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SUPPORTING E-LEARNING WITHIN A SOCIAL FRAMEWORK

by

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ABSTRACT

E-learning has become a major delivery platform for higher education, continuing education and corporate training. The majority of e-learning research to date has taken place in academic environments using survey or qualitative research. This study used an experimental design ($N = 99$) to view three different models for supporting asynchronous e-learning in a corporate setting where learners are geographically distributed. The support interventions were rooted in andragogical principles of learning. Two treatment groups were provided socially engaging proactive models while the control group used a learner directed reactive authoritarian model. The purpose of this study was to see if different variables influenced trainee completion time and retention at six months of employment for new female branch administrators in a financial services company. The goal was to produce a predictive model for employee training completion and retention based upon type of e-learning support and other demographic and observed variables. Data analysis used multiple regression to determine if training completion time could be predicted. There was no significant relationship between any of the variables and time to completion. Logistic regression was used to model prediction of trainees most likely to stay on the job at six months. The only variable approaching significance from that analysis was gender of supervisor. Neither regression analysis resulted in a valid predictive model. This study used an available voluntary sample randomly assigned to treatment groups and tracked through training by dedicated support specialists trained in the different interventions. A larger sample size and different methods of treatment implementation should be studied with this population in the future.

ACKNOWLEDGEMENTS

Although this research was conducted over the past 18 months, it was a 30 year detour from my original goal of attaining a Ph.D. in Education while attending Michigan State University in the late 1970s. Due to numerous reasons, I was unable to complete the degree then. It was only recently that I was ready to try again.

In 2002, I returned to school to achieve this outstanding goal. There were numerous obstacles along the way; however, this time I had a wonderful support system in place to assure that I was successful.

Special thanks go to Dr. Kathleen Haywood, whose encouragement and support kept me going when I was ready to stop. Great appreciation goes to Dr. Thomas Schnell, my dissertation advisor. His direct style, clear direction and vast experience gave me the confidence to keep moving forward. Thank you also to Dr. Lloyd Richardson, Dr. John Henschke and Dr. Pi-Chi Han for serving on my committee.

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CHAPTER I--INTRODUCTION

Over the past five years, the World Wide Web has grown as an e-learning delivery system. According to *Training Magazine's* annual state of the industry report for 2006, online and virtual training represent 29% of all corporate training delivered, up from 23% in 2005. In companies with 10,000 or more employees, online and virtual classrooms make up 36% of total training compared to 57% classroom and 6% from other platforms. In 2006, 50% of all mandatory compliance training and 70% of profession/industry specific training was delivered with some online components (O'Leonard, 2006).

These numbers remained fairly static throughout 2007. However, the number one corporate training priority for 2007 expressed in a large-scale survey was to improve training effectiveness. Training impact was a high priority in 2006; however, it was especially noted as high in the financial, telecommunication and pharmaceutical sectors in 2007 (O'Leonard, 2008).

Training impact is difficult to measure and therefore is most often measured by participant responses via reaction or post-implementation surveys. According to Donald Kirkpatrick (1998), there are four levels for which one should evaluate training. Level one measures trainee reactions. Level two measures learning, often through a written test or performance demonstration. Level three evaluates learning application from training to the job. Has there been a change in performance as a result of the training? Finally, level four measures impact of training, or the results of a training intervention. Measuring impact can be an expensive process for companies since a well designed study must include both control and experimental components

under well monitored conditions. The dynamic forces of a corporate environment preclude the type of controls required for most experimental designs in order to measure impact.

Background of Study

Distance learning is not new. It evolved from the correspondence course to video and telecourses to Computer Based Training (CBT) to current synchronous and asynchronous web based classes. The question that remains through each evolution of distance learning is how do organizations best support students who are geographically dispersed?

The World Wide Web and current technologies allow more flexible support and feedback than past distance platforms. Prior to the internet, correspondence students received most feedback by mail—a slow process. Many correspondence courses also had a tutorial element where the student could reach a knowledgeable person by telephone. Depending upon the situation, this might be the teacher, or a variety of people such as tutors who worked for the sponsoring school. With the advent of e-mail and learning platforms such as Web-CT™ and Blackboard™, the number of feedback channels increased while time between inquiry and feedback decreased.

New technologies in computer simulations allow computer and web-based training to provide immediate feedback. Students can take a test and receive instant results after submitting responses through a Learning Management System (LMS). Students can engage in a task such as completing a computer exercise and be prompted with positive or corrective feedback as to their performance. LMS

technology continues to grow with approximately 40% of all U.S. companies using this technology in 2007 (O'Leonard, 2008).

Although these technologies have many benefits, there is also a downside to their use. Students lose many of the social aspects of learning with online instruction. Much of the increase in online learning has been through self-study delivery methods (O'Leonard, 2006) paired with a classroom approach (hybrid/blended). Students in an online only environment may lose out on the opportunity to reflect with others and share ideas in a safely moderated environment. Invisible teachers and tutors as well as anonymous co-learners change the learning dynamic from a social to a didactic or learner driven process.

Rovai (2001) studied how online instructors can create classroom community and measured this "sense of community" through The Sense of Classroom Community Index (SCCI). The SCCI is a 40 item self-reporting online questionnaire with four subscales: trust, spirit, interaction and learning. Using a mixed quantitative and qualitative design, Rovai found that women value interactivity and learning communities more than men. In their postings to the community discussion, women's writing voices tended to be supportive and helpful while men's patterns were more assertive and impersonal.

Chyung and Vachon (2005) conducted a qualitative study to identify satisfiers and dissatisfiers among 164 students in 17 different graduate level e-learning courses between 1999 and 2003. Using extant data from course evaluations, they found that the learning content itself, instructor teaching methods within the e-learning platform, instructor subject matter expertise and types of learning activities were the most

satisfying factors among the different respondents. Yet in the same study the two major dissatisfiers were instructional directions and expectations and instructors' participation levels. These activities are both tied to the teacher. The role of the teacher has not disappeared because of e-learning and remains an important contribution to student achievement and satisfaction.

Furst-Bowe and Dittmann (2001) studied 40 non-traditional women students enrolled in a distance learning program to determine what motivated them to enroll in a distance course. They conducted a face to face focus group with one-half the participants and a virtual focus group with the other half. About 75% of the subjects enrolled in distance learning for job related reasons, which represents goal orientation as noted by Rovai (2001) and Klein, Noe and Wang (2006). One-third of the total respondents believed there was not enough contact with the instructors in the distance courses, especially regarding feedback. They believe that students taking distance education classes need to be more motivated than those in traditional classroom settings in order to be successful.

Huang (2002) proposed that online educators be well versed in andragogy and that the instructor should help shape the learners' experience from the environment. Although learning can occur independent of place or time, there is a need for a social context for true assimilation of knowledge. Students desire feedback not only from an instructor, but also from their peers. Social constructivism is one theory that aligns with new developments in cognitive science and adult learning theory (Bush, 2006).

Examples of how instructors build social context into online learning include chats, bulletin boards, group projects, online presentations and more. However, a

virtual environment provides constraints to social dynamics. This is especially true in corporate America where learners are geographically dispersed across the globe and constrained by time. With only 40% of corporations using LMS technology (O'Leonard, 2008), there are even greater limitations in how to support web based training and provide a socially interactive framework.

Problem Definition

A multi-national financial services company based in the Midwestern United States has over 10,000 offices dispersed across North America and Europe. These offices are staffed with between two and five people, with the majority of offices having only two employees. The position of branch administrator is an hourly, bonus eligible position found in all offices. This position is critical to the daily operations of the organization. In 2006, turnover in the role was approximately 21% within the first six months of employment. For employees completing training and staying past the 18 month mark, the attrition rate decreased dramatically with the average tenure for the branch administrator position being 5.69 years. In addition to turnover, corporate growth continues to increase the number of these positions at the rate of approximately 6% per year resulting in more than 2,000 full-time trainees per year. According to the Corporate Leadership Council (2005), high turnover in the first 12 months is indicative of organizational problems in recruitment or onboarding. A commonly used model for estimating cost of turnover is to use that employee's average annual salary.

Because of the demand for ongoing training due to attrition and expansion, the company used a computer learning platform to disseminate training materials. In

November, 2006 the platform began migrating from a text based UNIX system to an interactive graphically-interfaced web system. This change resulted in a decrease in time to preliminary training completion from six weeks to 3.5 weeks. The training model used prior to this study was an authoritarian model of support through a call center. Learner calls to the center were reactive to online instruction. Four outbound calls to learners were scheduled as touch points, with additional outbound calls made when the trainee failed to pass certain training benchmarks.

The company expressed interest in analyzing the best training support interventions for decreasing training time and increasing retention of new hires into this position (decreasing attrition). An experimental design whereby different training supports were provided to various treatment groups could yield valuable information for not only supporting training for this particular company, but also for e-learning support in other companies as well as in higher education.

Purpose of Study

The purpose of this study was to see how different variables influenced training completion time and employee retention at six months among branch administrator trainees. The goal was to produce a predictive model for employee training completion and retention based upon type of e-learning support, acquired preliminary test score, business volume and other selected demographic variables.

There is little research on supporting e-learning students outside of an academic setting. Given the dispersion of time and place, how can a company most effectively support learning that can only be delivered in an asynchronous distance platform? In observing eight different independent variables, regression equations

were developed based upon analysis of extant data and outcome variables as identified in the literature.

Hypotheses

The underlying framework of this study was that students who were more socially engaged in training would complete their training faster and stay in their jobs longer than those who were not as socially engaged. The hypotheses for this study were:

1. There are faster rates of training completion and increased six month retention rates for trainees provided six additional social interactions by their support specialists.
2. Trainees with preliminary test scores of 80% or greater will have faster training completion rates and greater six month retention rates than those scoring lower than 80%.
3. Trainees in offices with lower volume will have faster training completion rates than trainees in offices with higher volume.
4. There will be no differences in six month retention rates based upon the office business volume.
5. There will be no differences in training completion times based upon the gender of the supervisor.
6. Trainees in male supervised offices will have higher retention rates at six months than trainees in female supervised offices.
7. There are faster rates of training completion and greater six month retention rates among trainees born after 1967.

8. There are faster training completion rates and greater six month retention rates based upon the amount of the trainees' previous financial experience.
9. There are faster training completion rates and greater six month retention rates based upon the trainee receiving local office support.
10. There will be significantly different training completion times based upon trainees' geographical area.
11. There will be no difference in trainee retention rates based upon trainees' geographical area.

Variables

In an experimental design, the dependent variables are the outcome variables observed to determine an effect of the treatment or independent variables on the outcome. Two dependent variables and eight independent variables were monitored in this study. Of the eight independent variables, only one involved manipulation of treatment, while the others were either self reported or collected from extant data.

Dependent Variables

The dependent (outcome) variables were: time to training completion in calendar days and employee retention at six months measured as a dichotomous variable or in number of days until attrition, depending upon the research question being asked.

Independent Variables

There were eight independent variables used in this study. Two of these variables were associated with treatment or some type of intervention. The six remaining variables were observed variables self-reported by the subjects or reported

metrics through either the Human Resources Information System (HRIS) or the training database.

Independent Treatment Variables

The manipulated independent treatment variable for this experimental design was type of e-learning support. The research question was: Is there a difference in training completion time and six month retention rates by type of corporate e-learning support?

Group 1: The control group used an authoritarian reactive learner directed model using the standard didactic support that historically accompanied the e-learning training. This included a call center and messaging system for written inquiries.

Group 2: The coaching group had access to the same supports as the control group, but in addition received six proactive outbound calls lasting up to 30 minutes from dedicated support personnel for one-on-one coaching.

Group 3: The facilitated learning group had access to the same supports as the control group and also received six weekly one-hour conference calls with peers and a facilitator for the purpose of sharing and reflection.

A second type of treatment variable was support at the local level. Some regions have their own mentoring programs or special arrangements for training a new branch administrator. Since there is no way of controlling for this type of treatment due to individual office differences, this variable asked whether any local training or mentoring took place and coded local training by type.

Independent Background Variables

Demographic or observed variables were used to analyze the data to answer the following research questions:

- Is there a difference in completion and retention rates by preliminary test scores?
- Is there a difference in completion and retention rates by volume of office business?
- Is there a difference in completion and retention rates by gender of the branch supervisor?
- Is there a difference in completion and retention rates by previous related experience in the financial sector?
- Is there a difference in completion and retention rates by trainee age?
- Is there a difference in completion and retention rates by trainee geographical area?

The preliminary test score was chosen as a measure because it serves as a major milestone in the trainee's learning. The results of this test trigger the first feedback call for all three treatment groups. This test also represents a level-two evaluation according to Kirkpatrick (1998). This study also evaluates training at Kirkpatrick's level three, behavior change and level four, training impact. Other reported variables were chosen because of their utility in helping to solve the turnover problem among this population.

Delimitations

Because few males are hired into this position, the sample was limited to women. The scope of the study was also narrowed by the following parameters:

- Participants were limited to new female full-time branch administrator trainees in offices located in the United States. Rehires or transfers from corporate offices as well as part-time employees were not eligible to participate in the study.
- Participants were voluntary and were allowed to remove themselves from the study at any time.
- Sampling was based upon a voluntary available sample during the period August 1, 2007 through October 31, 2007, randomly assigned to one of two treatment groups, or the control group upon participants' consent to take part in the study.
- Some offices of study participants were part of a regional mentoring network. Data could only be analyzed for a local support effect and could not be analyzed for a mentoring effect on completion and retention.
- Because the study took place within the context of a dynamic work environment, external changes could have influenced study outcomes. Some of these changes included: addition of three new support staff during study enrollment, change in management for the support specialists and additional job responsibilities added to the support specialist role during the study period due to corporate growth. It should be noted that the original six support specialists trained prior to the beginning of study enrollment remained through the end of the intervention period. Thus there was consistency of intervention delivery for all participants in the study.

Part of this study took place in a turbulent financial environment where the stock markets had wide fluctuations, financial services companies were laying off employees and unemployment rates began to rise, although the company in this study

had no layoffs and was in a growth mode. These external environmental factors could have played a role in improving the retention variable.

Definition of Terms

Andragogy. The art and science of helping adults learn (Knowles, 1980).

Authoritarian reactive model. Corporate support model for control group whereby support specialists contacted learners at four touch points or when the trainee fell behind in milestone attainment. All other contacts were initiated by the trainee.

Blended learning. Also known as a hybrid approach where learning takes place both online and in a face to face classroom environment. In the context of this study it also represents synchronous class time via conference call as experienced by the facilitated treatment group.

Business volume. Categorization of a branch office based upon production. The segments ranged from the lowest category of 0 to the highest category of 5.

Coaching model. Corporate support treatment model whereby learners have a trained coach using six scheduled outbound calls to help them through an interactive learning process.

Cognitive learning theory. Theory of learning based upon assumption that information is processed in working memory and integrated into existing knowledge and experience (Svinicki, 2004, p. 10-11; Clark & Mayer, 2003, p. 35-36; McInerney, 2005).

Constructivism. Learning theory rooted in psychology and philosophy posing that learning is contextual and the learner should be allowed to construct his own knowledge as he makes sense of his world (Driscoll, 2000, pp. 375-377).

Days to attrition. The number of calendar days it takes for a trainee to leave the organization, calculated as termination date minus hire date.

E-learning. Learning through the World Wide Web.

Facilitated model. Corporate support treatment model whereby asynchronous learners gather synchronously together once a week through six facilitated teleconference calls to interact and reflect upon their learning process. In the context of this study it is viewed as a blended or hybrid learning approach.

Geographic area or region. Thirteen areas for grouping offices based upon geographic location and office density patterns. Each region has its own field leadership and dedicated training support specialist at the corporate office.

Interactional learning theory. Learning theory that focuses upon the social and cultural contexts of cognitive development and learning interactions (Driscoll, 2000, p. 221).

Learning management system (LMS). Web based software that allows online enrollment and delivery of learning, learning assessments and courseware evaluations.

Metacognition. The ability of the learner to understand how he/she learns best and employ appropriate strategies to optimize the learning situation (Huang, 2002; Klein, Noe & Wang, 2006; Bush, 2006).

Onboarding. Process of introducing and acculturating a new employee into an organization. These actions take place between the offer of employment through the assimilation of the employee into the corporate culture (Corporate Leadership Council, 2004). Many organizations continue organized onboarding for a full 12 months.

Preliminary or e-skills test score. Test score based upon a validated criterion referenced test administered at the completion of preliminary training (within two to four weeks on average). This score is used as feedback to the learners as to how they have mastered critical survival skills for the job and serves as a level two evaluation measure of learning.

Previous financial experience. Amount of time in months previously worked in the financial sector as self-reported by learners. Financial sector experience includes the following institutions: brokerage, bank, insurance or mortgage lending.

Retention. Trainees who completed training and remained employed with the company and were eligible for promotion at the six month anniversary from hire date.

Social framework. Model whereby the distance learner had regularly scheduled contacts with a coach or facilitator for the purpose of interaction and reflection through socially constructed activities.

Support specialist. Position/role of person responsible for enrolling, monitoring, providing intervention and following up on the training progress of branch administrator trainees. In the context of the study, this fulfills the teacher/tutor role in distance learning.

Training completion time. The number of days it takes from the enrollment date into training to the date where the trainee passes a final exam. This must occur by the six month anniversary from hire date.

Significance of the Study

E-learning is rapidly evolving with constantly changing software and technologies. The majority of studies to date have taken place in academic settings using Web-CT™ or Blackboard™ academic course management systems. The opportunity to apply an experimental design in a corporate setting is a rare opportunity. The willingness of the company to participate had much to do with timing of structural and operational changes aligning with the research questions. This study not only provided an experimental approach to e-learning social supports, but may be generalized across the corporate world of companies that do not have Learning Management Systems. Study findings may be relevant to post-secondary e-learning, especially as it applies to instructor involvement in creating social learning environments.

CHAPTER 2--REVIEW OF THE LITERATURE

This chapter looks at the evolution of distance learning and how specific learning theories and frameworks have been applied to this delivery platform. Because e-learning is relatively new and constantly evolving, little experimental research has been conducted as reflected in the literature. Studies that employ experimental designs tend to have small sample sizes making generalizability difficult. Surveys have been the dominant tool for e-learning research within the recent peer reviewed literature. Qualitative studies are also acknowledged in the research and help to formulate assumptions about how adults learn at a distance. According to O'Leonard (2008), measuring impact of training programs is the top priority for 28% of the companies surveyed for the *2008 Corporate Learning Factbook*. Yet most companies struggle with this process of linking training to results. Since there is little work done on e-learning training impact in the corporate sector, the majority of the research reviewed for this study has taken place in academic settings.

Background of E-learning

Distance learning evolved over more than a century from correspondence courses to today's online learning. Over time, technology became an essential tool for enhancing distance education. Even the telephone was used as a distance learning tool as early as the 1930s. During the 1960s the University of Wisconsin Extension connected almost 200 communities across the state for continuing education (Olgren,

1997). Teleconferencing has continued to be an effective technology for geographically dispersed students by telephone as well as newer technologies such as Interactive Television (ITV) and video conferencing. These technologies have been well illustrated, especially in medical continuing education (MacIntosh, 1993; Crump, Caskey, & Farrell, 1998).

In the 1970s, Computer Based Instruction took off and from then until the 21st century plodded along with the changing technologies. The major revolution in distance learning was the emergence of the World Wide Web in the late 1990s.

Zemsky and Massy, (2004) in their Weatherstation Report said that e-learning has not turned out to be the panacea that it was thought to be. Entrepreneurial endeavors glutted the market with products that were little more than electronic content. After studying both the academic and non-academic markets, the authors concluded that e-learning exploded before people knew how to use it. Market forces had not yet required standards for design and implementation.

E-learning is a constantly evolving medium that is yet to be empirically tested on a large scale in order to move toward broad adoption. In their report, Zemsky and Massy (2004) discuss the variety of impediments to e-learning such as the evolution of bandwidth, lack of standard evaluative measures for products and services, and faculty and trainers inability to adapt their teaching to the new medium.

Hedberg's view (2006) aligns with Zemsky and Massy about e-learning's failures. He specifically points to the lack of student engagement and higher order thinking available in the various e-learning products and services. Hedberg refers to "disruptive technologies" as an important occurrence for e-learning to overtake the

status quo. Disruptive technologies refer to a change in technology that has not yet proven its effectiveness over the status quo. According to Hedberg's Australian study of over 20,000 students and 800 staff, 53% of respondents stated that e-learning was nothing more than the provision of information.

