Older Adults Learning Online Technologies: A Qualitative Case Study of the Experience and the Process

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Abstract

The Census 2000 Brief (2001) informs us that the American population is aging. The predictions are that by the year 2050 there will be 80 million adults over the age of 65 as compared to 35 million in the year 2000. Since technology is becoming more important in our daily lives, many older adults are interested in learning how to use online technology to communicate and gather information. This study was designed to better understand the process and the experience of older adults as they learn to use online technology with computers. The questions guiding the inquiry were:

- What is the experience that older adults have while learning online technologies?
- What is the process for older adults of going from non-literate to literate in online technologies?
- What are older adults' responses to challenges and successes?

Older adults were interviewed, videotaped, and asked to keep a reflection journal while learning and sharing their personal experiences. A qualitative grounded theory methodology was used to explore how online technologies are experienced. These case studies were based on retired adults, sixty-five years of age or older, who had not used (or learned) online technologies.

This researcher is not aware of any grounded theory qualitative case studies that used interviews, videotapes, and journaling to detail the process and experiences of how older adults learned online computer technology. This study augments the body of knowledge concerning older adults learning computer technology and informs future studies specifically on how older adults learn online computer technology.

The findings in this research showed that the participants in this study applied none of the learning strategies used in a classroom situation (where the instructor controlled the learning process by teaching). A process was depicted illustrating how the participants in this study learned how to use the Internet and e-mail. This process consists of six phases and describes stages within each of the phases. Challenges and successes were also listed and explained in regard to each participant's experience and learning process.

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Dedication

This study is dedicated to my son, "Mick" Michael Roth Gibbons. May he grow to experience a true love for learning and realize that one never stops learning.

Acknowledgments

"The self-made man (or woman) is an absolutely wonderful fairy tale."

A.A. Cantor, 2003, p. 1. *Lights, Cubicle, Action! 100+ Directives for Survival in Corporate America.* DocVoc® Press.

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Chapter One: The Problem

"A good look at the conditions of old age in our stage of history makes it obvious that we are all facing the prospect of steadily increasing longevity in an unpredictable technological future – a future in which, in fact, it must first be proven that mankind as a whole can survive its own reckless inventiveness."

(Erikson, Erikson & Kivnick, 1986, p.14)

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Background

Aging Population

According to the 2000 Census, the American population is aging. In 1860, half the United States population was under 20 years old and "most of the population was not expected to live to age 65" (Hobbs & Damon, 1996, p. 1-2). In 1950, half of the population was under 30 years old (Hobbs & Damon, 1996) and life expectancy for people born that year was 68.2 years (National Vital Statistics Report, 2001). By 1994, a dramatic shift occurred — half of the population was now *over* 35 years old (Hobbs & Damon, 1996) and life expectancy for people born in 1994 increased to 75.7 years (National Vital Statistics Report, 2001). The Census Bureau predicts that in 2010 half of the population will be over 37 years old and the high assumption[1] for life expectancy will be 76.1 years for males and 82.7 years for females born in that year (Day, 1996). In 2030, at least half of the population will be older than 40 years old (Hobbs & Damon, 1996) and life expectancy is estimated to be 81.1 years for males and 87.4 years for females (Day, 1996). These data show that the population is aging and life expectancy is increasing, which means that there will be more people in the United States, but most importantly for this study, there will be more older people who are living longer.

According to Greg Spencer, chief of the population projections branch for the U. S. Census Bureau, starting in August of 2011, the 65+ population will grow “tremendously” (personal communication, February 13, 2002). One of the reasons for this continued growth is the result of the baby boom after World War II, beginning in August 1946. In August 2011, the WWII babies will begin to turn 65 years old. The growth of this population will be enormous and the baby-boomers will become the grandparent-boomers. The population of the elderly to

the non-elderly will have increased. In 1994, 1 in 8 Americans were over 65. In 2030, it is projected that 1 in 5 will be over 65 years old (Hobbs & Damon, 1996).

The number of seniors is continually increasing. According to the Census 2000 Brief (2001), 31.2 million people were over 65 years old in 1990 and in 2000 there was a 12 percent increase to 35 million. The number of persons over 65 years old is predicted to double to 80 million by 2050 and the life expectancy for people born in that year will be 86.4 years for males and 92.3 years for females (Day, 1996).

