software.
3. In the past I have felt anxious when required to use certain software.

Computer Self-Efficacy (alpha = .66)

4. Instead of asking for assistance with a computer-related problem, I prefer to try and solve it myself.
5. From past experience, I would prefer to learn a new computer software package on my own.
6. I am reluctant to ask for help when using a computer.
7. When using a computer, I prefer to learn through trial and error.

Computer Experience (alpha = .92)

8. I know what a LAN is.
9. I know what an operating system is.
10. I know how to install software on a personal computer.
11. I know what e-mail is.
12. I know what a database is.

13. I am computer literate.

14. I regularly use a PC for word processing.

15. I am good at using computers.

Training Preference

Please read the following descriptions regarding potential training methods before answering the last question on this survey.

Classroom Training: This method involves group instruction with the training information being delivered by a qualified lecturer/instructor to the entire group of trainees at one time.

Online Training: This method requires trainees to work on a computer, using a web-based company intranet or the internet to review and complete training information individually.

Blended Training: This method combines some classroom training by an instructor as well as some online training time.

16. I would prefer to complete work-related training sessions using <u>classroom</u> methods.

17. I would prefer to complete work-related training sessions using <u>online</u> methods.

18. I would prefer to complete work-related training sessions using <u>blended</u> methods.

19. If I had to choose just one method, I would prefer to complete work-related training sessions using (choose only one):

    A. Classroom methods
    B. Online methods
    C. Blended methods

REFERENCES

Aamodt, M. (2004). *Applied industrial/organizational psychology.* Belmont, CA.: Thomson-Wadsworth.

Baldi, R. (1997). Training older adults to use the computer: Issues related to the workplace, attitudes, and training. *Educational Gerontology, 23(5),* 453-465.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84,* 191-215.

Beckers, J. J. & Schmidt, H. G. (2003). Computer experience and computer anxiety. *Computers in Human Behavior, 19,* 785-797.

Berman, E., Bowman, J., West, J., & Van Wart, M. (2006). *Human Resource Management in Public Service.* Thousand Oaks, CA. Sage Publications, Inc.

Bozionelos, N. (2001). Computer anxiety: the relationship with computer experience and prevalence. *Computers in Human Behavior, 17,* 213-224.

Brosnan, M. J. (1998). The impact of computer anxiety and self-efficacy upon performance. *Journal of Computer Assisted Learning, 14,* 223-234.

Butchko, L. (2001). *Computer experience and anxiety: Older versus younger workers.* Poster session presented at

the Indiana University Research Conference, Kokomo, IN.

Callahan, J. S., Kiker, D. S., & Cross, T. (2003). Does method matter? A meta-analysis of the effects of training method on older learner training performance. *Journal of Management, 29(5),* 663-680.

Charness, N. & Czaja, S. J. (2006). Older worker training: What we know and don't know. *AARP Public Policy Institute Report,* Washington, DC.

Charness, N., Czaja, S., & Sharitt, J. (2007). Age and technology for work. In K.S. Shultz & G. A. Adams (Eds.), *Aging and Work in the 21st Century* (pp. 225-250), Mahwah, NJ: Lawrence Erlbaum Associates.

Charness, N., Kelley, C. L., Bosman, E. A., & Mottram, M. (2001). Word-processing training and retraining: Effects of adult age, experience, and interface. *Psychology and Aging, 16(1),* 110-127.

Clark, C. S., Dobbins, G. H., & Ladd, R. T. (1993). Exploratory field study of training motivation. *Group and Organization Management, 18(3),* 292-307.

Colquitt, J. A., LePine, J. A., & Noe, R. A. (2000). Toward an integrative theory of training motivation: A meta-

analytic path analysis of 20 years of research. *Journal of Applied Psychology, 83(5),* 678-707.

Compeau, D. R. & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly,* 189-211.

Craik, F.I.M., & McDowd, J.M. (1987). Age differences in recall and recognition. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 13,* 474-479.

Cronbach, L. J. (1975). Beyond the two disciplines of scientific psychology. *American Psychologist,* 116-127.

Czaja, S. J., Charness, N., Fisk, A. D., & Hertzog, C. (2006). Factors predicting the use of technology; Findings from the center for research and education on aging and technology enhancement (CREATE). *Psychology and Aging, 21(2),* 333-349.

Dolezalek, H. (2005). 2005 Industry Report. *Training, 42(12),* 14-28.

Doyle, E., Stamouli, I., & Huggard, M. (2005). Computer anxiety, self-efficacy, computer experience: An investigation throughout a computer science degree. *35th ASEE/IEEE Frontiers in Education Conference, Session S2H, Indianapolis,* IN.

Falkenberg, L. (1990). Improving the accuracy of stereotypes within the workplace. *Journal of Management, 16(1),* 107-118.

Finkelstein, L. M., Burke, M. J., & Raju, N. S. (1995). Age discrimination in simulated employment contexts: an integrative analysis. *Journal of Applied Psychology, 80,* 652-663.