During the time between the Zemsky and Massy Weatherstation report (2004) and the Hedberg (2006) article, emerging new promises for e-learning occurred. More sophisticated online instructional development tools came to market, bandwidth increased and the LMS, a staple in academia, became more prevalent in the corporate sector. Still, the use of proven teaching-learning theory was lagging behind the software and hardware revolutions.

A major problem with distance learning platforms is that they have been based upon behavioral theories and have not incorporated higher order critical thinking within their design and implementation (Garrison, 1993; Zemsky & Massy, 2004, Hedberg, 2006). By nature of the platform, distance learning has historically been content centered whether by correspondence or today as seen on the web. As new learning technologies emerge, educators often lose sight of why they are being used. The right fit should be considered when determining appropriate applications for learning strategies, taking into account each particular audience and its learning goals.

In reviewing off-the-shelf e-learning products, one typically sees content-centered instruction. Somewhere in this new technology there needs to be sound theoretical foundations for teaching and learning to help researchers infer causality and allow for empirical testing. There is a dearth of research that validates frameworks underlying e-learning design (Gorsky & Caspi, 2005; McCombs &

Vakili, 2005). Two factors require attention if e-learning is to be a successful learning platform: sound theoretical foundations upon which to build it and meaningful learner interactions.

A variety of educational theories can frame an e-learning design besides behavioral: cognitive, interactional and constructivist are three examples. Jung (2001) believes that existing theories can define the framework for web-based instruction and that theories specific to e-learning need not be developed. Although Jung ascribes to a transactional distance learning theory based upon the concepts of dialogue, structure and learner autonomy, she also cites cognitive and constructivist theories as valid frameworks. Stating an underlying philosophical framework within which the instructional system resides is important to achieving stated goals within the teaching-learning process. Without a theoretical framework, the instruction stands on a shaky foundation, often illustrated as content on an electronic page.

If one assumes an andragogical approach to e-learning for job training, the adult learner would bring a variety of experiences, or a biography to the training (Knowles, 1990; Jarvis, 1987, McCombs & Vakili, 2005). Since each learner is an individual, how does the teacher tap into learner-centered strategies? McCombs and Vakili (2005) and Jung (2001) point to the social role of teacher and peers in creating a safe and encouraging learning environment. Too often the role of the teacher is diminished or removed from e-learning. This role has not yet evolved to match learner needs within these new technologies. Zemsky and Massy (2004) refer to the “guide on the side” role of the e-learning instructor. Battalio (2007) suggests that the

role must vary with the individual learner's needs in order to optimize the online learning experience.

Clark and Meyer (2003) use a cognitive learning framework to teach instructional designers how to develop e-learning. They discuss collaborative approaches to e-learning that an LMS can provide such as threaded discussions, online conferencing and chats. Their approach focuses upon the delivery of content in ways that enhance learning for retention and transfer; however, the authors do not discuss the role of a teacher or trainer.

This literature review analyzes learning theories from an andragogical perspective to define theoretical assumptions for an e-learning model within a social framework. To deliver successful instruction through an e-learning platform, social learning theories and the role of the teacher must be effectively integrated into the e-learning experience. The framework will focus upon social aspects of student learning built upon the works of Knowles, Jarvis, Burner and others to identify learning assumptions that can be realistically and effectively applied to the said study described in the previous chapter.

Andragogy

Andragogy is the art and science of helping adults learn. This is in contrast to pedagogy which historically has been defined as the art and science of teaching children (Knowles, 1980, pp. 41-43). Newer views of teaching and learning do not see these approaches as a dichotomy, but as a continuum in which pedagogy is found at the teacher-centered end of the spectrum and andragogy, or learner centeredness, is found at the opposite end of the spectrum. The role of the instructor is to identify

learning dependencies of the student and align interventions in accordance with where that adult is on the continuum (Knowles, 1980, p. 43). Pedagogy has been viewed as a subject-centered approach to learning motivated by extrinsic rewards. Andragogy's approach is intrinsically motivating and is process-centered (Knowles, 1996).

The Practice of Andragogy

Andragogy has not been embraced as a theory as much as a conceptual framework (Merriam & Caffarella, 2001). Knowles poses six assumptions for adult learning that have been accepted within the supporting literature (Knowles, 1996, pp. 255-258; Henschke & Cooper, 2006). These six assumptions are:

1. Adults have a need to know why they are learning something specific
2. Adults need to be self directing and take responsibility for their own learning
3. Adults approach learning with a wealth of experience as a resource for themselves and other learners
4. Adults are ready to learn when they experience a need to know
5. Adults are oriented to learn by tasks and problem solving and not content per se
6. Adults are motivated more intrinsically than extrinsically

Although there is little empirical research on its validity, adult learning practitioners link andragogy to the developmental tasks of adult social roles. Research on self-directed learning supports the assumption that self-directedness evolves as adults mature (Merriam & Caffarella, 2005).

One study that incorporated Knowles adult learning theory was conducted by Meeker and Byers (2003). Healthcare executives ($N = 215$) were administered a survey to identify Registered Nurses' learning needs across a variety of healthcare institutions within a single state. Fifty-four of the state's 67 counties were represented in the executive survey. The survey return rate was 54%. In addition, R.N.s were randomly sampled in an 11 county service area where 6,915 surveys were sent with a 23% return rate. The survey found that broad geographic needs across the state could be best met by a distributed learning platform that included web-based delivery, videotapes and ITV. This did not preclude face to face learning formats; however, the distance platforms' incorporation of interactive distributive learning strategies allowed for greater flexibility by the students in satisfying their own as well as their employers' desired outcomes.

Andragogical Processes

Knowles (1980, pp. 45-49) described processes for practicing an andragogical approach to teaching and learning. These practices are platform independent in that they can be used in classroom, blended or distance learning applications. The approach includes practices such as creating a climate where learners' needs can be diagnosed, planning and goal setting as a partnership between teacher and learner and moving the learner toward metacognition through design, facilitation and evaluation of learning experiences.

Henschke (1998) and Wegge (1991) discuss the lack of training and preparation required of adult educators. Content-centered qualifications dominate higher, continuing and corporate education. The inability to relay this content to

adults in a supportive manner is associated with the high dropout rates in continuing education programs. Wegge's research inferred that with as few as six hours of training, subject matter experts teaching adults in continuing education can learn to apply andragogical principles to their teaching-learning approach, resulting in more effective learning. This could have an especially large impact on distance learning, where the teacher may not only lack the understanding of teaching and learning, but also the dynamics of communicating and modeling from a distance.

Moving Toward Learner-Centeredness

Knowles (1980, pp. 28-29) looked at Maslow's hierarchy as a way to explain how ready the learner is to be self-directed. According to Maslow, one cannot satisfy the higher levels of the hierarchy until the lower levels are sufficed. The lowest level of the hierarchy, physiological and survival needs, followed by safety needs, point to the learner's requirement to feel safe, and supported both physically and psychologically. The next levels of Maslow's hierarchy, sense of belonging and esteem needs, require a setting of social affiliation where the learner can feel competent. The highest level of the hierarchy, self-actualization, is where the individual learner finds self-fulfillment and indicates the farthest end of the pedagogy-andragogy spectrum as being fully self-directed (Jarvis, 1995, pp. 46-47; Knowles, 1990). It is at this point that the learner is metacognitively aware.

Maslow's hierarchy can be viewed as a tool for motivating adult learners. Its broad application across many different disciplines including business, adult education, psychology and sociology has allowed the model to be operationalized from theory to application. In a study by Benson and Dundis (2003), Maslow's

hierarchy was applied to healthcare workers within a rapidly changing technological environment. The authors found that technological changes affected safety needs of employees by increasing stress and reducing social need fulfillment. One can generalize these stressors to other industries since changing technologies result in a threat to one's job if new skills cannot be mastered.

Application of adult learning theories has value in continuing adult education (Wegge, 1991; Ausburn, 2004). Including adult learning principles in an online instructional design can assist the learner in improving his confidence. Ausburn, (2004) administered a questionnaire to 67 students in five different courses at a U.S. state university who were full time working adults. The questionnaire addressed learning style as determined by a normed test, past experience with e-learning and experience in self-directed learning. It queried the subjects on the importance of 15 different course goals important to their success. Using a ranking system, the author conducted a chi-square test of the learning style to assure the sampling was representative of the normed population. Priority of instructional goals were based upon sum rankings of the 15 different goals. The top five rankings all involved creating a sense of structure and security for learners. The five top ranked goals included: "provide options for individualization/customization of learning; facilitate self-directed learning; provide variety in learning activities and assignments; encourage and enable active communication and interaction among learners; provide effective 2-way communication between learners and instructor." (Ausburn, 2004, p. 331). Ausburn's research points to the importance of both structure and interaction in designing online courses for adults. In concurrence with Knowles alignment with

Maslow's hierarchy, Ausburn's research illustrates adults' desire for autonomy but not until safety needs of understanding teacher expectations are met.

Understanding how change can affect a learner's motivation allows trainers to create a safe learning environment. Good trainers will look to meet social needs within Maslow's hierarchy in order for learners to feel confident. Since learning is a social process, understanding where each learner is on Maslow's hierarchy can promote more individualized goal setting and learning outcomes.

Andragogy and Learning Theories

The assumption of this research is that adults learn differently from children and that employment of andragogical processes will improve adult learning. Within that assumption, theories of teaching and learning need to be explored in order to support an e-learning framework.

Knowles (1990, p. 116) developed a continuum of theorists illustrated on a graph with the x axis representing level of individual's learning ability and the y axis representing complexity of learning task. The behaviorist theories are at the low-simple end of the spectrum; modeling-Gestalt and cognitive models at the midpoint; and humanistic, adult oriented self directed models at the high ability-high complexity end of the spectrum. For the purpose of this paper, the focus will be on theorists from mid-point to the highest end of the continuum.

Cognitive Learning Theory

Cognitive learning theory, first described by John Piaget in the early 20th century, asserts that sensory information must be processed and interpreted before moving to long-term memory. Learning occurs when information is processed in the

working memory system and becomes integrated with existing knowledge and experience. Anything new entering the system must be encoded according to previous memory. Lack of previous memory structure to store the information results in the brain creating a new repository for it, provided the information is important enough to retain (Svinicki, 2004, p. 10-11; Clark & Mayer, 2003, p. 35-36; McInerney, 2005). Information from working memory moves to long-term storage for learning to take place. Thus, the teacher's job becomes one of helping the learner make sense and meaning of information in the context of his or her life experience (Sousa, 2001, p. 47-50). Cognitive theory is illustrated within an e-learning instructional design through strategies such as chunking learning into meaningful parts, organizing materials in an order that contextualizes learning, (i.e. simple to complex) and stories and metaphors (Alonso, Lopez, Manrique & Vines, 2005). All of these strategies help the learner move the information from short term to working memory.

Working memory is where the encoding process and skill acquisition take place. Working memory holds incoming information and compares it to what is already stored in long-term memory (Svinicki, 2004, p. 10). Working memory has limited capacity with adults able to hold five to nine chunks of information at a time (7 ± 2 chunks) with an attention span up to 45 minutes (Sousa, 2001).

Much research in cognitive theory has been conducted in the areas of distributed practice in order to optimize learning integration into memory. These research findings support the conclusion that spaced presentation of learning material is more effective for learning retention than massed presentations (Seabrook, Brown, & Solity, 2004; Bloom & Shuell, 2001; Son, 2004; Hertenstein, 2001). In an e-

learning context, this is often seen as chunking of content into modules or lessons of moderate duration of 10 to 20 minutes.

Garrison (1993) espouses a cognitive approach to distance learning theories; however, he also believes that emerging theories should be consistent with constructivism since it provides a context based learning experience and allows the learner to create her own meaning beyond knowing and understanding facts. According to Garrison, e-learning is based mostly on self-instruction materials targeted at the lower levels of Bloom's cognitive taxonomy: knowledge and understanding. Achieving higher level instructional goals such as analysis and evaluation, which lead to metacognition, cannot take place within a behavioral framework. Hedberg (2006) uses outcomes, similar to Bloom's cognitive taxonomy, to categorize processes that move beyond facts and into interactive activities that move the learner toward metacognition.

Alonso, Lopez, Manrique and Vines (2005) also contend that e-learning has been built around the lowest levels of Bloom's taxonomy. They combine the levels from Bloom's original six into three: syntactic level encompassing knowledge and understanding; semantic level encompassing analysis and synthesis, and pragmatic level encompassing application and evaluation. Higher order learning can be built into e-learning using both cognitive and constructivist theories. An effective e-learning design will encompass aspects of cognitive learning theory such as distributed practice, chunking of information and feedback of performance. However, it will not stop there. It will also include the role of the teacher within the instructional design itself and social interactions from which the learner can apply,

evaluate and synthesize new information, moving to higher levels of Bloom's taxonomy.

E-learning Research Within Cognitive Frameworks

Markel (1999) believes that there is not much difference in teaching-learning practices between classroom and distance learning. His ideas about platform independence concur with Knowles (1980) practices of andragogy. Each delivery platform attempts to utilize practices of rhetorical thinking, cooperative learning and analyzing, presenting and evaluating information. The goal of the lesson is to move the learners to think at higher levels and lead them toward metacognitive awareness.

Markel sees the role of the teacher, whether in class or at a distance, as subject matter expert/facilitator. The teacher's role is not so much to present the content itself, rather, his role is to organize it, provide learner feedback and clarify and synthesize ideas while supporting student learning. This aligns with the role of the teacher within adult learning theories.

Knowles (1990, p. 116) discussed a continuum of learning theories based upon task complexity. Tasks of moderate complexity and learning ability can be well represented by cognitive learning models. Knowles and Markel's stance agree with Bloom's taxonomy, which illustrates the different levels of cognitive learning: knowledge, comprehension, application, analysis, synthesis and evaluation (Chyung & Stepich, 2003). Teaching to the lower levels of the taxonomy, knowledge and comprehension, works well within a cognitive learning framework. As the learner moves up the hierarchy of the cognitive taxonomy, more complex learning theories are required to explain how people learn to analyze, synthesize and evaluate.

Interactional Learning Theories

Interactional learning theories remove the focus from content and shift it to the learner from both a developmental and social perspective. These theories are not necessarily mutually exclusive and encompass elements of cognitive learning theory (Driscoll, 2000, pp. 237-239). Much of the theoretical research about interactional theories include child development milestones. Since this study is based upon an andragogical approach, the discussion will be limited to theories applied to adult learning.

Theorists

For the purpose of this study, interactional learning theory is defined as a theory that focuses upon the social and cultural contexts of cognitive development and learning interactions (Driscoll, 2000, p. 221). In reviewing different theorists who ascribe to this approach, the role of the learner as actor emerges as the common thread. Theorists Jerome Bruner and Peter Jarvis discuss the importance of learner as actor within a defined culture and the roles that are needed to adapt to the culture.

Bruner

Jerome Bruner's work looks at developmental theory in children, especially the development of the self as thinker (Driscoll, 2000, pp. 222-228). This theory can be applied to adults in the context of the adult being fully biologically developed while still developing intellectually. Bruner focuses on representational systems and the role of culture in one's cognitive growth. He has written on the use of narrative as a means of defining reality. Bruner (1991, p. 3) states, "...language and other symbolic systems mediate thought and place their stamp on our representations of

reality." From a developmental standpoint, Bruner takes us from the concrete physical world to the abstract world of thinking through language. He poses narrative as a way of transmitting culture and reality. Indeed, narrative is another form of reflection. Storytelling, such as parables and fables, has been a platform for teaching since ancient times. Storytelling continues to be effective as a teaching delivery method, especially when the story is framed in a context understandable and relevant to the learner (Schank, 2005).

Instructional design in e-learning can make good use of stories, case studies and simulations or role plays to engage the learner. Narrative is especially powerful for learning in the affective domain. Companies enjoy building their heritage and culture through stories. Stories of companies' founders, charitable works and community involvement all help define the cultural context within which the learner resides (Schank, 2005, p. 124-125). Part of the culture is the language for that context. The individual's ability to learn the language of the culture and integrate it into her personal thoughts and narratives help define her social beliefs and therefore, the organizational fit.

Bruner (2004) defines his transactional approach as compatible with both cognitive and constructivist theories. He looks at people's narratives as reflective autobiographies. Stories cannot be disengaged from personal feelings since individuals are continually creating memories and constructing an analysis of themselves. There obviously is a bias when the story teller and narrator is the same person; however, by repeating our narratives, we enter our learning into long term-memory. We also reconstruct our stories through the culture and other external forces

that may influence retelling. Bruner (2004, p. 708) states "...life as led is inseparable from life as told."

Jarvis

Peter Jarvis (1987, p. 9) used Malcolm Knowles' adult learning assumptions of andragogy, however, he framed these assumptions in a social context. Everything that is learning is social. Jarvis takes the reader through a learning process whereby different forms of reflection are employed for learning to take place. What is learning but a reflection and integration of our experiences? This aligns with the works of Benjamin Bloom and Abraham Maslow who illustrate learning and motivation within a hierarchical structure. Like Bruner, Jarvis believes that learning and self are intertwined and uses Maslow's hierarchy of needs as an example of self development. Maslow's hierarchy places social development at a lower hierarchical level than the development of self. Therefore, to become self actualized, or to reach the pinnacle of Maslow's hierarchy, one must first feel safe, socially accepted and good about himself (Jarvis, 1995; Benson & Dundis, 2003).

McCombs and Vakili (2005) used a learner-centered framework for e-learning. In agreement with Maslow, they stated that learners require supportive relationships in a safe and trusting environment for learning to be effective. Too often the e-learner feels alone and isolated and therefore, not in a safe place to learn and become autonomous. Rovai (2001) stated that online instructors must be sensitive to the different way students communicate (online) in order to assure that the learner does not feel isolated.

Interaction through reflection. Jarvis refers to reflection as a complex process that can involve all the different learning domains (Jarvis, 1987, p. 98-99). Thinking, or individual reflection, creates an inner dialogue with the self and allows for practice and retention of learning. Reflection on self allows the individual to put learning into the context of her own biography or experience. Reflection with others creates learning that allows not only for integration of skills and knowledge but also enculturation into the larger organization. The apprenticeship model was used for generations because it worked so well. Not only did the apprentice learn the craft, but he also came to understand the social milieu in which he worked (Jarvis, 1987, p. 155-160).

Moon (2004) discussed the value of reflective processes for ill-structured ideas with no obvious solutions. This application has been especially helpful in the field of healthcare where practitioners are constantly looking to improve their outcomes. Morgan, Rawlinson and Weaver (2006) used online reflective practice for post-graduate healthcare workers in a hybrid course using a field experience and problem based learning. The authors wrote a case study about this blended learning class. Using online evaluation tools, focus group discussions and analysis of online dialogue, the 25 students enrolled in the course supported the authors' hypothesis that personal and professional issues cannot be separated out from the learner. Reflective reports from the study identified five themes supporting Knowles principles of adult learning: 1) Reflection led the learners to additional reflection and better metacognition resulting in improved self-regulation of learning 2) Focus groups encouraged iterative learning through sharing/discussing experiences with others 3)

Reflection allowed the learners to control their own learning in deciding when and what to post online, 4) Learners were better engaged in learning because of their own reflections and comments on others' reflections, 5) Learners were able to identify their own achievements and thereby increase their metacognitive awareness of their own learning. This research concurs with both Bruner and Jarvis' view of the self intertwined with learning.

Interaction through dialogue. Like Jarvis' discussions of reflection, Gorsky and Caspi (2005) theorize that learning requires both intrapersonal and interpersonal dialogues. They identify four different types of dialogues in which the learner may take part: inquiry, conversation, instruction and debate. Dialogue may be integrated into instructional objectives or stand alone as a social phenomenon.

Jarvis (1995) believes that classroom learning involves relationships whereas distance learning does not necessarily include relationship building within its design. Jarvis believes that relationships within groups go beyond a social sharing and move toward that of building a community. The teacher's role is that of creating a climate of morality and bringing a group of strangers together. Jarvis accentuates three issues in understanding human interaction: autonomy, authenticity and personhood.