The fastest growing age group is the 85 and over population (see Figure 1). This group will double in size, twice in this century, for a predicted total of 14 million 85 year olds (Hobbs & Damon, 1996).

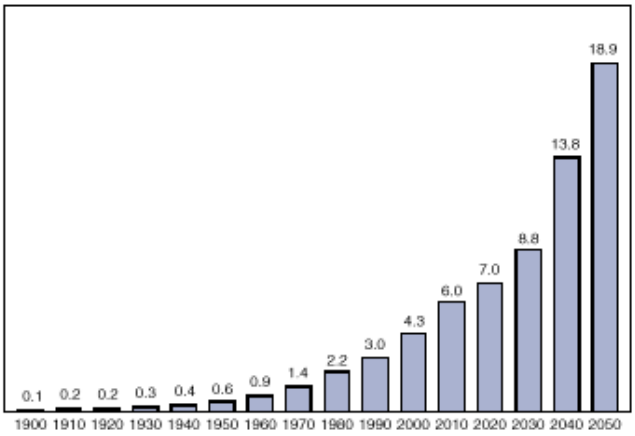

Figure 1. Population 85 + for 1900 to 2050 (in millions).

Data from the Census Bureau indicate that it is difficult to predict the number of centenarians (persons over 100 years old) in the United States. However, it is certain that about 4 out of 5 centenarians are female (Hobbs & Damon, 1996). In 1994, 72 percent of the U.S. population 85 years and over were women. This figure is predicted to get larger because women have shown greater survivorship probabilities throughout the years (Hobbs & Damon, 1996). So, the elderly population is growing at an unprecedented rate, and life expectancy is increasing.

Growing Online Technology

Online technology is increasing exponentially (Perse & Ferguson, 2000). The Internet is now used to access more information every day. Almost everything is online: music, books,

speeches, history, sports and even gambling. Everyday tasks such as banking, shopping, medical research, newspaper reading, and education classes can be accomplished via the World Wide Web. For example, the public schools are now 99 percent equipped for the Internet and this percentage has almost tripled since 1994 (see Table 1). The Internet has transformed the way more people gain access to information and e-mail has made communicating faster world wide. In fact, "ninety-four million people used the Internet at home in 2000, up from 57 million in 1998" (Newburger, 2001). The Internet is growing as a routine method of obtaining information for more and more people who are now, and will be, using online technologies.

Table 1

Percent of Public Schools with Internet Access, by School Characteristics: 1994 - 2001

School Characteristics	Public schools with Internet access							
	1994	1995	1996	1997	1998	1999	2000	2001
All public schools	35	50	65	78	89	95	98	99

Source: Digest of Education Statistics (2002)

Internet Interest

Women over 50, African Americans, and Native Americans are among the fastest-growing groups using online technologies (Press, 1998). Results of a study by Nielsen Media Research and CommerceNet (1998) indicated that over one third of Americans use the Internet. Research commissioned by SeniorNet and conducted by Charles Schwab in November of 1998 reported that computer ownership within a sample group of people over 55 increased 20 percent since the original study in 1995 (Wrixon, 2000). Moreover, Internet usage within the group grew

60 percent, with 80 percent of participants stating that they had accessed the Internet within the past month (Wrixon, 2000). More and more older adults are interested in using the computer to access the Internet and e-mail for personal use.

Evidence of a problem

The changing population figures show that there is a disproportionate population growth. There will be more people older than 65 than at any time in history by the year 2011. Simultaneously, information technology and online communications are burgeoning. These two forces are converging during this unprecedented nexus point in history. This is a relevant and important phenomenon for the present and for the immediate future. This occurrence alone is momentous; however the added fact that more elderly individuals are interested in learning this new technology is indeed meaningful to our future.

Problem Statement

Research has explored how older adults learn computer applications. Research has also focused on computer technologies in general and specifically on those featuring the World Wide Web. Little has been studied, however, about the process of how older adults learn these online technologies. This process is important to understand, given the predicted surge of older adults in the coming years and the dramatic increase in online technology. Ogozalek, Bush, Hayeck, and Lockwood (1994) describe the impact of over-65ers on the country as an "age wave." Technology is becoming the norm in our daily lives. Those wanting to learn in the future must be comfortable with technology. As Redding, Eisenman and Rugolo (1998, p. 19) state, "The notion that everyone is computer literate, or has used a computer is simply not true!" The literature has cited many benefits for older adults to learn to use computers and go online, but does not describe how an older adult learns online technology. This better understanding of how

older adults learn online technologies is important both because there will be so many older adults in the future and because technology is becoming more mainstream. Consequently, there will not only be a need for older adults to learn online technologies, but an equally important need to better understand that process.