Finkelstein, L.M., & Farrell, S.K. (2007). An expanded view of age bias in the workplace. In K.S. Shultz & G. A. Adams (Eds.), *Aging and Work in the 21st Century* (pp. 73-108), Mahwah, NJ: Lawrence Erlbaum Associates.

Forsyth, D. R. & Archer, C. R. (1997). Technologically assisted instruction and student mastery, motivation, and matriculation. *Teaching of Psychology, 24(3),* 207-212.

Garland, K. J. & Noyes, J. M. (2004). Computer experience: a poor predictor of computer attitudes. *Computers in Human Behavior, 20,* 823-840.

Gibson, K.J., Zerbe, W.J. & Franken, R.E. (1993). The influence of rater and rate age on judgments of work-related attributes. *The Journal of Psychology, 127,* 271-280.

Gist, M. & Mitchell, T. R. (1992). Self-efficacy: A theoretical analysis of its determinants and malleability. *Academy of Managerial Review, 17(2),* 183-211.

Gist, M., Rosen, B., & Schwoerer, C. (1988). The influence of training method and trainee age on the acquisition of computer skills. *Personnel Psychology, 41(2),* 255-265.

Gist, M. E., Schwoerer, C., & Rosen, B. (1989). Effects of alternative training methods on self-efficacy and performance in computer software training. *Journal of Applied Psychology, 74(6),* 884-891.

Goldstein, I. & Ford, J. (2002). *Training in Organizations.* Belmont, CA. Wadsworth-Thomson Learning.

Gutherie, J. P. & Schwoerer, C. E. (1996). Older dogs and new tricks: Career stage and self-assessed need for training. *Business Source Premier, 25(1),* 59-91.

Harrison, A. W. & Rainer, K. R., Jr. (1992). The influence of individual differences on skill in end-user computing. *Journal of Management Information Systems, 9(1),* 93-111.

Hasan, B. (2003). The influence of specific computer experiences on computer self- efficacy beliefs. *Computers in Human Behavior, 19,* 443-450.

Hassell, B.L. & Perrewe, P.L. (1995). An examination of beliefs about older workers: do stereotypes still exist? *Journal of Organizational Behavior, 16,* 457-468.

Heinssen, R.K., Jr., Glass, C.R., & Knight, L.A. (1987). Assessing computer anxiety: Development and validation of the computer anxiety rating scale. *Computers in Human Behavior, 3,* 49-59.

Hill, T., Smith, N. D., & Mann, M. F. (1987). Role of efficacy expectations in predicting the decision to use advanced technologies: The case of computers. *Journal of Applied Psychology, 72(2),* 307-313.

Huffman, K. (2002). *Psychology in action* (6th ed.). New York: John Wiley & Sons, Inc.

Igbaria, M., & Chakrabarti, A. (1990). Computer anxiety and attitudes towards use. *Behaviour and Information Technology, 9,* 229-241.

Iverson, K., Colky, D., & Cyboran, V. (2005). E-learning takes the lead: An empirical investigation of learner difference in online and classroom delivery. *Performance Improvement Quarterly, 18(4),* 5-18.

Jex, S.M., Wang M., & Zarubin, A. (2007). Aging and occupational health. In K.S. Shultz & G. A. Adams (Eds.), *Aging and Work in the 21st Century* (pp. 199-224), Mahwah, NJ: Lawrence Erlbaum Associates.

Kite, M. & Johnson, B. (1988). Attitudes toward younger and older adults: An updated meta-analytic review. *Psychology and Aging, 3,* 233-244.

Klein, K., Conn, A., & Sorra, J. (2001). Implementing computerized technology: An organizational analysis. *Journal of Applied Psychology, 86(5),* 811-824.

Kubeck, J. E., Delp, N. D., Haslett, T. K., & McDaniel, M. A. (1996). Does job-related training performance decline with age? *Psychology and Aging, 11(1),* 92-107.

Lawless, K. A. & Brown, S. W. (1997). Multimedia learning environments: Issues of learner control and navigation. *Instructional Science, 25,* 117-131.

Lindbo, T.L. & Shultz, K.S. (1998). The role of organizational culture and mentoring in mature worker socialization toward retirement. *Public Productivity & Management Review, 22(1),* 49-59.

Mackay, S. & Stockport, G. (2006). Blended learning, classroom, and e-learning. *The Business Review, 5(1),* 82-88.

Martocchio, J. J. (1992). Microcomputer usage as an opportunity: The influence of context in employee training. *Personnel Psychology, 45,* 529-552.

Marakas, G. M., Yi, M. Y., & Johnson, R. D. (1998). The multilevel and multifaceted character of computer self-efficacy: Toward clarification of the construct and an integrative framework for research. *Information Systems Research, 9(2),* 126-163.

Maurer, T. (2001). Career-relevant learning and development, worker age, and beliefs about self-efficacy for development. *Journal of Management, 27,* 123-140.

Maurer, T. (2007). Employee development and training issues related to the aging workforce. In K.S. Shultz & G.A. Adams (Eds.), *Aging and Work in the 21st Century* (pp. 163-179). Mahwah, NJ: Lawrence Erlbaum Associates.