Autonomy is the way the learner controls herself in the learning situation allowing others to also have autonomy within the group. Authenticity is equated with Maslow's level of self-actualization, or self understanding. The teacher's role is to create an environment for constructive and original thought to bring out the best in each learner. Personhood is an individual's development through interacting with

others. Jarvis states that moral behavior is established through personhood interactions.

When people arrive to a new learning experience, whether at work, school or pleasure, they are seeking different types of interactions: those of the self and those of the group. These interactions can be proactive or reactive (Jarvis, 1987). Knowles (1990), Jarvis (1987) and Maslow all bring a humanistic framework to the learning experience and focus upon motivating the individual to learn. Assuming that learners are self directed and self motivated, some will prefer intrapersonal self reflection or narrative, while others will prefer interacting with others through dialogue.

E-learning Research Within an Interactional Framework

Interactional theories are embedded in studies that examine learner motivation and learner to learner, learner to teacher and teacher to learner interactions.

Motivation

Motivation to e-learn has been explored in both work and university settings. Rentroia-Bonito, Jorge and Ghaoui (2006) administered a questionnaire on motivation to e-learn among three engineering classes ($N = 77$) at a Portuguese university. The investigators assumed a theoretical framework of contextual learning to align with organizational fit. Subjects were asked to complete a questionnaire that rated factors affecting motivation to e-learn.

Seventy-seven subjects responded to the questionnaire with three motivating factors accounting for 67% of the variance: Twenty-one percent of the variance was due to e-learning's contribution to the competence of the learner, the usefulness of the content and allowance for the learner to feel part of an e-learning group. The second

factor accounted for 20% of the variance and represented the learners' e-learning related experience. The third factor accounted for 14% of the variance and included instructor support and convenience of learning. Social factors are significant in this study since feeling part of a group and instructor support represented the three highest factors generated from the factor analysis.

Bonk (2002) conducted a survey of 201 corporate trainers, instructional designers, managers and human resource personnel to try to understand the motivation and engagement needs of online learners. Of his sample, approximately one in four respondents worked in large companies with over 5,000 employees. Representative sectors included education (20%), technology (15%), financial services (13%) and others. When respondents were asked to rate the importance of 13 different motivating principles in e-learning, on a scale from highly important to not important, more than 50% of the respondents chose four principles as the most important: relevant and meaningful materials, timely and responsive feedback, goal driven/product oriented activities and personal growth. Bonk's study pointed specifically to reflective training techniques and idea sharing as both highly engaging and practical for e-learning. Although conducted four years apart, Bonk's observations foreshadowed the work by Rentroia-Bonito, Jorge and Ghaoui (2006) that identified relevance of content, building of competence and importance of being part of an e-learning community as the most important motivators identified in their survey.

Klein, Noe and Wang (2006) used Malcolm Knowles' adult learning theory to frame research in understanding how learning goal orientation, delivery mode and

perception of barriers and enablers affected students' motivation to learn. The researchers used a naturally occurring quasi-experimental design to compare in-class instruction to a blended learning approach. Using existing classes of both in-class and blended learning courses, volunteers completed a series of three surveys querying students' learning goal orientation, barriers and enablers and metacognitive measures.

The researchers hypothesized that motivation to learn was influenced by learner characteristics, instructional characteristics (classroom or blended) and perceived barriers and enablers. Using a hierarchical regression analysis, the data indicated that learning goal orientation and delivery mode were significant to motivation to learn. In conducting an exploratory analysis of interactions among learning goal orientation, delivery mode and perceived barriers and enablers they found statistical significance of delivery mode by perceived barriers and enablers. They also found that learners in the blended group had higher motivation to learn than those in the classroom group. There was a significant difference in both age and hours worked each week between the two groups, with the blended group being older and working more hours. Limitations to this finding include: the sample was not random, low response rate on the surveys, attrition of participants and unequal sample sizes. Yet this study supports the works of Bonk (2002) and Rentroia-Bonito, Jorge and Ghaoui (2006) in identifying motivational factors such as building a learning community and learning goal orientation as relevant to supporting an e-learning environment.

Social Interactions

Jarvis (1987) focused on learning, not teaching theories, to place a social lens on adult learning. He used Knowles' assumptions about the social constructs of society allowing for learning to occur during every potential interaction of an individual in a new situation (Jarvis, 1987, p. 12). Jarvis' use of reflection with self and others demonstrates how e-learning can become more interactive.

MacIntosh (1993) studied the use of focus groups in nursing education. Using teleconferencing from post-graduate nursing classes ($N = 32$) across a variety of sites, the findings supported the importance of discussion in enhancing learning among adult women. Gueldenzoph (2003) stresses the importance of social foundations in e-learning. The ability of the learner to interact with others and learning objects results in active learning, purposeful interactions and evidence of acquired knowledge.

Jung (2001) performed a meta-analysis of 58 different articles across six different journals. She found that the majority of the literature focused on dialogue or interaction with web-based instruction. After analyzing the research of which 26% was experimental in design, Jung concluded that web-based instruction can be an effective way of promoting social interactions.

In contrast to Jung, Battalio (2007) also performed a meta-analysis of 25 studies that looked at online interactions in education. His findings showed that the research is conflicting as to the type of interactions that are required for successful e-learning. Battalio's research, being more recent than Jung's, questions the value of interactions without putting them in the context of the student's individual learning style. Battalio believes that one size does not fit all, and that successful online

learning should accommodate learner differences in types and degrees of interactions. Specifically, the individual learner's autonomy level may be related to the amount of interaction required. Battalio's observations are congruent with Knowles andragogical framework in that the learner will desire specific types of interactions based upon where they are on the pedagogy--andragogy continuum.

Constructivist Theories

Constructivism is a learning theory rooted in psychology and philosophy that poses that learning is contextual and the learner should be allowed to construct her own knowledge as she makes sense of the world (Driscoll, 2000, p. 375-377).

Although there is not one version of constructivist theory, it is rooted in the idea that there are optimal conditions for learning and that a constructivist approach will encompass these optimal conditions. Theorists from other areas encompass constructivism within their frameworks, including Bruner and Garrison.

Zualkernan (2006) espouses a framework for developing authentic constructivist e-learning environments. He uses Bloom's taxonomy to build complex authentic learning opportunities. Zualkernan discusses the importance of architecture to support an authentic environment for problem-based-learning, related experiences, available information, knowledge construction tools, tools for collaboration and social supports to keep the learner motivated.

A constructivist framework encompasses not only the content but also how it is taught. (Laroche & Bednarz, 1998). Since constructivism is learner centered, each learner will construct his own reality. Hedberg (2006) looks at interactivity within e-learning as a disruptive technology. He espouses the need for dialogue and

the learner's construction of his own environment. Dialogue is an important component of this approach. Without some type of conversation and feedback from teachers or peers, the learner may not establish real meaning because of the isolated learning conditions of an e-learning platform. This is especially important when the learning goals include objectives from the affective domain (Garrison, 1993).

E-learning Research Within Constructivist Theory

Huang (2002) studied adult distance learning to see the impact of a constructivist approach. Using the theoretical framework of andragogy, the research was based upon the assumptions of learner control, orientation to real life contexts and understanding of the learning application. Huang emphasized the role of the instructor in providing positive reinforcement and a structure to the learning in order to improve student success rates.

Huang notes that people work collaboratively in their lives and therefore, should learn collaboratively. The constraints imposed by distance platforms may result in isolated learning. Instructional designers and e-learning teachers need to foster interactivity, be it reflective or direct. Huang is in agreement with Markel (1999) that good teaching and learning is not necessarily platform dependent.

Good delivery of e-learning was explored by Perreault, Waldman, Alexander and Zhao (2002) among accredited business schools. Sixty-one schools and 184 professors participated in a survey on distance learning defined as web-based and Interactive Television instruction (ITV). The response rate was 48.5% with a final $N = 81$. The validated questionnaire, drawn from an extensive literature review, found that the technology itself was often the largest obstacle to e-learning. Unreliable

technology was noted as problematic by 80% of respondents. The next biggest obstacle cited was either student (63%) or teacher (41%) lack of competence in technology. Other problems included access to resources, access to the teacher and lack of training of both designer and teacher. The authors' recommendations for rectifying these problems include better instructor training, better coordination between instructional designer and teacher and better use of collaboration and communication vehicles in the courses.

McLoughlin (2002) looked at the instructional design of e-learning through a constructivist lens. She utilized scaffolding in an online setting to assure the learner had social support, task support and opportunities for developing metacognition through accessing different resources. In discussing guidelines to serve as benchmarks in e-learning design, adult learning principles such as learner control, goal orientation and prior experience as well as social principles such as collaboration, teacher role and accessibility were built around the concept of scaffolding to take the learner from dependence to independent learning.

Gray (2001) explored work-based action learning on the web in a U.K. partnership with the University of Surrey MBA program and a large multinational corporation using a case study approach. Using a blended program based upon active learning principles including a live tutor and corporate client input, synchronous meetings and problem based learning projects, the author found the web to be a great data collection and sharing tool, but lacking in group and reflective opportunities. Still, the author proposed the greater use of the action-learning-reflection cycle for work based learning environments.

Dobrovolny (2006) also espouses the use of adult learning principles such as group work, reflection, prior experience and metacognition. She developed her model from constructivist and adult learning conceptual frameworks, emphasizing social construction of meaning, reflection, and prior experience and self-monitoring (metacognition). This study was conducted in the corporate sector where little prior research had been done on self-paced technology-based instruction. Dobrovolny conducted an exploratory qualitative study to determine how adults learn in corporate settings using a phenomenological method whereby the subjects described their experiences through taped conversations and written accounts in critical incident journals. Although the small $N = 7$, this is considered a good size for phenomenological studies. The coding of data yielded 2,818 messages from the five female and two male subjects who ranged in age from 32-59. The data analysis pointed to knowledge construction beginning during the course of study and continuing on after completing the course. The research verified that adults in corporate settings use peer interactions, metacognition, reflection, prior experiences and authentic experiences to construct knowledge. This study pointed to metacognition as the most important strategy, represented within 22.9% of the coded messages, followed by reflection in 18.2% of the coded messages. The author recommended building frequent opportunities to both self assess and self correct in order to optimize the e-learning experience.

Macpherson, Elliot, Harris and Homan (2004) also conducted a phenomenological analysis of peer reviewed survey research on e-learning to analyze how large corporations in the United Kingdom identified successes and emerging

issues. The authors noted that e-learning was highly promoted because of its flexibility and cost. They found the major obstacles to e-learning included lack of feedback by humans, problems with learner support and poor content and delivery in terms of creativity. Using a social constructionist model, the authors focused on social context as important to e-learning student success. They identified blended learning strategies as ways of optimizing training. A major constraint to evaluating learner success was the lack of impact studies conducted in the corporate setting.

Using a Social Framework in E-learning

Because content models have dominated e-learning products, there has been little experimental research on process models. Andragogy underlies the assumptions brought to process approaches to e-learning. The assumptions of adult learners can be legitimately applied to an e-learning platform since they encompass self-directedness, problem solving and tend to be purposeful.

E-learning Research in a Social Framework

The theorists are not purists in that they do not ascribe to a single ideology. Jung (2001) ascribes to interactional learning theories, but also considers cognitive and constructivist theories to be valid to all learning platforms.

Social Constructivism

Social constructivism looks at learning as a process that takes place each time people purposefully interact. Learning is viewed as participatory with shared and meaningful activity. Bronack, Riedl and Tashner (2006) used a three dimensional virtual workspace to create areas where both students and teachers could socially

interact in ways not typically found in e-learning. Courses were built from a social constructivist framework with an emphasis on interactivity. Interactive opportunities included using avatars, text, audio conversational tools, forums, discussion boards and web forms. Student feedback was positive and described as a 'rich learning community' which not only allowed the student to construct her own learning but allowed for more and better quality student-teacher interactions.

Online courses are often adapted from text-based materials that do not include social interactions. Gueldenzoph (2003) applied socialization to constructivist learning theory in an online platform through synchronous communication media such as video, polling, learning teams and prompt teacher feedback. Without active learning built into the instruction, e-learning is no different from reading a book.

Ongoing, consistent communication provides a key social foundation for any learning platform. Garrison (1998) sees a pragmatic social constructivism as embodying action and not just abstract thinking. Although his philosophy is deeply rooted in cognitive learning theory, the social constructivist approach includes reflection on self and society and listening to others' stories in creating dialogue.

Larochelle and Bednarz (1998) state that there are many different interpretations of the constructivist approach. They identify the learner as bringing her own experience into the learning environment and therefore, being responsible for her own actions. The teacher serves to acculturate the student into the community of practice, thereby identifying activities that allow the learner to grow as a student. These ideas are congruent with the positions of Jarvis (1987) and Knowles (1990),

whose theories are more interactional in their grounding but still work within the constructivist definition.

Role of teachers in e-learning

E-learning is still in its early childhood of development. As new tools are introduced into this platform, the less it looks like content on a web page and the more it becomes an interactional experience. The evolving role of the teacher in e-learning is being explored through research primarily on college and university students.

Pawan, Paulus, Yalcin and Chang (2003) examined online discussions from three different graduate level classes in teacher education. Their purpose was to better define online collaboration and how it is used. They looked at the threaded discussion as the main learning tool for collaborative dialogue. Using an inquiry model for coding, they found discussion to often be one-way monologues or by two-peer interactions. Students were more likely to share information or comment based upon a triggering statement than to use higher order thinking such as evaluating a comment or synthesizing information into new meaning. As previously discussed by Alonso, Lopez, Manrique and Vines (2005), e-learning often fails to reach the higher order learning found in Bloom's taxonomy. It is the role of the teacher that guides and encourages the student to go beyond understanding. The importance of the teacher was evident in the Pawan, Paulus, Yalcin and Chang study since the teacher could facilitate the discussion to go beyond idea sharing and into higher order thinking. The authors concluded that online discussion by itself does not equate to interaction.

Chyung and Vachon (2005) conducted a content analysis study to identify satisfiers and dissatisfiers among graduate students in 17 different graduate level asynchronous, instructor led e-learning courses between 1999 and 2003. Herzberg's motivation-hygiene theory was operationalized into a coding system for extant student evaluations to determine decisions to continue enrollment in e-learning courses. Existing course evaluation questionnaires were used to code student comments as thought units.

There were 164 usable surveys in the sample where all courses were taught by first time e-learning instructors. In addition to the coding scheme, a hierarchical cluster analysis was used to identify two clusters based upon frequency percentages. These clusters were 1) content itself and 2) instructor's teaching methods/style. In further analyzing the teacher's role as a motivator, the research identified frequency of instructor interaction and explicit communication of student expectations as important to student satisfaction of e-learning.

Returning women adult learners were found to have different needs from traditional learners and men. Furst-Bowe and Dittmann (2001) studied 40 women enrolled in distance learning classes at four different public and private institutions of higher education. There were five research questions posed in the study of which two of the questions were pertinent to this research:

- How do adult women in distance learning courses describe their experience as compared with the traditional college classroom?

- How can educational institutions create supportive learning environments for adult women students enrolled in distance learning programs (Furst-Bowe & Dittman, 2001)?

Focus groups were conducted to poll satisfaction of learning. One-half the sample participated in a face-to-face focus group while the other half participated in virtual focus groups. Data was transcribed, coded and analyzed by the researchers. Seventy-five percent of the women in this study were enrolled in school in order to progress in their chosen careers, a content centered decision. However, one-third of the women participating felt they did not have enough teacher contact in the distance course. Specifically, they desired more instructor feedback than what was provided. Learners expressed that they needed to be more self-directed and motivated than those in traditional classes.

A New Theoretical View

E-learning is a relatively new approach to training. One of the major mistakes in e-learning has been moving content from text to the web without thought of how the difference in platform affects the learner. Although many of the researchers cited in this literature review, including Markel, (1999), Jung, (2001) and Huang, (2002), do not see a theoretical foundation being platform dependent, Alonso, Lopez, Manrique and Vines (2005) state that good teaching-learning principles are necessary to frame effective e-learning. They point to the three most common foundations illustrated in contemporary e-learning programs: behavioral, cognitive and constructivist theories. These authors are critical of behavioral approaches in e-learning since they do not explain the social behaviors necessary for adults to learn.

Theoretical frameworks such as cognitive and constructivist allow for better transfer of training through knowledge schema and assist the learner in achieving metacognition. The instructor plays a very important role in any e-learning program and the authors support the use of blended learning approaches to include online and face to face instruction.

This author poses that a foundational theory should be employed when developing e-learning, a practice not always followed. For the purpose of this study, a social framework was used, drawn from andragogy and other theories previously discussed that focus upon social interactions. Specifically, this study looked at the importance of the role of the teacher in creating interactivity as it relates to teacher-learner interactions around goal definition, job relevance and responsive feedback (Bonk, 2002). Theories are only as good as they can be operationalized into facilitation of learning (Knowles, 1990, p. 66). The assumptions for operationalizing this framework are:

- E-learners require a supportive relationship in a trusting environment to be effective (McCombs & Vakili, 2005; Benson & Dundis, 2003).
- All learning is a social process provided there are opportunities for reflection, narrative and dialogue (Jarvis, 1987; Bruner, 1991; Gorsky & Caspi, 2005).
Because e-learning can be an isolating experience, instructors should structure it to allow for regular interactions with teachers and peers.
- Learning in context with timely application is more meaningful to the e-learner than hypothetical learning with delayed application (Rentroia-Bonito, Jorge & Ghaoui, 2006; Huang, 2002).

- Biography of the learner, or prior experience should be accessed to optimize the individual's learning experience (Knowles, 1990; Jarvis, 1987; Larochelle & Bednarz, 1998).
- Adult e-learners require ongoing communication and feedback to have a satisfying learning experience (Garrison, 1998; Furst-Bowe & Dittman, 2001; Bonk, 2002).

E-facilitation

If all learners are provided the same e-learning content, how can the teacher optimize the learning experience? Crump, Caskey and Ferrell (1998) studied the effect of a remote facilitator on group problem solving by telephone and ITV. Their study sampled three successive groups of third year medical students involved off-campus in a four-week rural clerkship. Two groups had six participants and the third group had five for a total of $N = 17$. Each group met three times to discuss problem cases. The groups were presented three different modes of facilitator presence: 1) facilitator was in the room where discussion took place 2) facilitator was off-site but students and facilitator had views of each other through ITV, 3) facilitator had only an audio presence. Interactions at each session were recorded and coded by interaction type.

Six one-way analyses of variance (ANOVAs) were conducted with the group type as the independent variable and number of responses during the discussions as the dependent variable. The researchers used a Bonferroni adjustment to account for multiple ANOVAs. They then looked at responses with a main effect of facilitator location and interaction of location with communication pattern and found no

significant differences when $\alpha = .10$. They did find significance for facilitator location and communication pattern, with more student questions asked via teleconference and the facilitator asking more questions of students under these conditions. Because the design of the study had the technology pattern fixed, there may have been a learning effect between the teleconference and telephone call and therefore, no significance in the phone session. Overall, students reported no major differences in facilitator location other than they felt they learned more with the facilitator on site or video.

E-coaching

Although the telephone was the least desirable facilitation presence in the Crump, Caskey and Ferrell study (1998), Rossett and Marino (2005) see it as a highly effective coaching instrument. They define coaching as purposeful interactions between an expert and neophyte. The authors found in their research that coaching through technology such as instant messaging, strategic online activities and telephone are not only effective but are leading the future direction of coaching. They cite a 1997 study where training followed by eight weeks of coaching resulted in a 400% increase in productivity. The telephone as a teaching tool has been used for over 70 years. Although it may not be as effective as face to face encounters, it does allow for learning, including practice opportunities that might not otherwise exist for the geographically dispersed.