Research Questions and Definition of Terms

The present study focused on how an older adult experiences online technologies. The researcher explored the following questions.

- What is the process of going from non-literate to literate in online technologies?
- What is the experience that older adults have when learning online technologies?
- What are responses to challenges and successes?

For the purpose of this study, online technologies are defined as the Internet and e-mail. The Internet consists of search engines, hyperlinks, bulletin boards, home pages, and chat rooms. E-mail consists of America Online , Microsoft Network (MSN), and other browsers used for communication by the participants. Process is defined as the outcome of each participant's journey from non-literate to literate to be depicted by a flow chart of events such as rapid growth, plateaus, regressions, and slow growth. Non-literate is defined as never having used online technologies either in the work environment or for recreational purposes. Literate is defined as having understood the basic concepts of e-mail and web browsing (see Appendix A for a list of the basic concepts). Experience is defined as the when, why, where, and how of each journey. Specifically, experience details critical events such as the intellectual and physical behaviors, as well as affective responses to challenges and successes. Challenges and successes are defined individually by each participant in the study.

Significance of the Study

A review of the literature on older adults using technology revealed little information written on older adults and the process of *how* they learn online technologies such as the Internet or e-mail. A qualitative, grounded theory case study of learning online technologies augments the literature in older adult learning and provides an understanding of how some older adults learn e-mail and the Internet. Using online technology has become a new means of communicating, similar to the telephone in the early 1900s. Online technology uses hyperlinks and attachments, and will continue to use this design in the future for web sites and e-mail communications. Since new technologies will emerge, and hyperlinks are common on the new Microsoft's Ultimate TV, which combines television, the Internet and dual VCR technologies, older adults will continually have to learn new technology that they never learned in school or on the job. Future developments to the Internet and impending, newer designs may or may not use similar technologies in years to come. By becoming more comfortable with technology in general, and specifically online computer technology, older adults may have a better quality of life and might not become frustrated or feel excluded when new technologies emerge. This comfort level can also assist elder care workers by better understanding how older adults learn online technologies. Mary Alice Wolf, a contemporary older adult learning scholar states,

> Research on how and why older learners come to us and what they experience in the "learning" process is limited, contradictory, and often does not provide a solid conceptual base on which programmers can build (Wolf, 1985, p.8).

This knowledge could prove useful to gerontologists, educators, program planners, older adults, and other groups who have an interest in the fastest growing population in the United States.

Limitations

The main question this research addressed was: What is the experience and process an older adult goes through while learning online technologies? As noted in this chapter, the research was conducted as a qualitative, case study approach using grounded theory to analyze the data. Due to certain factors, there are limitations to this study. First, the nature of the task--starting with a participant at ground zero (non-literate) is difficult because each participant is part of a historical cohort group where people 65 and older have not grown up with this technology. Nor did they have to learn the Internet or e-mail in the workplace. However, the Internet and e-mail have been public since 1992 and are always in the news, or seen on television commercials. Therefore, a limitation that must be addressed is the fact that the participants will have some background information or misinformation about the topic and may not be entirely non-literate. Next, the information gathered from each participant is only as good as the interviewer's questioning skills and observations. As the interviewer, I prepared my topics and questions carefully. Merriam (1998, p. 75) states that "pilot interviews are crucial" for developing interview questions. Two participants were interviewed in a pilot study for this research; questions and topics were tested and reworded. I have been an active participant in a qualitative coding class[2] for three years, where I learned how to present the topics and apply proper questioning techniques. Also, because of my professional experience as a teacher of computer instructors, I have had practice observing others and reporting my findings. I was also a professional recruiter/interviewer for three years and have had instruction in interviewing and listening skills. However, even with this training and careful planning, it may be difficult to understand and document a participant's exact thoughts. In fact, the participant may not even know precisely what she is thinking or be conscious of why she exhibited a certain behavior.

Using the knowledge and skills gained from my reading, experience and practice, I did strive to document each participant's story to the best of my ability. So, even though prepared, circumstances of time and humanity render limitations to this study.