Meyers, D.G. (2002). *Social psychology* (7th ed.) Boston: McGraw-Hill.

Morris, M. G. & Venkatesh, V. (2000). Age differences in technology adoption decisions: Implications for a changing work force. *Personnel Psychology, 53,* 375-403.

Noe, R. A. (1986). Trainees' attributes and attitudes: Neglected influences on training effectiveness. *Academy of Management Review, 11(4),* 736-749.

Potosky, D. & Bobko, P. (1998). The computer understanding and experience scale: A self-report measure of computer experience. *Computers in Human Behavior, 14(2),* 337-348.

Rizzuto, T. (2005, April). *Workplace technology and the myth about older workers.*Poster session presented at the annual Society for Industrial Organizational Psychology, Los Angeles, CA.

Rizzuto, T. (2007, April). *Dispelling the myth about older workers and technology: A cross levels analysis of person and place.* Poster session presented at the annual Society for Industrial Organizational Psychology, New York, NY.

Rosen, L. D., Sears, D. C. & Weil, M. M. (1987). Computerphobia. *Behaviour Research Methods, Instruments and Computers, 19(1),* 167-179.

Sam, H. Othman, A., & Nordin, Z. (2005). Computer self-efficacy, computer anxiety, and attitudes toward the internet: A study among undergraduates in unimas. *Educational Technology & Society, 8(4),* 205-219.

Schmeeckle, J. M. (2003). Online training: An evaluation of the effectiveness and efficiency of training law

enforcement personnel over the internet. *Journal of Science Education and Technology, 12(3),* 205-260.

Shultz, K.S., & Adams, G.A. (2007). In search of a unifying paradigm for understanding aging and work in the 21st century. In K.S. Shultz & G. A. Adams (Eds.), *Aging and Work in the 21st Century* (pp. 303-320), Mahwah, NJ: Lawrence Erlbaum Associates.

Shultz, K. S., & Whitney, D. (2005). *Measurement theory in action: Case studies and exercises.* Thousand Oaks, CA: SAGE Publications, Inc.

Simpson, P. A., Greller, M. M. & Stroh, L. K. (2002). Variations in human capital investment activity by age. *Journal of Vocational Behavior, 61,* 109-138.

Smith, B., Caputi, P., & Rawstorne, P. (2007). The development of a measure of subjective computer experience. *Computers in Human Behavior, 23,* 127-145.

Stajkovic, A. C. & Luthans, F. (1998). Self-efficacy and work-related performance: A meta-analysis. *Psychological Bulletin, 124(2),* 240-261.

Sternberg, R. J., Grigorenko, E. L., Ferrari, M. & Clinkenbeard, P. (1999). A triarchic analysis of an aptitude-treatment interaction. *European Journal of Psychological Assessment, 15,* 3-13.

Tai, W. T.. (2006). Effects of training framing, general self-efficacy and training motivation on trainees' training effectiveness. *Personnel Review, 35(1)*,51-65.

Tajfel, H. (1982). Social psychology of intergroup relations. *Annual Review of Psychology, 33,* 347-386.

Taylor, M., Shultz, K., & Doverspike, D. (2005). Academic perspectives on recruiting and retaining older workers. In P. Beatty & R. Visser (Eds.), *Thriving on an aging workforce,* (pp. 43-50) Malabar, FL: Krieger Publishing Company.

Thatcher, J. B. & Perrewe, P. L. (2002). An empirical examination of individual traits as antecedents to computer anxiety and computer self-efficacy. *MIS Quarterly, 26(4),* 381-396.

Todman, J. & Monaghan, E. (1994). Qualitative differences in computer experience, computer anxiety, and students' use of computers: A path model. *Computers in Human Behavior, 10(4),* 529-539.

Trentin, G. (2004). E-learning and the third age. *Journal of Computer Assisted Learning, 20,* 21-30.

Venkatesh, V. & Davis, F. (1996). A model of the antecedents of perceived ease of use: Development and test. *Decision Sciences, 27,* 451-481.

Vician, C. & Davis, L. (2002). Investigating computer anxiety and communication apprehension as performance antecedents in a computing-intensive learning environment. *The Journal of Computer Information Systems, 43(2),* 51-57.

Waldman, D. A. & Avolio, B. J. (1986). A meta-analysis of age differences in job performance. *Journal of Applied Psychology, 71,* 33-38.

Webster, J. & Martocchio, J. (1992). Microcomputer playfulness: Development of a measure with workplace implications. *MIS Quarterly,* 201-226.

Weiss, E. M. & Maurer, T. J. (2004). Age discrimination in personnel decisions: A reexamination. *Journal of Applied Psychology, 34,* 1151-1562.

Wrenn, K. & Maurer, T. (2004). Beliefs about older workers' learning and development behavior in relation to beliefs about malleability of skills, age-related decline and control. *Journal of Applied Social Psychology, 34,* 223-242.