Proactive E-teaching

The current role of the teacher at the site of this proposed study is filled by employees with the title of Support Specialist. This role, as it fulfills teaching duties,

is primarily reactive. The support specialist makes four scheduled outbound phone calls to check in with the student and to assess progress. The student can always make inbound calls as questions arise. Additional outbound calls are made by the support specialist when there are problems. The support position has historically been an authoritarian one and not one of a coach or facilitator. The experimental independent variable of learner support defines the support role into three categories: authoritarian reactive, coaching proactive and facilitative proactive. Support specialists in the proactive groupings (coaching and facilitated) duties were defined as follows:

- Establish rapport with learners to understand their backgrounds and what each learner brings to training (Knowles, 1990; Jarvis, 1987).
- Articulate expectations of training period with emphasis on performance (Knowles, 1990).
- Facilitate learning through exploration, probing questions and reflective activities (Gorsky & Caspi, 1998; Markel, 1999).
- Provide feedback through positive reinforcement and guided correction (Markel, 1999; Bonk, 2002; Huang, 2002).
- Support and motivate learners by making self available and discussing issues within the context of work (Markel, 1990; McCombs, & Vakili, 2005).
- Model the corporate culture (Bruner, 1991).

Summary

The purpose of this chapter was to review literature related to the theoretical constructs underlying e-learning. Although many authors believe that learning theory

is platform independent, little research has been conducted in the exploration of theoretical constructs underlying good e-learning development.

Andragogy underscores all the theories examined within this review. Adult learners have the self directed ability to be successful in e-learning because of their life experience and ability to problem solve. The e-learning platform is often developed for just-in-time learning, thus making it more meaningful and applicable to the adult learner. An adult learner's ability to self-direct does not negate the need for feedback and social contact. Malcolm Knowles' principles of andragogy frame the theoretical model adopted for this study.

Cognitive learning theory is evidenced in the instructional design of many e-learning products. However, applied cognitive theory alone misses the needs of adults to reflect and dialogue with others. A good instructional design will include cognitive learning principles such as chunking learning, spacing delivery and providing opportunity to practice. Metacognition allows the learner to determine his preference for learning style and this often includes social aspects such as group work, dialogue and teacher-learner interactions.

Interactional theories looked at the way narrative, reflection and dialogue can be used to enhance e-learning. Research (Furst-Bowe & Dittmann, 2001; Rovai, 2001), has shown that women in particular, have a preference for interactional e-learning over content or object oriented learning. Social elements may be more important in an asynchronous e-learning platform than a classroom because of the reduced opportunity for learner to learner and learner to teacher interactions. Bloom's taxonomy of learning was also reviewed to point to the need for higher level critical

thinking often missing from e-learning. Current e-learning products tend to be content laden and do not address the interactions necessary for higher order thinking and ultimately metacognition.

Constructivist theory supports the importance of contextual learning for the e-learner. Good e-learning must include the ability of the learner to construct her own reality within the learning experience. Adult learning theory points to the importance of relevance and timeliness for adults to use what they have learned.

The three theories discussed in this literature review were used in the construction of the essential skills modules developed for the curriculum used within this study. However, a missing piece of curriculum implementation was a social framework for supporting the individual learner. On the basis of this literature review and the current context of the training delivery within the organization from which this study was conducted, three different social interventions were studied in supporting e-learning. The Support Specialists were trained in adult learning theory in order to modify the feedback provided to the e-learners. This fourteen hour training was developed using cognitive learning theory, interactional learning theory and constructivism wrapped within an andragogical foundation (Appendix A).

After the support specialists were trained in the new support/feedback models and implemented the experimental design, social interaction variables were studied to determine their affect on the dependent variables of training time to completion and six month retention. The target audience of branch administrator trainees was evaluated at the learning level, or level two according to Kirkpatrick. The support staff's training was evaluated at the behavioral level or level three on Kirkpatrick's

hierarchy. The measure of the outcome variables represent a level four evaluation or impact on the target audience, in this case time to complete training and retention at six months. The need for more corporate impact evaluation has been documented (O'Leonard, 2007; Macpherson, Elliot, Harris & Homan, 2004) in the literature. The small body of quantitative literature currently available will continue to grow as blended and e-learning evolve to become commonplace and not the exceptional platform for teaching and learning.

CHAPTER 3--METHODOLOGY

The purpose of this study was to identify the contribution of learner support to employee training completion and retention in a corporate e-learning program. A corollary purpose was to determine if employee completion time of training (length) and six month retention could be predicted based upon selected variables. Predictions were based upon the observed variables of learner support—corporate and local, acquired preliminary test score, and selected demographic variables. Little research has been conducted on supporting e-learning students outside of an academic setting.

An experimental design was used to look at how three different corporate support methodologies affected learners' training completion time and employee retention rates. Learner support at the corporate and local levels were hypothesized as high predictor variables for the outcome variables within a social learning framework. A sequential (hierarchical) regression equation was proposed to predict learners who completed training in the least amount of time. The independent variables proposed for this regression model included preliminary test score, age of learner, previous financial experience, profitability of office, gender of supervisor, local support and assigned treatment group. A logistic regression analysis was used to predict those learners most likely to stay in the job at least six months using all of the above mentioned variables except corporate and local support. These variables were abandoned given the lack of patterning in leavers by support type.

Design

This study used random assignment of available qualified subjects to a corporate support treatment group within an experimental design. All other variables were either observed or self-reported.

Hierarchical (sequential) multiple regression and logistic regression models were used based upon the theoretical framework that those who learned in a social context would learn faster and be more likely to stay on the job than those trainees who did not learn in a social context.

Subjects

Subjects were drawn from a pool of all female full-time new hires for the position of branch administrator trainee during the period August 1, 2007 through October 31, 2007. Subjects were limited to women full-time employees who had not previously worked for the company. In 2006, the number of new hires into this position was approximately 1,850.

At the initiation of the study, all eligible female new hires in the branch administrator trainee position were invited to participate. Potential participants were read a short version of the informed consent form and directed to a web site describing the study in greater depth. Enrollees accepting entry into the study printed the informed consent form available as a pdf (Portable Document Format) file on the web site and were asked to read and sign the release describing participation in the study. Participants were also asked two questions on the fax cover sheet: 1) What is your date of birth (mm/dd/yyyy)? And, 2) what is your previous experience in

months in any of the following financial industries: brokerage, banking, insurance, and mortgage?

After signing the release and answering the questions on the cover page, each subject faxed her consent form to the principal investigator. Upon receipt of the form, each participant was randomly assigned to one of three treatment groups based upon the queuing of her consent form for data input: Control (authoritative reactive), coached (didactic proactive) or facilitated (group proactive). Each of the three treatment groups had between 32 and 34 subjects enrolled for an $N = 99$.

Learners who did not wish to participate in the study or who were not qualified because of prior experience, part-time status or gender were automatically assigned to the default treatment of the control group. Some non-participant data was available through the company's training database. Data was provided by the company for non-participants on the following independent variables: volume of business and time to attrition. There were 386 non-participants enrolled in training from August 1, 2007 through October 31, 2007. Including the 99 study participants, a total of 487 trainees began training during the study period.

Informed Consent

New trainees were invited to participate in the study at the time of their "enrollment into training" phone call as illustrated in Appendix B. This call was made during the first few days of employment. The study was explained by the support specialist using a script similar to the informed consent form. Participants were asked if they would like to enroll in the study. If they answered yes, they were directed to a web site for the study where the *Informed Consent for Participation in Research*

Activities form was posted as a pdf file that could be printed at their office.

Participants were asked to sign the form, make a copy for themselves, fax the form to their support specialist and send the original to the principal investigator. The principal investigator confidentially stored all releases. In addition to the individual releases, the company provided written consent to participate in this study and share aggregate data that was not identifiable for any specific individual.

Trainees choosing not to enroll in the study completed their course enrollment at the end of the initial phone call. Those choosing to participate were informed about beginning training and then called again after receipt of the faxed forms to discuss their e-learning support assignment. Treatment group assignment was based upon when the informed consent form was received. The self-reported and system generated data was stored in a master spreadsheet. Treatment group was a pre-filled field on the spreadsheet: group numbers 1 = control (authoritative reactive), 2 coached (didactic proactive) or 3 = facilitated (group proactive) were randomly assigned to each row as determined by a random number generator.

Although participants were informed of the option to remove themselves from the study at any time, there was no attrition from the study itself. Attrition due to voluntary or involuntary turnover was recorded on the spreadsheet as last day worked.

Curriculum

The e-learning curriculum used in this study was two pronged. The preliminary or essential skills (e-skills) curriculum focused upon execution of tasks through a graphical user web interface (GUI). E-skills consisted of 31 learning

modules built upon cognitive learning theory (Clark & Mayer, 2003), and the use of storytelling (Schank, 2005). The modules were self-directed and allowed the learner to choose sequencing and practice. These modules included embedded quizzes and self-assessments for learner feedback. By the end of four weeks most learners were ready to take a criterion referenced test that assessed their ability to perform the essential or survival skills of the job. The e-skills, or preliminary test score served as one of the independent variables and represents a level two evaluation measure of student learning.

The second phase of the curriculum, called Topical Basic, was a transitional curriculum that was replaced in January, 2008 with GUI modules similar to essential skills. Topical basic was a text based linear curriculum delivered through a UNIX system. Although the training appeared on computer screens as text, many learners preferred to print it out and read through the hard copies. Unlike essential skills, topical basic was not interactive or narrative driven. It was more of a documentation manual than a training experience, but had served as a training platform for dispersed audiences for over 15 years. At the end of the topical basic training, learners were administered a 100 question final exam. Learners were required to complete training and the final exam with an 80% score by their six month anniversary date to be promoted from the trainee position. If a trainee received less than an 80% score, they were allowed to retake a second version of the test. The overall failure rate in the general population for those who stay and take both tests is less than 1%. All subjects who stayed to complete their training passed the final exam.

Support Staff Training

Nine support specialists were trained in andragogy, coaching and reflective learning techniques. The training consisted of 14 hours of interactive classroom training with follow up activities that included writing operating procedures for the coaching and facilitative model and data collection for the study. Subject matter experts were chosen as trainers. They partnered with the principal investigator to deliver the training which they had collaboratively developed.

According to Wegge's research (1991), continuing education teachers receiving a minimum of six hours of in-service training on andragogy showed a significant difference in their classroom teaching techniques as assessed by themselves and their students on a survey instrument. The training objectives and outline for the support specialists participating in this study are illustrated in Appendix A.

The support specialists were trained in two groups using the same training curriculum. The first group ($n = 6$) consisted of incumbent employees with a minimum of two years tenure in the position. This group was taught using a distributed learning approach over a two week period from July 17-31, 2007. Each module was broken into a chunk of between one and 2.5 hours spread over the two weeks. Because the group was well experienced in their roles, they were able to create realistic role plays. Each support specialist in this group enrolled between 8-22 qualified branch administrator trainees into the study for a total enrollment of 79.

The second group of support specialists consisted of recent hires with previous experience within the company but only 30-60 days in the support specialist

role. They received training for the study in a massed approach across two consecutive days. Because these three new employees began their roles after the beginning of study enrollment, they were not initially included within the study until their training was completed. This group had less opportunity to enroll trainees because they were not participating for as long a period as the incumbent specialists and because their capacity was lesser due to lack of experience. In addition, they were not allowed to facilitate treatment group #3 (facilitated group) because the groups had already been assigned to incumbent support specialists. Total enrollments for these three support specialists was 20.

The support specialists were assigned subjects according to their dedicated geographical regions. Subjects assigned to the control or coached groups automatically were assigned their regional support specialist for the designated treatment. Subjects assigned to the facilitated group were enrolled with a pre-assigned support specialist with a cohort of peers beginning work within a similar time span. This group also had access to their dedicated support specialist by region, so had direct access to two different people.

Type of intervention for a particular subject was a result of the random treatment assignment. Thus, any given tenured support specialist could provide each of the three different treatment models depending upon her own and participants' assignments; whereas the non-tenured support specialist could only support the control and coaching treatment.

Level Three Training Evaluation for Support Staff

A level three training evaluation was conducted with the support staff to determine the outcomes of skill transfer from their training in andragogy. A success case method approach was used to identify training impact upon support staff behavior (Brinkerhoff, 2006) in delivering training treatments to the branch administrator trainees. A success impact model was developed based upon the training objectives. This model serves as the foundation for subsequent level three evaluation. Table 1 illustrates the training impact model. The business unit goals for this model are to decrease time to training completion and increase retention.

Table 1. *Impact Evaluation Model*

Knowledge and Skills	Critical Actions	Key Results
Use adult learning principles	Find out about learner and use experience in training	Increase learner confidence; Increase training transfer
Use different models for supporting e-learning	Use appropriate model with designated learner	Support is modified to meet each learner's needs
Use effective feedback strategies	Provide positive reinforcement to proper performance Provide corrective feedback in objective manner	Learner continues to progress through positive and corrective feedback
Demonstrate active listening	Spend a minimum of 50% of call time listening to learner Ask probing questions	Learner able to identify and assist in solving own learning problems
Demonstrate coaching strategies	Use discussion guide and principles of coaching and feedback when assisting learners	Learner solves own problems
Demonstrate reflective teaching and learning	Use reflection as a tool to reinforce and evaluate self	Learner metacognitive about learning approach

Survey results. All support staffers were given an 11 question survey based upon the impact model to self-report on post-training use of coaching and facilitation

skills. The choices regarding use of new skills were: 1) Use this action to regularly get concrete results 2) Tried and saw some results 3) Tried but did not work 4) Have not tried yet. Open ended questions were also asked. Nine support team members were sent the survey with seven of the nine returning the survey for a return rate of .77.

Table 2. *Survey Results of Level Three Training Evaluation*

Training outcomes for support team	1 Used regularly for concrete results	2 Tried and saw some results	3 Tried but did not work	4 Did not try
Use Maslow's hierarchy in assessing trainee	4	2	0	1
Question trainee's past experience	6	1	0	0
Informally assess learning style of trainee	3	4	0	0
Use adult learning principles with trainee	1	5	0	1
Use the three different learning models	3	2	0	2
Use corrective feedback with trainee	7	0	0	0
Use active listening	7	0	0	0
Use open ended questions	7	0	0	0
Use reflective learning 1:1	3	4	0	0
Use reflection	2	1	0	4
Check for trainee metacognition	4	3	0	0

Focus groups. Focus groups were conducted on November 7, 2007 with the longer tenured team members and again on November 14, 2007 with the three newer

members of the team. Focus group questions addressed the high success areas of using corrective feedback, active listening and open ended questions and why these skills emerged as so useful. Focus group questions also addressed low success areas, specifically reflection as a training tool.

Aggregate results from both groups pointed to listening skills, questioning and using corrective feedback as highly successful due to the amount and type of practice. Role plays were used in both small and large group practice. In large groups, a stop-action role play was used to correct wrong practice behavior and allow the student to readjust her response upon provision of feedback. Trainee impact of the support team adopting these skills included:

- Willingness to listen allowed the support team member to better learn the individual learner's history and the skills and knowledge each brought to the position and use in individual learning.
- Corrective feedback skills provided trainees with "ah ha" moments where the support team member could see that understanding took place.
- The skills provided greater ongoing rapport between the support team and trainees.
- There was a feeling that all the skills allowed for building better trust between support team and trainees and instilled greater confidence due to change in tone from directive to inquiry.

The focus groups were asked why reflective learning appeared as the most difficult skill to put into practice. The newer employees discussed the difficulty of learning this material since it was not only difficult to grasp but also presented as last

in the sequence of skills/knowledge in a 14 hour intensive training. Incumbents were more willing to try using this technique but requested a job aid to assist them in applying reflection. They also discussed that this was the most difficult material to grasp within the training. Branch administrator trainee reception to reflective practice varied by individual. Some learners liked the technique because it worked well with their learning styles. Other learners either did not like it or had a difficult time applying it.

Three of the support team members had come from teaching/education backgrounds and found Maslow's hierarchy as both familiar and applicable. They, along with the majority of the team, were able to incorporate that model into establishing rapport with the trainee to assure that external factors were not interfering with learning. For some support team members, the Maslow and adult learning models were difficult to operationalize since they were more theory than practice. Results of the survey and focus groups illustrated that actual skills that could be practiced were more likely to be used than philosophies or frameworks of learning.

The end result of the level three evaluation pointed to three specific skills with consistently high usage by the support team after training: 1) using corrective feedback, 2) using active listening techniques and 3) asking open-ended questions with trainees.

Variables

The two dependent variables for the experimental design were originally continuous variables: Time to completion of training (length) from date of enrollment to date of completing the final exam in calendar days, attrition over the first six

months as measured in calendar days from day enrolled in study to last day of work or until promoted out of the trainee position and into the office administrator position. This variable was later recoded as a dichotomous variable: stayers or leavers, for use in a logistic regression.

There were three different types of independent variables in this study: treatment variables to determine a treatment effect based upon the type of support given to the learner, descriptor variables to determine differences in outcomes based upon certain demographic characteristics and observed variables based upon data collected during the course of the study.

Independent Treatment Variables

Corporate Support Groupings

Control Group. Subjects assigned to the control group (authoritarian reactive) received the standard support in place for all enrollees in the e-learning training. This support involved a telephone support center where a support specialist served as a resource for answering questions. Learners typically contacted the support specialist via phone or messaging system and posed specific questions. Other phone interactions included walking through examples, explaining test answers and clarifying content. In the course of the training, the support specialist made a minimum of four and up to nine outgoing touch point calls to check on learner progress. Contacts were primarily initiated by learners when they had specific questions. Support specialist contacts were made at specific milestones and when the trainee was falling behind in training or performing poorly in testing.

Coaching group (didactic proactive). Subjects assigned to this group received the control treatment as well as six special outbound calls by their dedicated support specialist for purposes of dialogue, goal setting, problem solving and metacognitive learning. Support specialists assigned to this model were provided training in a six step coaching model as noted in the call guide in Appendix B. Subjects in this group received no fewer than six outbound calls from the support specialist in addition to the four to nine touch point calls. The call guide in Appendix B illustrates the content for the six calls.

Facilitated group (group proactive). Subjects assigned to this group had the control treatment available as well as a weekly one-hour telephone conference call with a minimum of three other learners on the phone line to reflect upon learning strategies and issues related to training and induction into the company. Learners were invited to participate in a minimum of six teleconference calls led by a facilitator trained in a reflective facilitation model similar to the coaching model, only intended for a group. The corporate groups were then contrast coded for the regression analysis.

Local Support

Because each office functions semi-autonomously with local and regional affiliations, support provided at the office or regional level varied greatly from one location to another. For example, one office losing an administrator was allowed to have the leaving administrator stay on for two weeks to provide hands-on training to the trainee. Other offices used a mentoring model where trainees had a regional mentor to support them through training. In some metropolitan locations where

offices were geographically close to each other, branch administrators met regularly on an informal basis for socialization and networking. Any of these interventions were viewed as a local support. Participants were asked this question at the time they reported their e-skills exam score. Therefore, there were missing values for this variable because seven of the subjects left the company before this data was collected.

The six reported local support codes were: 0 = no local support; 1 = other branch administrator in office; 2 = mentor support; 3 = visited another office; 4 = socialize with other branch administrators; and 5 = more than one local support. After reviewing the frequency distribution for this variable, it was decided to recode it into three different classes: 0 = no local support; 1 = one type of local support (previous codes 1-4) and 2 = more than one support (formerly code 5). The recoding yielded frequencies as follows: code 0 = 7, code 1 = 48 and code 2 = 42. There were two missing values for this variable.

Independent Demographic Variables

During study enrollment, support specialists collected the following data on subjects:

Age. Coded by birth date and self reported at enrollment—continuous variable. The birth date was later recoded as age in 2007 for easier computation.

Previous financial experience. This continuous variable represented the amount of time in months that the subjects worked in the financial sector in businesses such as banking, mortgage lending, brokerage or insurance prior to beginning their new position as branch administrator trainee. This was self-reported by each subject at time of enrollment. This variable was heavily skewed to the right

with 46 of the 99 subjects having no previous financial experience. The remaining 53 subjects ranged in experience from 1 to 288 months. This variable was recoded into a dichotomous categorical variable entitled "experience" with 0 = no experience and 1 = previous experience. Both the original and recoded variables were used in the analyses.

Volume of business. Coded by categorical levels zero through five, with zero being the least amount of volume and five being the most. The large number of classes within this categorical variable (6) caused difficulty with analysis. Because of the requirement of large degrees of freedom, it was decided to recode this variable into a dichotomous categorical variable where 0 = the office was not yet profitable (previous codes 0-2) and 1 = profitable office (previous codes 3-5). Both the original and recoded variables were used in analyses.

Gender of office supervisor. This dichotomous variable was coded as 0 = female and 1 = male.