Organization of the Document

Chapter one has introduced the problem, described the background, and built the argument for this study. This chapter has documented that the American population is aging, technology is booming, and many older adults will be interested in and using the computer online. The problem was formulated and the absence of research detailing the process of how older adults learn online technologies has been illuminated. The research questions stated that this study would explore the process and experiences of how older adults learn online technology. The significance of the study was also explored. The following sections of this dissertation are organized as follows: Chapter Two documents the background literature in the areas of adult learning theory, technology, and older adults learning computer technology; Chapter Three describes the research design, participants, data collection procedures, and analysis of the data; Chapter Four presents the findings; and Chapter Five summarizes, analyzes and provides further insights into the stages within the process of the participants learning online technologies. Recommendations and a need for further research are also addressed.

Chapter Two: Literature Review

"The problem arises because current software producers and manual writers are basically computer engineers (or have been trained by computer engineers) who understand how the machine works but have no idea about how adults learn. …As an adult educator, I would view this to be a tragedy, since I perceive the computer to be the most potent tool for adult learning to appear in modern history."

Malcolm S. Knowles (1990, pp. 163-164).

Overview

The purpose of this study is to better understand the process of how older adults learn online technologies. This chapter reviews background literature concerning computer and online technology, older adult learning theories, and related studies of how older adults learn online and computer applications. This study's conceptual framework is developed from two

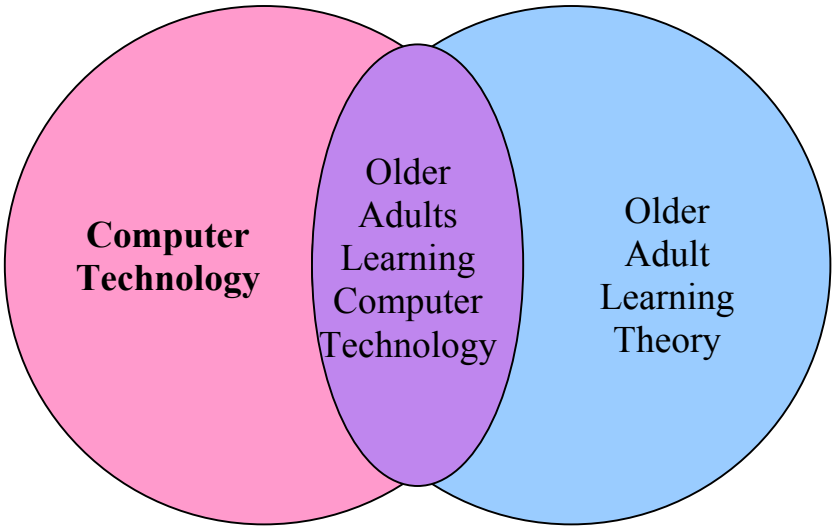

Figure 2. Conceptual Framework for Literature Review.

bodies of knowledge and their intersection (see Figure 2). The first body of knowledge includes information concerning computer applications and online technology. This body of knowledge is important to better understand computer technology in general, and the differences between computer applications versus online technologies, including their use and mastery. The second body of knowledge consists of older adult learning theories. A brief history of older adult learning theorists is offered and three theorists and their ideas are described and analyzed. Figure 2 offers a conceptual framework to organize the research. The intersection of the previously mentioned two bodies of knowledge forms a third body of research covering older adults

learning computer technology. These current studies, which inform us about the process of how older adults learn online technologies, will be organized, discussed, and analyzed.

Technology: Differentiating Computer Applications and Online Technology

This first section specifically discusses the unique nature of using the Internet, particularly the World Wide Web as opposed to using computer applications. Online technologies are defined as the Internet and e-mail. Computer applications consist of word processing, spreadsheet, graphic, and database programs. Online technologies differ from computer applications in three distinct ways: their purpose, the philosophy of use, and the final results.

First, when using computer applications one's goal is to complete a task. In contrast, when using the Internet or e-mail the goal is to get information and communicate. For instance, one might write a letter or calculate a spreadsheet. On the other hand, when using e-mail or the Internet's World Wide Web one might send a picture to a relative or look for bargain air fares. One could argue that creating a letter is a way of communication, which is true; however, using e-mail allows immediate feedback.