Region (numbered 1-13). Indicated by geographical divisions and density of offices. Each region had its own level of leadership and was supported by a dedicated support specialist. It was decided to abandon this variable after some initial data analysis due to the large number of degrees of freedom required. When using this variable, there were too many cells with fewer than five subjects to be able to conduct any valid statistical analysis such as χ^2 or Analysis of Variance. The number of subjects for the 13 areas ranged from three in areas #8 and #13 to 16 subjects in area #12.

Observed Variable

During the early part of training, subjects took a criterion referenced test upon finishing the first 31 modules. This test was typically completed within the first two to four weeks of training. The test score was a continuous variable measured as a percentage with scores ranging from 52-100%. In pilot testing, the scores ranged from 60-100%.

The twenty-five item criterion referenced test was piloted and validated for content and face validity prior to the commencement of this study. Internal consistency was assessed by running a Cronbach's alpha statistic on individual item scores compared to total test score. A biserial correlation coefficient of $r_b = 0.68$ was attained during the field test validation. Details on how the test was constructed and validated according to the work of Shrock and Coscarelli (2007) can be found in Appendix C.

Dependent Variables

The regression outcome variables were length of time to complete training from enrollment through final exam completion and whether or not the employee was still working for the company at the six month anniversary date when employee promotion from trainee to office administrator took place.

Length of training was a continuous variable calculated as completion of training date minus enrollment date in calendar days. A descriptive analysis was conducted for the 92 subjects who completed training. Length of training varied from 22 to 184 days, with seven missing values due to those subjects leaving prior to

training completion. The data was normally distributed with $M = 118.14$ days, $Mdn = 127$ days and $SD = 48.52$ days.

Retention was initially calculated as a continuous variable as days to attrition as measured by termination date minus enrollment date in calendar days. Because of the small number of leavers from the sample ($n = 9$), it was decided to change the variable to a dichotomous one: leavers = 1 and stayers = 0. After this decision was made to recode the variable from a continuous to a categorical one, a logistic regression was run in the place of a multiple linear regression in an attempt to predict the leavers from stayers.

Reliability

In the context of this study, reliability is defined as the ability to generate similar results when repeatedly measuring the same thing. Measures attained through self reporting by the subject are most likely to suffer reliability errors. Specifically the question on length of previous experience in the financial sector was most prone to reporting error. Previous experience is a subjective measure and can be viewed on the subject's employment application. However, the definition of previous experience was delimited in the self report to positions in the financial, banking, mortgage or insurance industries, whereas it was broadly interpreted on the application. Forty-seven percent of enrollees had no self-reported previous experience in the financial sector. The other 53% varied from one month of previous experience up to 24 years. This variable was later recoded as a dichotomous variable (0 = no experience, 1 = prior experience) given the large spread of experience with a large skew of the data to

the right. All other self reported measures could be verified through the HRIS and training databases.

Data Check

All data was reviewed by a student intern for accuracy of input from each of the data collection forms which held the self-reported and observed data, including the dependent variables. Ninety-nine subjects were reviewed on 13 entries for a total of 1,287 data entries. There are fewer variables than the 13 entries because some of these items were used to calculate observed variables.

Four missing values were identified within four different subjects where the intern was able to retrieve this data through telephone interviews and archival records. There were eight different input errors across seven subjects. An input error was identified as a discrepancy between the data collection form and what appeared on the spreadsheet. When there was disagreement, the value recorded on the data collection form was accepted as the actual value. Inconsistent data was identified as data appearing on the spreadsheet without proper documentation on the data collection form. In this instance, eight subjects had inconsistent data which was verified via telephone and archival records with the values changed accordingly.

Reliability of Treatment

The treatment variables were reliable to the extent that all support specialists delivering a specific treatment attended the same training and used the same materials for training. Support staff training included instruction in the assigned models and simulated calls to trainees. Using principles of andragogy, the support specialists wrote a composite call guide (Appendix B) for each of the six outbound calls and

practiced them through group and simulation exercises. Following 14 hours of training and a 60 to 90 day lag time, training impact surveys were distributed to the support team. The results of the survey and follow-up focus groups showed that all support specialists consistently used a minimum of three of the six adult learning techniques taught during training.

Evaluation of reliability measures. The criterion referenced test had already been validated for internal consistency as noted in Appendix C. Measures of time from enrollment in training to completion of training and attrition were automatically collected through HRIS reporting systems. The reliability of these systems is assumed to be near 1.0 since access to work is restricted prior to starting and on the day of termination from work. Although there may be exceptional situations where this did not happen, one can assume the error rate to be negligible because of the company's security measures.

Data Cleansing

Initial data analyses were run for descriptive statistics to view normality of variables and correlation relationships. A chi-square analysis was run on the categorical variables to determine if associations existed between two categorical variables with multiple classes.

Correlation analysis of continuous independent variables. The three continuous independent variables were analyzed through a Pearson correlation coefficient. The Pearson correlation coefficient measures the linear relationship between two variables (Kinnear & Gray, 2005). These three continuous variables: e-

skills test score, age in 2007 and previous financial experience in months showed no significant correlations among the three variables.

Chi-square analysis of nominal variables. A chi-square test was run for six categorical variables to determine if there were any relationships where one category could possibly proxy for another. The categorical variables analyzed were: treatment group, area number, trainer code, volume of business, gender of supervisor and local support. A cross tabulation was run by paired variables to determine if the row and column variables were independent. A significance value of $\chi^2 < .05$ for the paired categorical variables listed in Table 3 was not statistically significant due to the small cell sizes in the chi-square test.

Table 3. *Chi-square Analysis for Categorical Variables*

	Supervisor gender	Treatment group	Region	Business volume	Local support
Supervisor gender	1.00	.182	.138	.057	.876
Treatment group	.182	1.00	.363	.039*	.001*
Region	.138	.182	1.00	.167	.001*
Business volume	.057	.039*	.167	1.00	.000*
Local support	.876	.001*	.001*	.000*	1.00

Those significance values denoted with * indicate that there were not enough expected counts in the cells (< 5) to yield a valid significance value for that relationship. The inability to calculate a valid χ^2 due to the large number of classes

compared to the sample size resulted in abandonment of the region variable and recoding of the business volume and local support variables.

Validity

Validity is the extent to which a measure actually measures what it claims to measure. There are two types of validity that were monitored during the course of this study: internal and external.

Internal Validity

Internal validity allows inferences to be made about the effect of treatment on the outcome measures. In this study, it answers the question of whether or not differences in trainee performance measures can be attributed to the intervention (The Research Methods Knowledge Base, 2007). In an experimental design, internal validity is assured through random assignment to treatment groups. A systematic assignment protocol was used within a randomized framework based upon a computer generated enrollment report and a queuing of subjects into each of the three treatment groups based upon date and queuing of their informed consent forms. At the time of receipt of the informed consent, each eligible subject was assigned to the next row of the master spreadsheet where the treatment group field was pre-filled by the group numbers 1, 2 or 3 by a random number generator. This assignment process continued for three months until 99 slots were filled with a sample size ranging from 32 to 35 for the three treatment groups. The target sample size was $N = 105$ as calculated by the National Statistical Service Sample Size Calculator (2007). Due to pending corporate changes in training protocol and system updates the last day to

enroll trainees into the study was October 31, 2007, resulting in a less than desired N . Protocols for data collection are found in Appendix D.

The major threat to the internal validity of this study is that the groups were not equivalent upon assignment to the study. There was no pre-testing to assess baseline knowledge or skills.

Another threat to the validity of the design is violation of assumptions of the general linear model. These assumptions include normality, linearity, homoscedasticity, homogeneity of variance and covariance and analysis of outliers. To protect against violation of any assumptions of the general linear model, continuous data was screened and analyzed using distribution and outlier analysis. Descriptive analyses were conducted. Some data was transformed into new variables to assure no assumptions were violated. All 99 subjects were included in the descriptive analysis.

Initial Data Analysis

- Age was normally distributed with $M = 40.65$, $Mdn = 40$ and $SD = 11.203$, a kurtosis of .243 and a skewness measure of -1.056.
- E-skills test scores were normally distributed with $M = 84.19$, $Mdn = 84$, $SD = 8.68$. The distribution had a kurtosis of .881 and a skewness measure of -.459.
- Previous financial experience was skewed to the right with $M = 35.96$ months, $Mdn = 8$ months and $SD = 58.23$. The distribution had a kurtosis of 6.67 and a skewness measure of 2.42. These measures indicated a need to recode into a categorical variable.

- Assumptions of normality are not valid when analyzing categorical variables.

However, during the initial data analyses, these variables were reviewed for representation both within the sample and the population in general. The following observations were made:

- Gender of supervisor was 18.2% female ($n = 18$) and 81.8% male ($n = 81$). The female sample was slightly over-representative of the population as a whole with approximately 15% of the supervisors in the population as female.
- The volume of business codes were representative of the population as a whole with a slight over-representation in category 0 ($n = 7$), which typically averages to about 3% of the trainee population. There was a slight under-representation in category 4 ($n = 12$) which averages to about 14-15% of the trainee population. Volume of business was recoded from a 0-6 categorical measure to two codings: 0 = not profitable 1 = profitable. These numbers were also representative of the larger population.
- Region code 1-13 was not representative in the sample or the population. This could have been influenced by a number of factors including the available sample being voluntary and limited to female new hires, regional variances in hiring patterns, the enthusiasm of the support specialists for enrolling their trainees into the study, or restrictions on subjects to being female with no previous company experience. The range of enrollments by geographic area was 3-16 subjects.
- Local support was coded from 0-6 with 0 representing no support, codes 1-4 representing a single type of support and code 5 representing multiple supports. There were two missing values from this variable. The variable was recoded for

better meaning in the analysis, with 0 = no local support ($n = 7$), 1 = one support ($n = 48$) and 2 = multiple supports ($n = 42$).

Missing data

Because of the enrollment and monitoring protocols there does not appear to be a problem with missing data other than two local support entries and seven length of training entries missing from early leavers. Missing e-skills scores were assigned the mean value for the treatment group to which that subject was assigned.

External Validity

External validity refers to the ability to generalize results outside the scope of a particular study. In this case, results may be generalizable to trainees within the study organization. The population of trainees is approximately 2,000 per year, and some results could be generalizable to this total population, although the sampling was limited to only female new hires.

There are broad limitations on the ability to generalize these results to other corporate settings or other job positions. Results from experimental designs in corporate settings are often difficult to generalize because of the uniqueness of the conditions under which the experiment was conducted. Due to advances in technology during the course of this research, it would be impossible to replicate this study today.

Analysis

Data was collected at various milestones during the training. The majority of data was collected at the time of enrollment into the study. The test score was

acquired after completing the test, typically during the first month of training. The local support question was asked at the one month milestone or completion of e-skills, whichever came first. Outcome variables were recorded at the six month milestone. Each variable was analyzed for descriptive data as soon as all subject data was entered.

Data Collection

Data was collected by multiple people (nine different support specialists) at multiple times during treatment and beyond. Initial data was collected by trained support specialists after receipt of the faxed informed consent form. The enrollee was assigned an identifying number through human resources. The principal investigator was not involved in any of the data collection in order to avoid any bias.

Upon assignment to a support treatment group, the support specialist entered the subject's self reported data into an Excel spreadsheet: age as coded by birth date; previous financial experience representing the amount of time the subject worked in the financial sector in businesses such as banking, mortgage lending, brokerage or insurance prior to beginning the new position. This variable was measured in months.

Additional variables such as supervisor gender, volume of business, region code and preliminary test scores were accessed by the support specialists through the training system database. Dependent variable data was collected at the end of six months. This was reported through the HRIS as six month review date or last day worked for the attrition variable. Data was analyzed for length of employment by demographic variables for significant differences between groups. Number of days to

attrition was calculated by subtracting the enrollment date from the end date/promotion date to get a total number of days up to 181.

Training completion time (length of training) was recorded by the support specialists through data available in the training information system. Dates were entered on the spreadsheet and recalculated into calendar days ranging from a low of 22 calendar days to a high of 184 calendar days. Upon completion of the essential skills test, the support specialists also questioned the subject about local support and recorded the response into the spreadsheet.

Data Transformation

As described earlier, a number of variables were recoded because of skewed data, too many classes in a single categorical variable for meaningful analyses, or inability to derive meaningful results from the non-transformed variable. The recoded variables used in the multiple regression were: Birth date to another continuous variable of age in 2007; local support to a three class variable; volume of business to profitability as a dichotomous variable; and treatment groups to contrast coding of the three treatment groups.

The outcome variable of days to attrition was recoded for regression as a dichotomous variable of 1 = the subject left the organization and 0 = the subject was retained after six months. That model used the following variables: profitability, gender of supervisor, previous financial experience, e-skills test score and age. All variables were dichotomous except for age and e-skills test score.

Hypothesis Testing

The 11 hypotheses were tested using either a *t*-test for independent samples or one-way Analysis of Variance (ANOVA). Because there was no significance found in any of these tests, there was no need for post-hoc analyses or statistical adjustments (Tabachnick & Fidell, 2001, p. 357) such as a Bonferroni adjustment. Type I errors result when the null hypothesis is rejected when it should not be. Since no significance was shown in the analysis, there was no concern for a Type I error.

Regression Analysis

A multiple regression analysis was run adding the following variables to the model to predict time to training completion (outcome variable = length). Variables were entered in a block due to the lack of support for the theoretical framework within the initial data analysis (Tabachnick & Fidell, 2001, p. 133). The variables entered into the equation were e-skills test score, age of trainee, gender of supervisor, previous financial experience in months, treatment group as a contrast coded variable, local support as a contrast code and profitability as a dichotomous variable.

Logistic regression was used for the retention model because a discrete outcome (stay or leave) was the dependent variable for retention. Logistic regression was also appropriate to use because no assumptions are made about the predictor variables and therefore, one can use a mix of discrete, continuous and dichotomous variables (Tabachnick & Fidell, 2001, p. 517) without worrying about assumptions of normality. The data for the attrition outcome variable was originally collected as a continuous variable: "days to attrition" as calculated by the enrollment date subtracted by the last day worked in calendar days. This data was recoded into a

dichotomous variable, attrition code, which was coded as 0 = stayed and 1 =left.

Independent variables entered into the logistic regression model included profitability (dichotomous), gender of supervisor (dichotomous), experience (dichotomous), trainee age in 2007 (continuous) and e-skills test score (continuous).

Limitations

There are major limitations to the generalizability of results due to the small population to which this study applies and the lack of significance attained in the analysis. There may be some generalizations specific to the organization, but little can be inferred outside the organization.

Although there was lack of significance, there is potential impact to the organization in that findings of lack of significance could have implications on hiring policy. For example, lack of previous financial experience does not appear to make any difference in time to completion or retention.

Because of the systematic approach of this study, it may be replicable to similar corporate settings, but probably has little application to other environments. This research in supporting e-learning adds to the small number of quantitative research studies conducted within the past three years.

Summary

This chapter laid out the protocol for data collection for an experimental design to identify the contribution of learner support to employee training completion and retention in a corporate e-learning program. A random assignment of voluntary trainees assured validity of data.

Because of the large number of classes in some categorical variables and lack of linearity in one continuous variable, there was a need to recode variables into dichotomous variables. Data transformations were described and data reliability methods were explained. Strict protocols for monitoring data collection and cross checks of data allowed for high levels of confidence that the data itself was not corrupted due to any mishandling.

Validity issues were discussed in that internal validity was checked through consistency of applied treatments and checking continuous variables for assumptions of linearity. A level three training evaluation was also conducted via survey and focus groups to determine skill implementation and impact from the support team training. The seven support team respondents all agreed that they were consistently using three of the adult learning skills as acquired during training.

There are broad limitations to the external validity of this study in that the conditions of the study and variables were unique to the organization in which the research was conducted. Conducting research within corporate settings is very difficult due to the dynamic environment. Consequently, limits to external validity were identified at the proposal phase with hope that findings regarding support types could be generalized to e-learning in other settings.

CHAPTER 4--RESULTS

Analysis of Variance and *t*-tests for independent samples were used to test the 11 different research hypotheses. Although the statistical analysis of all 11 hypotheses failed to reject the null hypothesis, it was decided to proceed with regression analysis to determine if any interaction effects among the different variables could produce predictive models for length of training and trainee attrition.

The Statistical Package for the Social Sciences (SPSS, 2006) software was used for the data analysis. SPSS allowed for robust analysis of the data. It was during the initial data analysis that problems with degrees of freedom appeared to limit computation of some relationships between variables. It was also here that problems in applying the collected data appeared and decisions were made to recode certain variables. Adjustments to the initial data analysis protocol were made in order to try to achieve better meaning from the data.

Hypothesis Testing

Eleven research hypotheses were proposed at the beginning of this study. Each hypothesis was tested by an independent samples *t*-test or one-way Analysis of Variance, depending upon the number and type of factor variables. The hypotheses were tested after all data was collected and initially screened for descriptive statistics, including correlation and chi-square relationships. Although there was no indication from this initial data analysis that there would be a relationship among the variables, each hypothesis was tested for significance. For all tests, $\alpha = .05$.

The underlying framework of this study was that students who were more socially engaged in training would complete training faster and stay in their jobs longer than those who were not as socially engaged. The hypotheses for this study were:

Hypothesis 1

Research hypothesis. There are faster rates of training completion and increased six month retention rates for trainees provided six additional social interactions by their support specialists.

Null hypothesis. There are no significant differences in rates of training completion and six month retention rates for trainees provided six additional social interactions by their support specialists.

Analysis. An independent samples *t*-test was run with $\alpha = .05$ for those receiving either of the two treatments (coaching and facilitated) as one group and the control as the second group. There were seven missing ($N = 92$) values from the length of training outcome variable due to subjects leaving before completing training.

Table 4. *Descriptive Statistics for Outcome Variables by Treatment*

	Group	<i>N</i>	<i>M</i>	<i>SD</i>
Length of Training	Treatment	61	121.08	45.58
	Control	31	112.35	54.18
Number of Days to attrition	Treatment	66	171.95	32.33
	Control	33	171.87	31.58

The test outcomes resulted in a failure to reject the null hypothesis.

Hypothesis 2

Research hypothesis. Trainees with preliminary test scores of 80% or greater will have faster training completion rates and greater six month retention rates than those scoring lower than 80%.

Null hypothesis. Trainees with preliminary test scores of 80% or greater will not have any significant difference in completion and retention rates than those trainees scoring below 80%.

Analysis. The e-skills test score variable was divided into two groups: those scoring 80% or greater and those scoring less than 80%. The 80% score was chosen since that was the cut off score for passing or failing the test. Seven values were missing from the length of training variable since those subjects left the organization prior to completing training and therefore, had no recorded value for length of training. Three of the 99 subjects left the study before completing the e-skills test. Those subjects were assigned the harmonic mean value for the treatment group to which they were assigned, resulting in no missing values from the analysis of number of days to attrition.

An independent samples *t*-test was conducted on both dependent variables with the independent variable being the e-skills test score as passing ($\geq 80\%$) or not passing ($< 80\%$), with $\alpha = .05$. Neither *t*-test resulted in a significant difference between those who passed and those who did not pass the e-skills test for either outcome variable.

Table 5. *Descriptive Statistics for Outcome Variables by E-Skills Test Score*

	Group	<i>N</i>	<i>M</i>	<i>SD</i>
Length of Training	≥ 80%	71	118.70	47.77
	< 80%	21	116.24	52.17
Number of Days to attrition	≥ 80%	78	169.49	35.61
	< 80%	21	181.00	0.00

Neither time to completion in calendar days nor time to attrition was statistically significant between the two scoring groups resulting in a failure to reject the null hypothesis. It should be noted that no subject who failed the e-skills test left the organization in the first six months as illustrated by the 181 day average.

Hypothesis 3

Research hypothesis. Trainees in offices with lower volumes of business will have faster training completion rates than trainees in offices with higher volumes of business.

Null hypothesis. There will be no significant differences in training completion rates based upon office volume of business.

Analysis. The initial variable of volume of business was an ordinal variable with categories from 0-6. This variable was later recoded so that the offices were designated as not profitable (categories 0-2), or profitable (categories 3-5). An independent samples *t*-test was conducted with 49 subjects in profitable offices and 43 subjects in not-profitable offices. Mean length of training was 120.59 days for the profitable offices and $M = 115.35$ in not-profitable offices. There were no statistically significant

differences in time to completion between subjects in profitable and not profitable offices resulting in a failure to reject the null hypothesis.

Hypothesis 4

Null hypothesis. There will be no significant differences in six month retention rates based upon the office business volume.

Analysis. It was anticipated that volume of business would not have an effect on time to attrition. In this analysis the original coding (0-6) was retained and a one-way ANOVA was run for number of days to attrition.

Table 6. *Descriptive Statistics for Days to Attrition by Volume of Business*

	Group	<i>N</i>	<i>M</i>	<i>SD</i>
Number of Days to attrition	0	7	166.29	38.93
	1	19	180.31	2.98
	2	19	176.21	20.87
	3	19	166.57	38.15
	4	12	167.50	46.76
	5	23	169.91	36.76
Total		99	171.92	31.92

Homogeneity of variance was not attained and there were no significant differences between the volume of business categories and time to attrition. Thus there was no need for any post-hoc analysis. The null hypothesis was retained as anticipated.

Hypothesis 5

Null hypothesis. There will be no significant differences in training completion times based upon the gender of the supervisor.

Analysis. A *t*-test for independent samples was run by gender of supervisor for the outcome variable of time to completion of training (length). Homogeneity of variance was not achieved for the sample ($p = .056$). While the mean difference for trainees of women supervisors ($n = 15$) was 125.4 days and male supervisors 116.73 days ($n = 77$), there was no statistically significant difference between the groups. As anticipated, the analysis resulted in failure to reject the null hypothesis.

Hypothesis 6

Research hypothesis. Trainees in male supervised offices will have higher retention rates at six months than trainees in female supervised offices.

Null hypothesis. There will be no significant difference in six month retention rates between male and female supervised offices.

Analysis. An independent samples *t*-test was run for number of days to attrition between those in female supervised offices ($n = 18$) and male supervised offices ($n = 81$). Levene's test for equality of variances was significant at the $p < .001$ level ($F = 16.986$). As indicated in the table, if equal variances were assumed, there would be significance for trainees with male supervisors staying longer than those with female supervisors.

Table 7. *Independent Samples t-test by Gender of Supervisor*

Number of Days to Attrition	<i>df</i>	<i>t</i>	<i>p</i>
Equal Variances Assumed	97	-2.26	.026
Equal Variances not Assumed	18.93	-1.50	.151

Trainees with female supervisors ($n = 18$) had $M = 156.89$ days to attrition while those with male supervisors ($n = 81$) had $M = 175.27$. The over-representation of leavers having female supervisors and the variable's approaching significance from the t -test indicated a need for additional analysis. Of the seven subjects who left the organization prior to training completion, three had female supervisors and four had male supervisors.

A chi-square analysis of leavers by gender was run under the null hypothesis that the row and column variables in a crosstab were independent. Row variable was gender of supervisor (male or female) while the column variable was retention code after six months (yes or no). The results of this analysis were $\chi^2 = (1, N = 99) = 4.59$, $p = .032$. Fisher's Exact Test was approaching significance with $p = .055$ ($df = 1$). Fisher's Exact Test is used when one or more expected cell counts are less than five in a chi-square analysis (SPSS, 2006). Results of this test illustrated that there may be a

relationship between whether or not a person stays as a trainee and the gender of her supervisor.

Measures of strength of association were also conducted during the chi-square analysis. The Goodman and Kruskal Tau statistics were significant at $p = .033$ ($df = 1$) based upon chi-square approximation. The analysis also yielded a Phi coefficient: $r_{\phi} = .215$, significant at $p = .032$ ($df = 1$) which shows a relationship between the two nominal variables. These statistics proxy for a correlation coefficient and vary in value from 0 to 1 to measure the degree of association, but not the direction (Kinnear & Gray, 2006, p. 382).

A relationship can be inferred between gender of supervisor and retention at six months based upon the chi-square statistics; however, the t -test results approaching significance, the Fisher's Exact test bordering on significance and the small sampling of female supervisors results in concern of a type I error.

It was hypothesized that branch administrator trainees would be more likely to stay in a male supervised office than a female supervised office. This hypothesis was based upon an assumption of the female supervisors being less tenured and more likely to not have previous experience supervising a branch administrator. The results of this analysis are interesting but inconclusive. The null hypothesis is rejected with the caveat that a larger sample size would increase confidence in the relationship.

Hypothesis 7

Research hypothesis. There are faster rates of training completion and greater six month retention rates among trainees born after 1967.

Null hypothesis. There are no significant differences between training completion and six month retention rates between trainees born before and trainees born after 1967.

Analysis. The age variable was split into a dichotomous variable for subjects 41 years of age or greater ($n = 49$) and those less than 41 years of age ($n = 50$). This age split was based upon whether the trainee was a baby boomer or under the age of a baby boomer. The assumption was that those of a later generation than the baby boomers would be more adept at e-learning since computers were part of their school culture and they were more likely to have encountered computer based learning. When running an independent samples t -test for length of training and days to attrition, there were no significant differences based upon the generational split in age resulting in a failure to reject the null hypothesis.

Table 8. *Descriptive Statistics for Outcome Variables by Age*

	Group	<i>N</i>	<i>M</i>	<i>SD</i>
Length of Training	≥ 41	45	118.84	44.98
	< 41	47	117.47	52.17
Number of Days to attrition	≥ 41	49	170.96	34.22
	< 41	50	172.88	29.81

Hypothesis 8

Research hypothesis. There are faster training completion times and greater six month retention rates based upon the amount of the trainees' previous financial experience.

Null hypothesis. There are no significant differences in training completion times and six month retention rates based upon the amount of the trainees' previous financial experience.

Analysis. The previous financial experience variable was recoded into a dichotomous variable of prior experience ($n = 52$) or no prior experience ($n = 47$). There were no significant differences for either outcome variable based upon an independent samples t -test resulting in the failure to reject the null hypothesis.

Table 9. *Descriptive Statistics for Outcome Variables by Previous Fin. Experience*

	Group	<i>N</i>	<i>M</i>	<i>SD</i>
Length of Training	No experience	44	119.16	48.65
	Prior experience	48	117.21	48.90
Number of Days to attrition	No experience	47	174.23	25.73
	Prior experience	52	169.85	36.77

Hypothesis 9

Research hypothesis. There are faster training completion times and greater six month retention rates based upon the trainee receiving local office support.

Null hypothesis. There will be no significant differences in training completion time and six month retention rates based upon trainee local support.

Analysis. Because the categories within the nominal variable of local support did not provide meaning in the initial data analysis, the variable was recoded into three categories: no local support, one type of local support and multiple methods of local support. A one-way ANOVA was run with the recoded local support variable resulting

in no significant differences among groups. The Levene Statistic for number of days to attrition showed that there was not homogeneity of variance ($p = .007$). Length of training attained homogeneity of variance even though the group with no support only had $n = 6$.

Table 10. *Descriptive Statistics for Length of Training by Local Support*

	Group	<i>N</i>	<i>M</i>	<i>SD</i>
Length of training	0 support	6	136.67	47.63
	1-support	46	117.04	47.19
	Many supports	40	116.63	50.76
Total		92	118.14	48.52

Table 11. *Descriptive Statistics for Days to Attrition by Local Support*

	Group	<i>N</i>	<i>M</i>	<i>SD</i>
Number of Days to attrition	0 support	7	157.85	61.23
	1-support	48	175.06	23.67
	Many supports	42	175.90	23.71
Total		97	174.18	27.75

The large differences between the no local support group from the other group means may be worth further exploration with a larger sample size. However, the current results indicate a failure to reject the null hypothesis for both outcome variables.

Hypothesis 10

Research hypothesis. There will be significantly different training completion times based upon trainees' geographical area.

Null hypothesis. There will be no significant differences in training completion times based upon trainees' geographical area.

Analysis. A one-way ANOVA was run with the 13 different areas as the factor and length of training as the dependent variable ($N = 92$). Seven subjects failed to complete training and were not included in this analysis. Results of the data analysis showed a range of subjects across the 13 areas from $n = 3$ to $n = 14$ for the subjects who completed their training, with a harmonic $n = 5.48$. Homogeneity of variance was assumed. However, there were no significant differences between groups. This analysis resulted in a failure to reject the null hypothesis.

Hypothesis 11

Null hypothesis. There will be no significant difference in trainee retention rates based upon trainees' geographical area.

Analysis. Results of the one-way ANOVA for the variable number of days to attrition indicated that there were unequal variances within the categories with a Levene statistic $p < .001$. All 99 subjects were included in this analysis with areas 3 ($n = 10$), 4 ($n = 10$), 6 ($n = 6$), 7 ($n = 5$), 9 ($n = 7$), 10 ($n = 4$) and 13 ($n = 3$) having no attrition. Robust tests for equality of means could not be determined due to 0 variance in these groups.

Although geographical area appeared to be a good variable for measuring group differences within the dependent variables, the unequal class sizes and small variance

for the attrition variable proved it to be of little use in this analysis. This variable was abandoned for further contribution to the regression analysis. It is still viewed as a possible contributor to the prediction of the outcome variables in future research, but current limitations cause it to be discarded.

The results from this analysis are inconclusive due to lack of variance and a low n. The null hypothesis failed to be rejected.

Regression Analysis

Although there was only one variable with possible significance from initial data analysis, it was determined that the regression analysis should be conducted in the event that any interaction effects might be predictors of time to training completion or attrition. Multiple regression was chosen for modeling the length of training outcome variable because it was continuous and had a large n ($N = 92$). The days to attrition variable had very small variance due to only nine trainees leaving. A logistic regression was chosen for the attrition variable to avoid worries about data normality and to determine if one could predict whether or not a subject was likely to leave the organization during training.

Multiple Regression

Theoretical foundations are critical in using multiple regression analysis appropriately (Cohen, Cohen, West & Aiken, 2003). The underlying theory of this study was that those who trained via e-learning in a socially supportive environment would be more likely to complete training faster than those not in a socially supportive environment. Had there been any correlations between variables, a hierarchical regression model would have been used to support the underlying theory of e-learning

in a social framework. However, given the lack of significant correlations in the initial data analysis and hypothesis testing, the selected variables were entered as a block for statistical analysis. The regression model entered the following variables: Treatment group (control-facilitated contrast), local support (no supports with many supports contrasted), gender of supervisor, trainee age in 2007, previous financial experience in months, e-skills test score and profitability of the office (as a dichotomous variable). The regression analysis showed no significant intercorrelations and had an $R^2 = .046$. There was no significance to this model or the interactions within it.

Table 12. *Summary of Multiple Regression Analysis for Length of Training (N = 92)*

Model	<i>B</i>	<i>SE B</i>	β
(Constant)	87.98	59.05	
Gender Sup.	-8.14	14.61	-.062
Age in 2007	0.19	0.48	.045
Prev. exp.	-.12	0.09	-.144
Profitable	3.60	10.92	.037
Treatment	6.41	6.54	.109
E-skills score	0.39	0.61	.071
Local sup.	- 3.91	9.02	-.049

The regression analysis failed to predict a model for length of training for branch administrator trainees. The model was in agreement with the individual hypothesis testing performed in the earlier analysis.

Logistic Regression

A logistic regression model is used when the outcome variable is dichotomous. It is used when the assumptions of linearity (Ordinary Least Squares) do not apply to a regression analysis either because the data is skewed or the variables are categorical resulting in counts instead of continuous measures. Rather than a normal distribution, logistic regression uses a binomial distribution. The logistic regression coefficients estimate the odds ratio for each of the independent variables entered into the model. The model predicts the probability within a population of an individual becoming or not becoming a case (Cohen, Cohen, West & Aiken, 2003, pp. 479-486).

Tabachnick and Fidell (2001) indicate that logistic regression is a good model when using different types of predictor variables. In this case, continuous and categorical variables were used in building a predictive model. The logistic regression attempted to predict the probability of a subject staying or not staying in the position of branch administrator trainee at six months of tenure.

From the initial data analysis it was observed that the gender of supervisor variable in the hypothesis testing was approaching significance in its relationship to the attrition outcome variable. That dichotomous independent variable, along with a dichotomous profitability variable and previous experience variable and continuous variables of e-skills test score and trainee age in 2007 were entered into the logistic regression equation. The continuous outcome variable of days to attrition was recoded as retained after six months where 0 = the subject was retained and 1 = the subject left employment. The logistic regression model predicts the probability of the outcome

variable being a case instead of a predicted score as you would find in a multiple regression model (Cohen, Cohen, West & Aiken, 2003, p. 437).

Of the 99 subjects enrolled in the study, 90 were retained after six months. Nine subjects left the organization, illustrating a 90.9% retention rate of subjects in the study. The variables chosen for this equation were entered in a block process in one step.

Table 13. *Summary of Logistic Regression Analysis for Retention (N = 99)*

	<i>B</i>	<i>SE</i>	Wald	Sig.	β
Profitability	-.456	.764	.356	.551	.634
Gender sup.	-1.610	.794	4.116	.042*	.200
Prev. exp.	.006	.007	.739	.390	1.006
E-skills score	-.061	.056	1.181	.277	.941
Age	-.018	.033	.307	.579	.982
(Constant)	8.020	5.353	2.244	.134	3040

Because the Wald statistic for gender of supervisor is significant with $p = .042$, this variable may be useful in predicting retention. The $\text{Exp}(B)$ represents the predicted change in odds for a unit increase in the predictor. When the $\text{Exp}(B) < 1$, as the variable increases, the odds of the outcome (retention) occurring decreases (SPSS, 2006). In this model it is interpreted that a subject with a male supervisor is more likely to stay in the organization within the first six months than a subject with a female supervisor. At each step, this is a goodness of fit test with the null hypothesis.

Table 14. *Omnibus Tests of Logistic Regression Model Coefficient*

Step1	Chi-square	<i>df</i>	Sig.
Step	5.992	5	.307
Block	5.992	5	.307
Model	5.992	5	.307

The large significance level indicates that the null hypothesis cannot be rejected for this model.

Although the logistic regression model does not predict attrition, it does reinforce the findings in hypothesis six that there may be a relationship between gender of supervisor and likelihood of a trainee to stay or leave the organization. In this analysis, trainees with a female supervisor appeared more likely to leave the organization than those with a male supervisor. In doing a case analysis of the nine subjects who left the study, four of the nine had female supervisors, showing an over-representation of subjects with female supervisors leaving, since only 18% of the supervisors in the sample were female.

Case Analysis

The lack of statistical significance in the regression analyses was disappointing, however, not necessarily without meaning. A view of the cases of leavers was in order given the small number ($n = 9$), to look at similarities among those who did leave the organization.

Case by Case Analysis of Leavers

Table 15 illustrates case summaries for the nine subjects who left the organization. Cases were sorted by gender, volume of business, local support, treatment group and previous experience (0 = none)

Table 15. *Case Analysis of Subjects Who Left by Six Months (n = 9)*

		Vol. of business	Local support	Treatment group	Previous financial experience
Gender	Female	1	1	Control	Yes
		2	1	Control	Yes
		3	1	Facilitated	Yes
		4	0	Facilitated	Yes
Total N		4	4	4	4
	Male	1	--	Coaching	No
		2	1	Coaching	No
		3	--	Coaching	Yes
		4	Many	Control	No
		5	Many	Facilitated	No
Total N		3	5	5	5
Total N			7	9	9

Corporate support type (treatment) was distributed equally among the three different treatment groups for those who left: control ($n = 3$), coaching ($n = 3$) and facilitated ($n = 3$). Local support types varied from one person with no local support, three with one type of support, two with many supports and two with missing values. Three of the leavers had no previous financial experience while four had three or more years of previous financial experience. Five of the nine offices from which the subjects left were profitable. Other than the gender of supervisor, there were no apparent variables that stood out among those who left, especially in relation to the underlying social framework of this study.

Comparison of Aggregate Data

The company supplied aggregate data for all full and part-time trainees who enrolled in training during calendar year 2007 ($N = 1828$). The population was divided into two cohorts: prior to the support team being trained in the new andragogical approach ($n = 1046$) during the period of January 1, 2007 through July 31, 2007; and after the support team was trained in the andragogical approach from August 1, 2007 through December 31, 2007 ($n = 782$). These two groups will be referred to as the pre and post intervention groups.

The aggregate six month attrition rate for all trainees in the pre-intervention group, both full and part-time, male and female was 13.2% (138 leavers/1046 total). This number was based upon the formula of termination or six month anniversary date minus the enrollment date.

Those trainees participating in the study had a six month attrition rate of 9.1%. All trainees in the post-intervention group ($n = 782$), including the study participants,

showed a six month attrition rate of 11.6% (91 leavers/782 total sample). This cohort, whether in the study or not, was exposed to the support team having been trained in andragogical methods.

The six month leavers in the pre-intervention group ($n = 138$) were compared to the leavers in the post-intervention group ($n = 91$) for days to attrition during the first six months. The maximum number for days to attrition was 180. Anyone staying beyond 180 days was considered a stayer and given the variable value = 181. Cases for comparison were selected only for those who left prior to their six month anniversary. An independent samples t -test was conducted comparing the pre-intervention group to the post-intervention group on days to attrition. Homogeneity of variance was achieved with significance also achieved ($t = 2.042, p = .042$). The results of this analysis indicate a significant difference in mean time to attrition between the pre and post intervention groups.

Table 16. *Pre and Post Intervention Groups for Outcome Variable Days to Attrition*

Days to attrition	<i>N</i>	<i>M</i>	<i>SD</i>
Pre-intervention	138	82.34	51.57
Post-intervention	91	67.97	52.93

The mean calendar days to attrition within the first six months for those in the pre-intervention cohort was 82.34 days. Those in the post-intervention cohort who left in the first six months left at an average of 67.97 days. The significance of these findings are that those exposed to the support team intervention left faster than those

who were not exposed to the intervention. This may have been a result of the conversations that took place around job fit and issues relating to metacognitive learning with the support specialist post-intervention. For employees who are going to leave in the first six months, it is better for the company if they make the decision to leave sooner as opposed to later. These findings have financial significance to the company in that training is expensive. If trainees realize that they are going to leave a job earlier, this will reduce cost of turnover.

Summary

This chapter looked at the 11 hypotheses proposed for the study and tested each for significance using either an independent samples *t*-test or one-way Analysis of Variance. In all hypotheses, the null hypotheses failed to be rejected. Although there were no significant correlations to indicate relationships among the variables, a multiple regression analysis was run for the outcome variable of length of training. A logistic regression was run on the variable of retention at six months. Although the logistic regression analysis illustrated the variable of supervisor gender as significant, there was failure in developing a predictive model for retention using the dichotomous and continuous independent variables.

Although results showed no significance, the company reported aggregate data inferred that the training of the support team had an effect on time to six month attrition for those trainees who entered the company after the training intervention. An independent samples *t*-test for trainees who left pre and post support team training showed a significant difference in days to attrition between these groups ($p = .042$). Further data collection and analysis needs to be monitored over time to determine if the

training intervention is related to attrition or if the pre and post-intervention differences in attrition were due to environmental conditions at that time.

CHAPTER 5--DISCUSSION

The purpose of this study was to see if different variables influenced trainee completion time and retention at six months of employment for new female branch administrators in a financial services company. The independent treatment variable, corporate support, was developed and implemented according to andragogical principles of learning so the subjects would be supported under three different social conditions: reactive, coaching or facilitated.

Local support was also identified as a treatment variable although the principal investigator had no controls on this variable due to regional and site specific circumstances. A number of demographic variables and an obtained test score were also hypothesized as affecting time to completion of training and retention at six months. Although there were no significant relationships between independent and outcome variables, there was still valuable information culled from this study.

Variables

Expected Outcomes

Research hypotheses #4: there will be no differences in six month retention rates based upon the office business volume; and #5: there will be no differences in training completion times based upon the gender of the supervisor were anticipated not to reject the null hypotheses. Both assumed that the underlying theoretical framework of social interaction would not affect the targeted outcome variables. Previous research by the company of the branch administrator did not find business volume as an influence on retention, and as posed in the hypothesis, was not expected to affect the outcome variable of retention at six months. Hypothesis #5 posed that supervisor

gender would not affect time to completion. This was also validated in the course of this study.