Secondly, when using computer applications, one must take a linear approach, as opposed to using the Internet's World Wide Web where a non-linear approach is used. Computer applications, such as word processing applications are linear and the World Wide Web is non-linear. For example, to create a simple letter using a word processing application, one starts at the same place each time and follows the same steps to complete the document. In contrast, when one enters the World Wide Web to search for information there are many avenues to select because there are so many different search engines and the hyperlinks and home pages seem infinite. Peter Whalley (as cited in Lumb, 2000, p. 2) states that "linear texts contain turn taking

cues which promote reflective critical reading" as opposed to the "fragmentation in hypertext making it more difficult." So, hypertext, used in an Internet web page design, is more difficult to learn than a word processing package. Ellis, Ford and Wood (1993) compared user evaluations of software applications and hypertext environments with regard to learning styles. They concluded that hypertext allows those with differing cognitive styles to succeed, and allows the users to create their own learning strategies. So, using hypertext, a nonlinear way of learning, is different than learning computer applications.

Thirdly, there is finality when using computer applications, but when using online technology, one never knows when the information is complete. For example, when one uses computer applications a finished product is created. Stuart and Thomson (1995) state that after teaching adults with learning difficulties how to use a word processing application, the participants produced a book which included graphics and text. When using the World Wide Web or e-mail, one does not have such a defined conclusion. Hill (1999) refers to technologies such as the World Wide Web as OEISs or Open-ended Information Systems. He declares that "technologies such as the Internet and World Wide Web are changing our conceptions of information systems" (p. 5).

In summary, there are distinct differences between computer applications and online technologies. This information is important because studies have been completed that show how older adults use computer applications, but there have been no studies to the author's knowledge, that illuminate the process of how older adults use online technologies. If learning online technologies and computer applications were the same, this study would repeat past research. However, since they are different, this study will augment the body of knowledge concerning older adults and online technologies.

Life Span Theory and Older Adult Learning Theory

This section will discuss life span theory and older adult learning theory. I have chosen Piaget's and Erikson's models because they describe the entire life cycle from birth to near death. This will provide a backdrop to the literature on older adults to permit a deeper understanding in the context of the entire life cycle. Also a brief history of older adult learning theories are discussed and analyzed. The works of McClusky, Neugarten, and Wolf are detailed to give a more in-depth look at how each theorist conceptualizes the older adult learning process. Neugarten and McClusky were chosen because they are well known and respected in the field. Some of the theories are outdated, while others have stood the test of time. Wolf's work is mentioned because she is emerging as a well-cited current theorist addressing learning in older adulthood. She has a large volume of documents and recent research to inform this study. Finally, a concluding section will integrate and summarize life span and older adult learning theory to provide the reader with the basic concepts, theories, and a framework in which to build an understanding of this field.

Life span Theory

Piaget's Cognitive-Developmental Theory

Jean Piaget was a Swiss psychologist who observed his own children in order to define intelligence. He developed a model based on stages, in which, the child must complete the tasks in one stage before proceeding to the next stage (McLeod, 1974). He gave approximate ages for each stage, but the time a child moved to the next phase was dependent on how quickly the child had learned all of the skills in the previous stage. He believed that children gain these skills by interacting with the environment (Piaget, 1970/1983). Piaget theorized that they were not taught

by caretakers, nor had a predetermined time to have the answer to the problems, thus accomplishing the tasks (Crain, 2000).

Piaget's theory consists of four stages (see Figure 3). This researcher is most interested in the last stage, called formal operations. This stage begins to occur between ages eleven and fifteen and may continue throughout the life span (Pulaski, 1980). In this stage, people can think logically and with abstract reasoning even when objects are not visible. Individuals can think

Stage	Approximate Age in Years
Sensorimotor	0 - 2
Preoperational	2 - 7
Concrete Operational	7 - 11
Formal Operations	11 - 15 +

Figure 3. Piaget's Stages of Cognitive Development.

Adapted with permission of the Jean Piaget Society Web Site (2002). Retrieved February 2, 2003 from http://www.Piaget.org.

hypothetically and can solve problems one-by-one, in an organized manner, to obtain all possibilities for the answers. Piaget defines this as "hypothetico-deductive reasoning" (Piaget, 1966/1995, p. 434). Piaget noticed that when adolescents become adults, they learn that there are limits, and are faced with "reality" (Crain, 2000, p. 132). Later research found that many adults do not use the formal operations stage of thinking in everyday life. In fact, some adults never reach this stage (Sandwell, 1997). Piaget replied to this finding by determining that when individuals are strongly interested in an area or subject, they apply formal operations thinking (Crain, 2000).

Piaget also studied intelligence, memory, and cognitive functioning. He concluded that even in small children, the environment and social pressure impact the development of intelligence (Piaget, 1952). He defined memory as "an accumulation of information coded

because of processes of perceptual and conceptual assimilation" (Piaget, 1976, p. 114). There are different types of memory including recognition, reconstitution, and recall. Remembering leads to "decoding and retrieval" of "coded" information from the brain and possible loss or modification of that information (Piaget, 1976). So, remembering, or using retrieving information is difficult and not an exact science.

In conclusion, Piaget developed a four-stage model in the life span of an individual. He realized that children do indeed think differently than adults. The idea is that adults are not just more intelligent than children; adults live by different rules and cognitive schemas than children. Children have yet to master certain concepts until they are ready to think a different way. Understanding that adults think differently than children is an important concept to note when studying how older adults learn and remember. Piaget's work has been augmented by post-formal learning researchers[2]. This knowledge helped inform this study by providing a frame of reference and context of the entire life span, particularly in the later cycles.

Erikson's Life Cycle Model

Erik Erikson (1959) proposed a life cycle model that describes stages of an individual's life. Past stages are not overlooked once an individual has reached the present stage. Erikson suggests that “each stage, once given, is woven into the fates of all” (Erikson, 1986, p. 337), similar to yarn intertwined into a patterned tapestry.

The latter three stages pertain to adulthood, and are most relevant to this study because they deal with older adults. The last two relate specifically to older adults. First, younger adults are concerned with intimacy and distantiation versus self-absorption, which details a person becoming intimate or shying away from interpersonal intimacy. The next stage, generativity versus stagnation, relates to older adults. Erikson (1959) details the healthy personality as

showing generativity which is "the interest in establishing and guiding the next generation" (p. 103). The unhealthy personality would tend toward "stagnation and interpersonal impoverishment" (p. 103). The final phase in Erikson's life cycle, also relating to older adults, is integrity versus despair and disgust. He has no definition for this stage but describes it as the "acceptance of one's own and only life cycle" (p. 104), whereas despair asserts the idea that there is not enough time to start over (Erikson, 1959).

Erikson's wife, Joan, felt that the final stages of the life cycle still needed more explanation and detail. So, she wrote an extended version of Erik's last book adding a preface and final chapter. Two concepts stood out to this researcher that aided this study. First, it is interesting that ninety-three-year-old, Joan, offered the advice to older adults to live more like "little children" in that they are predisposed to "live, love and learn openly" (Erikson, 1997, p. 9). Second, she needed to emphatically declare that the last stages are most profound, more so, than previously detailed. She states that particularly during the Integrity stage…

> Everybody, everything matters intensely, more than ever before. Every meeting takes on a special meaning, offers enrichment, or points in an unexpected and rewarding direction (Erikson, 1997, p.8).

Finally, Erikson (1986) suggested that a role switching might occur in older adults. Men accustomed to the working environment now relax, and women become more active in their communities and families.

> Men, it seems, become more capable of accepting the interdependence that women have more easily practiced. Many elder women of today, in turn, become more vigorously active and involved in those affairs that have been the dominant province of men. Some women come to these new roles by virtue of their propensity to outlive the men who have been their partners. (p. 334).

So, according to Erikson's life cycle, older adults are in a different stage of the life cycle than a younger adult. This research also focused on the differences between the genders in older

adults. Erikson (1986) believed, "Old age must be consciously anticipated, and that is why we have to understand the trajectory of the life cycle" (p. 295). Erikson's research is relevant to this study because as adult participants learn online technologies, the description of the stages provide a point of reference relating to the thinking patterns of each participant. Erikson's life cycle theory informs this study by setting a backdrop that depict stages of an older adult's life.

Learning Theory on Older Adults

Early Research

Early research on older adult learning theories was conducted by G. Stanley Hall, Edward Thorndike, Walter Miles, and Irving Lorge. The saying, "you can't teach an old dog new tricks" that had been used to "determine educational policy and action" was being overturned by these theorists (Thorndike, 1935, p. 1).

G. Stanley Hall (1922), a genetic psychologist, studied human development from birth to death. He labeled the period of "old age", senectitude. Hall, using questionnaires showed that older adults were still "productive and intellectually alert." He observed that they "seemed to have lost none of their basic cognitive abilities" (Rogers & Luepniz, 1982, p. 10).