Future research can ignore the variable of business volume since it has repeatedly shown over time that there are no relationships to training time or employee retention rates. Gender of supervisor is not a variable that has been studied much by the company, since historically there have been few women in this particular supervisory position. As the number of women in the branch supervisor role increases, the company should review how supervisor gender may affect variables such as training completion time.

Unexpected Outcomes

Although many of the research hypotheses were stated as expecting significance, there were three distinct tests that surprised the principal investigator due to the counter-intuitiveness of the results. These results were for the variables preliminary test score, previous financial experience and age.

Preliminary Test Score

Hypothesis #2 stated: Trainees with test scores of 80% or greater will have faster training completion times and greater six month retention rates than those scoring lower than 80%. The cut-off score of 80% was chosen since this was the pass cut-off for the essential skills exam. It was thought that those failing this first testing milestone would require more time to finish training. This test score also provided the first major piece of feedback to the learner in terms of measurable performance. It was thought that trainees failing at this point may re-evaluate their position to determine whether or not

they were right for the job and make a determination to stay or leave. A failing grade can be demoralizing and has shown to contribute to course attrition.

The lack of relationship between the test score and outcome variables was not as surprising as the fact that none of the nine leavers in the study failed the essential skills test. Although three of the nine subjects left the organization prior to completing the test, it was surprising to see that all the subjects who failed the test continued on to the final exam and promotion at six months. Considerations for this outcome may have been the relationship of the subject with her support specialist and the type of support provided at the local level. The support specialist role was to provide corrective feedback in a supportive manner and to use the principles of andragogy for the learner to take responsibility for her own learning (Knowles, 1996). Using the adult learning techniques provided through training, the support team would have given advice for overcoming obstacles presented to the learner and would not have encouraged a trainee to leave this early in the training.

Previous Financial Experience

When hiring a new employee, past experience is the best predictor of future performance. The finding that there was no difference between subjects with previous and no financial experience was not only surprising, but also has major hiring considerations for the future. Although almost ½ of the subjects (47%) did not have previous experience in the financial sector, results illustrate that past financial experience is not a key decision factor for many supervisors. Yet one would expect that someone with previous financial experience working in a financial industry would take less time to complete training. There was no significant difference between the groups

with those having previous experience taking an average of 117.21 calendar days to complete training while those with no previous financial experience taking on average 119.16 calendar days.

There was also no difference between the leavers as to whether or not they had previous financial experience. Of the nine subjects who left the organization by six months, five of the nine had previous financial experience while the other four did not. An interesting observation was that of the four leavers with female supervisors, all had previous financial experience, while of those with male supervisors, four of the five leavers had no previous financial experience.

Perhaps the lack of difference between those with and without previous financial experience could be attributed to the training as an equalizing factor. The training was highly structured and consistent across all trainees, regardless of the treatment. Expectations were set and support systems were put in place for the learners to access, although type of support varied by location and treatment group. Previous research has shown that a sense of structure and security is a high priority for e-learners (Ausburn, 2004). All learners were new to the organization, and although they may have come with previous knowledge of the industry, the application of that knowledge in the context of the organization's culture, systems and tools may have not provided any advantage.

Previous financial experience does not serve as a predictor for either retention or training time. This is an important finding in that letting go of false assumptions about past financial experience may open up a different and better recruitment pool for the supervisors, thereby increasing retention. A current study conducted by the

company is looking at the relationship between previous financial experience and supervisor performance ratings. Initial data analysis has shown no significant difference in performance ratings between new branch administrators who do or do not have previous financial experience.

Age

Much has been published in the popular literature about generational differences and the digital divide. Given that those born after 1980 have grown up in a mostly digital world, it was anticipated that the younger trainees would have previous digital experience and therefore, complete their e-learning training more quickly than those of the baby boomer generation. The subjects were divided as to baby-boomers and post baby-boomers, with the age of 41 as the dividing line (birth date in 1967). Historical reporting by the company included problems with new trainees, typically older ones, lacking in computer skills. This problem may have resolved itself over time as more people own or work with personal computers. An earlier pilot test by the company indicated no difference in e-skills test scores between those who did and did not have previous e-learning experience. Lack of differences could be attributed to a number of reasons including the support at both the corporate and local levels, as well as better screening of potential branch administrators for appropriate computer skills.

Gender of Supervisor

Hypothesis #6 poses additional questions. The research hypothesis was that there would be a difference in attrition between trainees in male and female supervised offices. This prediction was based upon the relatively low number of women

supervisors and their concomitant lack of tenure. It was the lack of experience that prompted an expectation of higher attrition among this group. Although gender of supervisor was approaching significance in the *t*-test and chi-square test and was significant in the logistic regression for predicting probability of attrition, it had no effect on length of training. Supervisor of gender should be studied further with a larger sample size since this variable could not definitively infer differences between men and women from the analyses. In addition, these results pose some interesting questions about how women as a minority in a profession are onboarded and taught how to supervise others. Are they treated in the same manner as the men, or are there differences in approaches to women who are a minority within an industry?

Research from Furst-Bowe and Dittmann (2001) and Rovai (2001) indicate that women have a greater social need in their e-learning than men. Since some of the supervisory training for branch supervisors is online, perhaps the company should analyze how it is supporting the needs of its growing number of women branch supervisors. Since this position has historically been male dominant with the training based upon male target populations, considerations for alternative learning styles may be needed to better train the emerging female population in this role.

Significance of Findings to the Company

Although none of the research hypotheses proved to be statistically significant, there are results that have corporate significance. The study itself established a new training approach that has shown greater adoption and satisfaction from the support team as noted in the level three evaluation and with inference that the support team training had a positive effect on trainee retention as noted by the lower attrition

between the pre and post intervention groups in the total population. Although environmental factors such as the economy, labor markets and even a Hawthorne effect could have influenced the increased retention from prior to implementing the andragogical support model, this data does establish some baselines and allows for continued observations of the effect of a social framework on trainees.

The support team identified best practices within the treatment models and adopted a hybrid approach of conference calling, coaching and reactive contacts for supporting e-learning beginning in January, 2008. Length of training declined from an average of 124 days pre-intervention to 118 days post-intervention within the study. This was further reduced to $M = 90$ days with a new curriculum and hybrid support model beginning in January, 2008. Other interventions within the organization such as supervisor training, changes in management at the corporate office and new approaches to recruiting the branch administrators may have contributed to a shorter training time post-study.

Impact Measure

This study established retention as an impact measure. It will continue to be used as new interventions are introduced in an effort to improve retention for the branch administrator position. Days to attrition has been defined as termination date – hire date in calendar days. This data can illustrate when branch administrators are leaving so appropriate interventions can be provided. For example, leaving within the first three months is typically attributed to poor selection and requires intervention at the hiring stage (Corporate Leadership Council, 2005).

With aggregate data pre and post intervention collected for 2007, the company will continue to measure retention as it moves forward with additional interventions related to training, recruitment and onboarding. Not only has this study provided baseline data for the company, it has allowed for a common measurement that is well understood across the organization. Valid measurements will continue to be produced because of this study and these measures will be used in longitudinal analyses.

Kirkpatrick (1998, p. 61) identified six guidelines to follow when measuring training impact. This study used four of the six guidelines: Use a control group; allow time to achieve results; measure pre and post intervention and be satisfied with evidence if you cannot prove a point. Given the importance of impact measures, but the lack of implementation (O'Leonard, 2008) this study can be considered a valid example for measuring level four training impact. The company would conclude that there was a positive impact from the new training support model.

Aggregate Data

Although there was no significant difference in retention between pre and post intervention groups, there was a significant difference in number of days to attrition. The trainees in the pre-intervention cohort who left in the first six months left after an average of $M = 82$ days. Those in the post-intervention cohort left after an average of $M = 68$ days. The mean differences were statistically significant at $p = .042$. Changes in training and onboarding as a result of the study could have influenced the decision to leave sooner for those in the post-intervention group. The role of the support person as coach and the use of adult learning techniques such as self-direction and reflection may have influenced the trainee to evaluate the work situation sooner.

Theoretical Framework

The underlying social framework theoretical model proved not to support a predictive model for retention or length of training. The three treatment groups: control, coaching and facilitated were not correlated with any of the other independent variables. There are a number of explanations as to why the data did not support the theoretical framework. The following discussion lists some considerations as to why social framework did not appear to make a difference in time to completion of training or attrition in this study.

Sample Size

Based upon the size of the population and the Power desired for the analyses, a sample of 105 trainees was proposed. Due to time logistics, the study had to be limited to the 99 enrollees as of October 31, 2007, because the conditions for new trainees were in the process of changing. Although the initial sample size of 99 appeared to be a large enough sample for the treatment variable, when combining it into a regression analysis with categorical variables having a large number of classes, inconclusive results arose due to the small number of subjects within individual cells for various analyses. A larger sample size may have yielded valid chi-square values for the geographic region categorical variable in particular. This variable has been shown to have an effect on supervisor attrition and may have showed similar patterns for branch administrators had there been a stratification of the sample by area.

Invalid Assumptions Due to Lack of Previous Research

Since e-learning is a relatively new approach to corporate training, little prior experimental research about the subject has been published. Macpherson, Elliot, Harris

and Homan (2004) noted in their research a lack of impact studies on e-learning in corporate settings. O'Leonard (2008) reported the importance of impact measures to corporations, but the lack of implementation of such measures. The vast majority of research in e-learning in corporations and education has been survey based.

The literature review overall supported interactivity within e-learning; however, a more recent literature review by Battalio (2007) indicates that interactivity in some forms may hinder the e-learner. Depending upon learning styles, interactivity may get in the way of reflective learning and take the focused self-directed learner away from the pursuit of the need to know.

The theoretical construct for this study was based primarily upon e-learning studies in academic settings. Academic settings typically use Blackboard™ or Web CT™ as the delivery platforms which allow for threaded discussions and collaborative activities. The highly regulated nature of the financial industry and lack of an LMS (Learning Management System) at the time of this study limited trainee interactions to phone conferences, one-on-one calls or written messages. Only the facilitated group had a peer learning cohort. Local supports were provided to specific individuals within each treatment group but were difficult to define in terms of quality or quantity. Learners were not allowed to self-direct their treatment and were relegated to a model that might have been at odds with their individual learning styles. Indeed, some of the feedback from the coaching calls were that they were not necessary for certain learners, while they were highly desirable for others.

Trainer Bias

The support staff was provided the same training and began implementing that training at the same time, albeit in two different groupings. Although there were to be separate types of interventions for the three treatment groups, the learning that took place among the support team was probably used unintentionally with the control group. The level three evaluation showed a high adoption rate for many of the adult learning principles. The trainers may have showed a greater interest toward study participants.

Participants in all groups thought they were receiving special treatment as part of signing up for the study, even those in the control group. Therefore, the control group may have been exposed to treatment by the trainers themselves or a Hawthorne effect occurred where they believed they were getting special treatment. This would account for any lack of differences among the three treatment groups. A better model would have been to have dedicated trainers to a treatment rather than all trainers supporting all three treatment groups. This alternative approach was not practical for the nature of the work flow in this corporate environment and would have been extremely disruptive to the day-to-day operations. The opportunity to conduct experimental designs in a corporate context is extremely limited due to the inability to tightly control the environment.

Observations from the Analyses

Although statistical significance was not achieved, there were some interesting observations that should be noted. Some of these observations may be helpful in reviewing the current training state and observing whether these measures persist over

time or need to be reviewed. For example, the company has consistently stated through the years that they were unable to find a relationship between volume of business and attrition of the branch administrator. This was validated through the logistic regression where there were no differences in retention based upon whether or not the office was profitable.

Dependent Variable Time to Completion of Training

Although there were no statistically significant differences in training time to completion among the three treatment groups, the means were different in that it took much longer for the facilitated group to complete training than the control group. Training completion time is important in a corporate environment because until the trainee is competent in performing, he/she cannot fully contribute to the organization. Training can be calculated in costs and thus a reduction of time to mastery in training is desired. However, this analysis did not measure training mastery, but time to training completion. Since the final exam did not test mastery, one cannot deduce a relationship. The results of this analysis showed that there may be an optimal time period for training completion where the trainee moves through the training at an adequate pace allowing for proper integration of learned material. The control group mean of 112.35 days was on the low side, while the facilitated group mean of 127.65 days was on the high side. The real value is probably reflected in the mean of the three groups where $M = 118.14$ calendar days. When setting expectations for training completion time, informing the learners and supervisors of average time to completion may reduce the variance.

Dependent Variable Retention at Six Months

Because of the high cost of recruiting and training new branch administrators, any reduction in attrition is considered a positive outcome. The six month attrition was not statistically significant in the study sample from the aggregate population. However, the six month attrition of the aggregate population decreased from 13.2% for the pre-intervention group to 11.6% with the post intervention group. A 1.6% reduction in turnover of the entire 2007 population would save 29 positions. With a conservative cost of turnover metric of one times the branch administrator annual salary, continued work on reducing this metric could result in large cost savings for the company.

Analysis of Leavers

Of the nine people who left the organization, seven left prior to completing their training. Early attrition is generally attributable to poor selection or onboarding. Since the attrition pattern declined for those who finished training, the inference can be made that expectations about the position had not been met for the seven early leavers. This problem is being addressed in a number of ways including development of a more realistic job preview and more in-depth discussion about the training during the interview process.

Although there was no patterning to the local support variable, it is interesting to note that the majority of the leavers reported one or more local supports in place. The local support variable should be given more attention in that the lack of significance of some of the selected independent variables may have had to do with the way those variables were defined for this study. Local supports should be re-defined and studied further since they do vary by region. Finding the optimal mix of number and types of

supports would assist the company in better identifying additional interventions to solve the attrition problem.

Recommendations for Practice and Further Research

Implications for further research and practice are based upon the outcomes of this study. Although most of these recommendations may be limited to the company itself, some recommendations are generalizable to other corporations and post-secondary institutions.

The support team's training in andragogy had a positive behavioral effect on the support of branch administrator trainees. The support team was more satisfied and felt better equipped to work with the trainees as noted in the level three evaluation. Continued training in andragogical approaches and specifically in reflective learning would benefit both trainers and branch administrators in providing appropriate support to meet individual adult learning needs.

Impact measures such as retention should continue to be monitored longitudinally as new interventions are introduced in an effort to curb attrition. This is a fairly easy impact measure to capture and can be generalized broadly across industries.

Gender of supervisor is a variable that requires further research and exploration. This position was an historically male role and currently has a female population of approximately 15%. It can be assumed that as women enter traditionally male roles, they may require a different type of training and support. Since this is a phenomenon not unique to this organization, and research suggests that women learn differently from men, corporations should be aware of this variable and whether or not it is having an impact on employee retention.

Geographic area often plays an important role in trainee success because of the local leadership, culture and support systems. The sample size in this study was too small to draw any conclusions about geographic influence. Because this is a variable that is important to dispersed training audiences, it should be further studied both within the study company as well as in other multi-national companies. Future research should include not only a larger sample size, but also stratified sampling by geographic area in order to compare differences by location.

Local support was not well operationalized for the purpose of this study. Further research into the types and amounts of local supports that are being used may help not only this company, but other companies facing the same type of geographic dispersion. The literature review identified the importance of social interaction and cohorts in building better e-learning, especially for women. This company is exploring local supports that can be put into place in order to affect both training time and retention. A mentoring model currently being piloted should be studied along with other supports such as those offices having multiple branch administrators and the level of engagement of the supervisor in the branch administrator's training.

The mixed results from the literature and this study, of a theoretical framework around e-learning, illustrates a need for continued research on theoretical foundations in e-learning. A future study comparing e-learners taught under different theoretical frameworks may shed further light on whether or not it is a necessary construct when building and supporting e-learning. Although good instructional design typically adopts some type of teaching or learning philosophy, a comparative approach would contribute to this ongoing discussion.

Further research into adult learning styles in e-learning is necessary to build the knowledge base. Many researchers believe that learning style is platform independent, however, this researcher believes that students in an online class may not be given the opportunities to use preferred styles because of the nature of the platform. Further research into adult learning styles used in online training will help instructional designers develop training that better meets their adult learners' needs.

These recommendations are not all encompassing but represent the scope of this study. This study represents a snapshot of one company over one time horizon. During that time, major changes have taken place in the e-learning environment including use of rapid e-learning development tools, greater use of streaming video, greater adoption of Learning Management Systems in the corporate world, including within the study company, and broader use of webcasts and teleconferencing for just-in-time learning. Although this research appeared to be cutting edge at the proposal stage, as time went on, the technology being used became old. The bridging of the technology to good teaching and learning practices continues to be a challenge.

Ongoing research that is quickly published is important to the growth of this discipline. Research cannot wait a year for publication in a journal, since in that period the technology may become obsolete. Although this research study cannot be broadly generalized, it does add to the body of knowledge about e-learning in corporate settings and the importance of adult learning principles in meeting individual learner needs, regardless of platform.

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APPENDIX A

Support Specialist Training Documentation

Course Objectives

Discuss your evolving role as a support specialist

Apply six principles of adult learning

Identify three models for supporting e-learners

Demonstrate ways of establishing rapport with your trainees

State performance expectations to trainees

Demonstrate effective feedback strategies

Demonstrate active listening

Demonstrate coaching strategies

Demonstrate reflective teaching and learning

Course Outline

The role of the support specialist (.75 hours)

Adult learning principles (2 hours)

Feedback (1.5 hours)

Listening (1.75 hours)

Coaching (2.75 hours)

Reflective learning (3.5 hours)

Call guide development and practice (1.75 hours)

APPENDIX B

Call Guide

Enrollment Call #1

The purpose of this call is to enroll the trainee in e-skills, set expectations and get him/her started on the training modules.

Welcome and introduce self

Walk through e-skills curriculum. Look at timeline as tool to use through training

Touch point calls

e-skills test

3 months

Final (or 5 months if necessary)

Time block (5-10 hours/week)

Invitation to enter pilot (optional—see next page)

Direct to pilot page on web site

Answer questions including benefits of participating

Call if have questions about training

You will receive a call from me next

After e-skills (if not in pilot)

After we receive your fax if enrolling in pilot

Enrollment Call #2--Invitation to Participate in Pilot For All Eligible Trainees

The purpose of this call is to explain the support team pilot to new eligible trainees.

Explain purpose of pilot: "to identify best forms of learner support for new trainees."

Volunteers for this pilot may qualify for additional training support along with the support already provided to all trainees.

Ask if might be interested and direct to pilot page. If not interested, thank trainee and complete enrollment.

If interested direct to pilot page on web site.

Print out pdf. If interested, sign and fax forms per cover page instructions.

After we receive fax, you will be called to go over your training plan.

Any questions? Call or message.

Pilot Group #1—Control Group

Thank trainee for willingness to participate in pilot.

Explain that he/she is assigned to pilot group that will receive the following training support:

3-4 touch point calls, generally

Completion of e-skills

Three months

Completion of final exam.

Trainees may call any time for training assistance. If it's a short question, talk to the person on the phone. If it's something in depth and you need to talk to me, leave a message and I'll get back to you.

For help with a specific transaction, contact the designated support area.

Review your timeline with your supervisor to determine what strategy will work best for your office.

Pilot Group #2—Coaching Group

Thank trainee for willingness to participate in pilot.

Explain that he/she is assigned to pilot group that will receive the following training support:

3-4 touch point calls, generally

Completion of e-skills

Three months

Completion of final exam

Six scheduled coaching calls on the following topics

- Building support and expectations
- Recognizing challenges and opportunities to your training
- Setting training goals
- Applying what you learned
- Reflecting on your branch experience
- Evaluating your training experience

Trainees can call any time for training assistance. If it's a short question, talk to the person on the phone. If it's something in depth and you need to talk to me, leave a message and I'll get back to you. For help with a specific transaction, contact the designated support area.

Schedule the weekly call and instruct trainee to make it a "to do" in calendar. Schedule for ½ hour. Review your timeline with your supervisor to determine what strategy will work best for your office.

Pilot Group #3—Facilitated Group

Thank trainee for willingness to participate in pilot.

Explain that he/she is assigned to pilot group that will receive the following training support:

3-4 touch point calls, generally

Completion of e-skills

Three months

Completion of final exam.

Six scheduled one-hour conference calls with other trainees on the phone about the following topics:

- Building support and expectations
- Recognizing challenges and opportunities to your training
- Setting training goals
- Applying what you learned
- Reflecting on your branch experience
- Evaluating your training experience

Inform learner of time and day of scheduled call group and assigned facilitator.

Walk her through scheduling it on calendar. Provide instructions for time and dates of call, how to dial into the conference call and instruct to put this information into calendar. Call at scheduled time (correct time zone). Dial in the pass code.

The dial-in instructions and schedule will be posted on the pilot web site one week before your first call. Trainees can call any time for training assistance. If it's a short question, talk to the person on the phone. If it's something in depth and you need

to talk to me, leave a message and I'll get back to you. For help with a specific transaction, contact the designated support area.

Review your timeline with your supervisor to determine what strategy will work best for your office.

Agenda for Coaching and Conference Calls

Call #1--Building supportive relationships and training expectations

Call #2--Challenges and opportunities during training

Call #3--Goal setting

Call #4--Applying your training

Call #5--Reflecting on your branch experience

Call #6--Evaluating the training experience

Coaching/Facilitated Call #1-Building Supportive Relationships and Training Expectations

The purpose of this call is to prepare the trainee for learning in a coached or facilitated environment through identifying supports and expectations.

Start the call with introductions. Be sure to also introduce yourself and your background:

Name

Location

Volume number (if known)

When began working

What you did before coming to this position

Guiding Questions

Different people like to learn differently. In what specific ways do you learn best?

Describe a place you worked before coming here. What training or skills do you bring from that experience to that of a trainee?

Have you ever taken an online course before? Describe what the experience was like.

Any concerns about online learning?

We pride ourselves on our unique business model for superior client service. How do you feel about this model? How is this different from prior work situations and specifically your previous training experiences?

What expectations do you have about your training and about being a trainee?

Describe the type of training you had at your last job. How does it differ from your current training? Are the training expectations clear?

Have you ever been in a position before where you had to take tests as part of training?

How do you feel about the testing requirements? What strategies have you used in the past to help you test?

Have you had a discussion yet with your supervisor? Did he/she discuss expectations around your performance and training? Are the messages from corporate office and supervisor the same? If no, what mixed messages are you getting?

Although most of you are in a one administrator office, you may have already discovered resources both in and outside your office to assist you in your learning. What resources have you tapped into?

Have you started having weekly meetings with your supervisor? If yes, how did these meetings help you in supporting your job performance? If no, how can you approach your supervisor to set up weekly meetings?

Has your supervisor allowed you to block time during the week to do your training? For those who did, how are you able to balance this with the demands of the job? If no, how can you approach your supervisor to do this?

How have the different topical support areas helped you during your first few weeks? Provide examples.

Have you used the calendar to help with your training schedule? Can you share an example that was helpful?

Looking back on your first week of work, how comfortable are you today compared to then?

Has this call helped improve your comfort level at all? If no, what can we do to help improve this call and your comfort?

We recommend that you start creating your own learning log. This is something that you can put together yourself any way that is most helpful to you. It can be a useful tool to help you look back on your training and reflect on learning. Keep it short, and write down key lessons, aha's, challenges and successes. Do not use it to take notes on the modules.

Thank everyone for participating and let them know next week the topic to be discussed will be Challenges and Opportunities during training.

Call #2-Challenges and opportunities during training

Purpose: The purpose of this call is to discuss training progress and identify strategies for success and overcoming obstacles.

Guiding Questions

First let's think about how learning is going.

Talk about a success you've had with learning something new in your branch or in the training? How did you feel about the success? Who informed you that you were successful (self, other branch administrator, supervisor?)

Talk about a challenge or opportunity in learning specific information/task about which you had concerns. Are there steps we could share going forward?

What obstacles are you facing in progressing in your training? What ideas can you propose to overcome these obstacles (talk to supervisor, support specialist, pose questions at meetings)?

Think about the different resources you've used for problem solving over the past few weeks.

Let's focus for a few moments on the different resources available. Share the resources you've been able to use? Give an example where topical support has helped you through a task or problem. How did you feel after the conversation (that you learned something, worried, uncertain)?

Discuss some of the challenges or opportunities about the different resources available.

How does the intranet help all of us daily?

Go back to the learning log we suggested you use during our first call.

Thinking back from your first entry to today, have you learned anything new about your learning style or approach to learning?

Let's talk about a challenge that we can change into an opportunity? Can you give an example of something that went wrong at the branch or in training and how you might approach it if it were to happen again?

Reflect back on last week's call about your comfort level. Where are you today compared to last week (worse, same, better)?

Call #3-Goal Setting

The purpose of this call is to set goals for completion of training and identify self-development goals for the trainee to think about once she finishes Basic Training.

Guiding Questions

Tell me how you've been using the Timeline for monitoring your training. Has anything in particular been helpful in keeping you on track? If not, what might we add to this timeline to help you?

Have you set any specific goals for reaching your milestones? If yes, please discuss. If no, can we work together to set some realistic goals to help you move forward.

Looking at the topical areas, which ones have you been most involved with on-the-job?

Set those for completion first since you will get the most practice doing those tasks.

Are there particular topics you are struggling with? Why do you think this is happening?

What strategies can we employ to get you past roadblocks?

Let's set an achievable goal for you to reach between now and our next call. What is that goal? What resources will you require to meet that goal? How will you know you are successful?

Has your supervisor shared the branch business plan with you? The business plan shows the target goals and may give you insight into why you are learning what you are and how to align your goals with your supervisor.

Some supervisors prefer not to share their business plans with their trainees. If this is your situation, how might you get your supervisor to share his/her main goals (ask what's highest priority, discuss which part of business he/she is focusing on building, ask what he/she sees as your major contributions to the branch)?

Have you set any goals with your supervisor in how you play a part in building the business? Let's brainstorm what you do to add value to the business. Be sure to bring these discussions to your supervisor when the opportunity arises.

Have you thought about what life will be like after you finish training? What professional goals, if any, have you set or thought about in terms of your career here?

Do you like the job itself? What about the job do you like the most?

What do you see yourself doing a year from now? Three years from now?

Has anyone discussed with you the opportunities for development here?

By participating in this pilot you are developing your skills further and helping the company.

Let's set a learning goal for you to achieve between now and the next call. This should be something achievable and measurable, yet it pushes you to stretch. This should not be either too easy or too difficult. We'll talk about this during our next call.

Think about a short term (between now and 6 months) medium term (within first year) and long term goal (2 years) you'd like to shoot for. Send them to me (your support

specialist) in writing. We'll revisit these goals after you complete your final exam to see if they have helped you along the way.

Call #4-Applying Your Training

The purpose of this call is to discuss how you apply what you learned in training into your daily tasks and responsibilities as a branch administrator.

Guiding Questions

Have you had any weekly meetings with your supervisor? If yes, what have you discussed that has allowed you to apply your training to your job (i.e. customer service examples). If you have not yet had a weekly meeting with your supervisor, how can you make one happen? What will be the first item on your agenda?

Describe a problem or challenge you faced over the past week that you had not yet learned about in training. How did you go about researching answers to this problem?

Are you confident about seeking out resources to help you through new situations? If not, what help can we find to assist you?

Thinking back on what you studied in training up until now, which modules have been most useful to your day-to-day routine? Other than practice and experience, is there anything you feel you should have been taught by now. What are you doing a lot of that you have not received training in?

Based upon your training up until now, share what learning has been most valuable to your role as a trainee. This could be something learned formally in training, by walking through a task with topical support or informally through other means. Why was this particular skill or knowledge valuable?

During our last call we set the goal of _____. Were you able to reach the goal fully or partially? If not, what obstacles got in the way? What obstacles need to be removed to attain that goal? What is your new due date?

Call #5-Reflecting on your Branch Experience

The purpose of this call is to reflect on your experience at the branch: your interactions with clients, your supervisor and others. By reflect, we mean 1) Recounting things that have happened, 2) Discussing how you felt about what happened and 3) Evaluating what happened.

Guiding Questions

Every branch functions somewhat differently. Think about what is unique about your branch compared to other trainees you've talked to.

Is your relationship with your supervisor what you expected based upon your interview and hiring? If not, what is different?

What has been your experience in talking to other trainees? Do you find yourself comparing your experiences with theirs? How do these comparisons make you feel? Do they prompt you to act in a different manner?

Tell me something about your branch that makes you feel good about coming into work every day. If you can't think of something, what would you like to happen to make you feel that way?

Think about a situation where your role and responsibilities may have been blurred with those of your supervisor. What happened? How did you handle that situation? What will you do in the future if a similar situation arises?

If you have not experienced that situation, are you concerned about something like that happening in the future?

Are you aware of the resources available to you in the event that the line gets blurred?

Anytime we are in a position where we work with people, there are times that we get frustrated or angry about a situation. Describe a situation you encountered with a client, corporate office or your supervisor that made you frustrated or angry. What might you have done differently to handle the situation so it did not pull you in emotionally?

What specific tasks might you do to not get pulled into the emotionally charged situation.

Identify some of your hot button situations. If you know what they are, you can head them off.

Let's look back on your level of confidence over the past few weeks.

Do you find yourself more relaxed in doing the daily tasks of your job? How does it show?

How do you feel about coming to work?

Is your confidence building?

Are you more comfortable talking to your supervisor? How is this shown?

Discuss your relationship with the different corporate office areas you call for support.

What do they do to help you feel more confident about your work?

Tell me about the best day you've had working as a trainee? What happened that day?

What did you do?

Can you reflect on that day and try to build those successes into the future?

What about your worst day? How can you prevent that from repeating itself?

Under what conditions do you leave your office saying "I've had a good day." Note those conditions so you can repeat them.

Call #6-Evaluating the Training Experience

The purpose of this call is to reflect back on the training experience and set learning goals and strategies (metacognition) for continuous learning in the role of the branch administrator.

Guiding Questions

Now that you've completed (e-skills, basic training), what strategies have you used to allow you to be successful during your training?

Think about the third phone session we had. It was on goal setting. Were you able to reach the learning goals that you set? What helped you or hindered you in reaching your goals?

What are the continuous learning goals that you would like to pursue when you finish training?

One of our goals for involving you in the pilot was to equip you with the ability to be a self directed learner. Think back on your coaching/facilitation sessions. Was there anything in particular you recall as being especially helpful in building your self-directed learning abilities?

Describe what you discovered about yourself as a learner? How might this discovery affect you as you move forward,

Based on your experience as a trainee in this pilot program, what modifications would you suggest to the current training support? What are we doing well that we should keep doing? Was the participation worth your time?

End the call with a closing and encouraging statement thanking them for participating in the study. Tell them that they have greatly contributed to the company in helping us find the best ways to support branch administrative trainees. Remind them that you are there to support all their training as they continue forward and that you look forward to hearing from them.

APPENDIX C

Validation of Criterion Referenced Test

Construction

The e-skills test is a 25 item criterion referenced test based upon the e-skills modules for branch administrator trainees. Learners complete the 31 interactive modules and when ready, take the test using any available resources. An arbitrary cut-off score of 80% has been declared based upon historic testing standards.

Items are based upon the priority ranking of 101 performance objectives that were *not* previously assessed via other instruments. Of the 101 target objectives, module developers identified 32 critical objectives for assessment. These 32 objectives represent five factors that a branch administrator's job tasks fall into. Given some overlap in tasks and objectives, a total of 25 items were selected to represent the 32 objectives.

The test was developed and disseminated to a group of Subject Matter Experts (SMEs) for formative evaluation. Modifications were made accordingly and the test was sent out for pilot among a group of experts.

Initial Pilot

A pilot group of 15 Senior branch administrators were selected to complete the test. They were given an open ended time frame and asked to fax the test upon completion and then answer a survey. The survey asked for feedback on item difficulty, criticality and clarity. Subjects were also asked to record how long it took them to take the test and suggestions for improving the test.

A total of seven participants returned the test and survey. On a four point scale with four being the highest and one being the lowest, the following descriptive statistics were identified:

Average time to complete test --74 minutes

Median time to complete test--45 minutes

Item criticality range--2.2-4.0

Item difficulty range--1.6-2.8

Item clarity range--2.7-4.0

Average test score--81%

Test score range--72-92%

Median test score--80%

Modifications

Modifications were made to the test according to the following priorities:

Clarity: was defined as ease in understanding the test item. Items below a 3 in clarity were reviewed and revised to eliminate ambiguity.

Wrong answers: Items 3, 8, 10, 16, 18, 19 and 24 were analyzed and revised accordingly because two or more experts chose wrong answers. Item 24 received 6/7 wrong answers; however, this had more to do with the target audience than the item itself. Narrative suggestions were analyzed and included when relevant.

In all, minor modifications were made to the test in terms of clarity. One question was eliminated and replaced. Other items took out ambiguous distracters. The results of the pilot phase led us to believe that the test had face validity and was ready to be further validated.

Validation Phase I

The test was rolled out on November 14, 2006. Instructions for the test suggested a two hour uninterrupted time block to take the test, but did not have any enforcement provisions. The first 53 test takers were also asked to answer a set of interview questions regarding the test. All wrong answers were recorded in order to later perform an item analysis.

Of the 53 test takers, 48 surveys were usable in that survey sections I and II were complete. Section III--open ended questions did not have to be complete for the survey to be accepted. The surveys suggested that the test was fair and had face validity. The following measures were derived:

Average time to complete test--78 minutes

Median time to complete test--60 minutes

Range of times to complete test--20-240 minutes

Average test score--85%

Test score range--60-100%

Median score--88%

A cursory item analysis was performed and found two items that were consistently missed. Item #3 and #13 had more incorrect than correct answers. In analyzing the responses it was determined that item 3 needed better clarification within the training itself and should remain. Item 13 was identified as not being critical and was revised to represent the critical aspects of the objective.

Statistical Analysis

Item analysis was run on all 25 items. Four items had 100% correct responses: #5, 7, 15, and 24. Cronbach's alpha yielded a 0.5 bi-serial correlation coefficient. A desirable score is 0.7-0.9. This correlation compares wrong item scores with high total scores and correct item scores with low total scores. A negative correlation on an item indicates it is not valid. The following items required revision since they had a negative correlation: #11, #18, and #23.

Recommendations

- Reinforce time blocking 1.5 to 2 hours to take the test uninterrupted. Average test time is 77 minutes. Median test time is 60 minutes. There is no relationship between time spent on the test and score. Look at ways to educate the supervisor on time blocking for training to increase time to completion.
- Modify distracters on items with 100% correct responses (#5, #7, #15, and #24) to make items more discriminating.
- Enhance instruction in cash receipts to assure proper examples are provided within the instruction to correctly answer the questions.
- Modify items #11, #18 and #23 to rid of the negative correlation with raw scores.
- Run a second validation with new items and different debrief questions to align with new data to be collected.

Test Revisions

Based upon suggestions from validation phase I, revisions were made to the e-skills test. Specifically, the following modifications were made:

Item 11, which had a negative correlation was removed and changed to a completely different item with a new underlying objective.

Item 13 was updated to clarify and better test the underlying objective.

Item 17 was changed due to changes in module content based upon new policy.

Item 24 was eliminated due to 100% correct response rate and replaced with a new item with new underlying objective.

Items 5, 7 and 15 had changes in the distracters in an attempt to reduce the 100% correct response rate.

Validation Phase II

The support team reviewed the test and made final recommendations prior to publication. The new test was released on February 1, 2007 and the first 43 test takers were asked to complete a one page survey administered by the support team. Of the 43 test takers, all surveys were usable and indicated that the test had face validity.

The following measures of central tendency were compiled for the phase II validation group ($N = 43$).

Average time to complete test: --89 minutes

Median time to complete test--90 minutes

Average test score--84%

Tests score range--60-100%

Median test score--86%

Different descriptive questions were asked as part of this survey that had not been asked in validation phase one. These questions and answers included:

Volume of business:--0 = 2; 1 = 5; 2 = 13; 3 = 12; 4 = 3; 5 = 8.

Those with previous e-learning experience: 20 of the 43 respondents had previous e-learning experience. That being approximately 46% who had previous exposure to this type of learning platform.

Those allowed to time block for the test: 24 of the 43 respondents were allowed to block uninterrupted time to take the test, that being approximately 56% who had uninterrupted time.

Ten of the respondents worked in multi-administrator offices.

Statistical Analysis

Data was compiled into a spreadsheet and analyzed for different relationships using The Statistical Package for the Social Sciences. Items #2 and #7 had 100% agreement. An item analysis revealed item #3 as the most difficult item, followed by the following items that had a difficulty score less than 75%:

#3	.37
#11	.63
#17	.52
#21	.74
#23	.53
#25	.69

Cronbach's alpha was calculated at .675 bi-serial correlation. This statistic is adequate in that if this test was standardized, it would yield a .7 correlation coefficient, which is within the target reliability range. Inter-item correlations showed three very small negative correlations between item and raw scores on item # 8 ($r = -.002$), #9 ($r = -.40$) and item #18 ($-.064$). Item #8 had 2 incorrect responses; item #9 had 3 incorrect

responses and item #18 had only 1 incorrect response. Due to the small sizes of the negative correlations and missed answers, no additional changes were made to try and reduce or eliminate the negative correlations between the items and the raw scores.

T-tests for significance were run between the means for validation groups I and II. The analysis yielded no difference between the samples. An analysis of raw score by business volume groupings in validation group II was run with segments 0-3 being one group and 4-5 the second group. Again, there were no differences in raw scores between these groups. Finally, group II 's scores were analyzed by whether or not the test taker was allowed to time block, and again there appeared to be no significant differences between those who had and had not time blocked.

APPENDIX D

Data Collection Protocol

Step I-Gather data for enrollment into pilot

Check the fax machine to see if any informed consent forms have been received for the day.

Make sure the informed consent form is signed by the sender. If she did not print her name on the right side of the second page, then fill it in.

Review the fax cover page to assure that the questions are answered. If any answers are missing, call the trainee. If the trainee does not want to disclose the answers, you must inform her that she cannot participate further in the pilot and thank her for her interest.

Attach the *Cover sheet* to the top of the three forms and staple together. Using the information sent in as well as information available in the Human Resources Information System. Record the following information on the form:

Name of trainee

Identification number

Training enrollment date

Area number

Volume of business code

Birth date of trainee (mm/dd/yyyy)

Supervisor gender

Previous financial experience (in months)

Using a yellow highlighter, place all forms for the day in date stamp order by the time they came off the fax machine. Highlight the date and time.

Deliver the day's forms to the data recorder no later than 3:00 p.m. each day.

Step II-Record enrollments onto data sheet and assign pilot group

Review date/time stamp on forms to be sure they are in order from least to most recent.

Using the information sheet, enter all relevant data into the master spreadsheet.

Assign the pilot group number based upon the next available row on the spreadsheet.

Make note of the subject number and record on the *Coversheet*. Sign and date the *Coversheet* after all data is entered into the spreadsheet.

Double check data entry for correct input OR have another support team member audit your entries.

Photo-copy cover sheets, keeping originals and distributing copies to assigned support people.

Hold cover sheets of participants enrolled in **group 3** until a minimum of five people are enrolled on the spreadsheet. When you get between 5 and 7 enrollees into group 3, assign the conference call starting date, facilitator and time and distribute to facilitator to make enrollment into study call. Photocopy coversheets and deliver to assigned facilitator.

Give the faxed Informed Consent form and cover fax to the Principal Investigator who will store it in a locked drawer and sign off as principal investigator.

At the final training date (date passed final or date terminated), you will receive the cover sheet back from the facilitator. Complete the remaining fields on the spreadsheet including six month results when appropriate (term date or six month anniversary date).

After data entry, store coversheets in alphabetical order in a file in a locked drawer. The forms must be retained for one year.

Step III-Maintain your enrollees' records until final exam completed

Check cover sheet for enrollees' assigned pilot group number. Upon receipt, make "Welcome to pilot" call within 24 hours.

File cover sheet first by group # and then in alphabetical order in folder.

At the e-skills phone call, record test score onto cover sheet. If in group #3, contact facilitator to record score on cover sheet.

Group 3 facilitators will return cover sheet to support specialist after six conference calls are made.

During three month call, ask participant if they had any local support of their training, specifically:

0 = no local training support

1 = another branch administrator was in the office to provide training support

2 = assigned a regional mentor

3 = visit another office

4 = socialize with other branch administrators

5 = more than one of the above categories

Record final exam pass date on the cover sheet

Return the completed cover sheet to data recorder.