Thorndike, a psychologist, studied intelligence, adult learning and interests. He developed an objective test to measure intelligence known as the CAVD. This test is the predecessor to the modern day IQ tests (Plucker, 1998). Thorndike found that adults 25 - 45 learned better than younger or older adults or children. In another experiment, given that median salaries measured abilities, he compared earning power to age. He encountered an upward swing until a peak at 42, leveling off until 55 years of age then declining. He concluded that "changes in general energy, interest in one's work, and the ability to improve is a regression in achievement" (Thorndike, 1935, p. 131). Thorndike theorized that:

- People younger than 50 years old can learn almost anything
- Adults have the capacity to learn much more than they attempt to learn
- Past experience makes learning more difficult from age 40 onward
- Older adults underestimate the power of learning because social pressures add to the difficulty of learning (Thorndike, 1928).

Thorndike was a great believer that all adults could learn no matter their age.

> Age in itself, is a minor factor in either success or failure. Capacity, interest, energy and time are the essentials. (Thorndike, 1928, p. 179).

He believed that learning:

- Required an interest or attainment of benefits
- Care and effort are essential
- Competes with many other priorities in life such as sleep, family, sports and work
- In order to occur must be "preferred" over other priorities
- Must be complemented by interest or aspiration (Thorndike, 1935, p. 3).

Thorndike maintained that if a person thinks he should learn but does not learn it could be for a number of reasons other than age. For example, low interest level, bad timing, more important priorities, or another good reason. One might continue even if not interested, in order to gain benefits of learning the subject, self-respect, or because of social pressure. He also postulated that "repetition of an unpleasant activity results in greater tolerance or even a liking for it" (Thorndike, 1935, p. 35). So, if a person learned by practicing, they could grow to become interested in that subject or task.

Miles, as well as Thorndike, discovered that older adults could perform as well as younger adults when speed was not involved in the tasks. However, Miles used participants as

old as 70 years of age. Miles was the first theorist to see aging as a "process" (Rogers & Luepniz, 1982).

Lorge continued this research and concurred that the speed of completing a task does slow with age, however, the ability to learn does not change with age (Lorge, 1955). He states,

> Bright people of 20 do not become dull by 60, nor do dull young people become Moronic by 60. An individual at 60 can learn the same kinds of knowledge, skill and appreciation at 60 that he could at 20 years of age (Lorge, 1963, p. 4).

He also noted that it is "crucial" that an older adult learner sees progress and "progress in learning is attributable to confirmation by success" (Lorge, 1963, p. 6.). Also, the older the person, the more unique experiences they bring into their individual learning processes. Plus, positive or negative transfer from past learning can effect present learning (Lorge, 1955).

Awareness of the evolution of older adult learning, helps to provide the foundation with which to build a reservoir of knowledge to use when analyzing the data from this study. Also, when added to the theories, contemporary scholars will help build a framework to better understand older adult learning.

Contemporary Scholars

Bernice Neugarten

Neugarten's research on older adults and aging spanned from the 1940s until her death in 2001 (O'Connor, 2001). She studied older adult personality theory within a social context and examined gender differences. She introduced new concepts to the field such as: social clock, on-time and off-time, young-old and old-old, the fluid life cycle, and age irrelevance. Neugarten was also a leader in exposing the myth of the frail, weak, degenerating older adult.

Neugarten's research on adult personality theory suggested that older adults have greater differences in personalities than younger adults. Common social roles lead to increased

similarities; however Neugarten (1980) noticed that as a person ages, individual differences vary. In fact, a "greater variety of patterns develop in the last half of the life than the first half" (p. 189). "Personal choice…personal commitments, and institutional structures" (p.190) aid in influencing these variations in personality.

On a social level, more and more older adults are retiring at a younger age (55), and have more free time for leisure activities. Significant studies show that older adults find leisure activities where they can "maintain respect," have a "sense of control," have a "valued identity," and build "meaningful bonds with others" (Neugarten & Maddox, 1978, p. 19).

Older adults who have continued their education, even informally, have less problems learning in new situations (Neugarten & Maddox, 1978). For example, it has been shown that older adults deal well with "well-established information but the ability to deal with new information declines" (Neugarten & Maddox, 1978, p. 7). Studies have also shown that verbal abilities, if kept current, may improve with age (Neugarten & Maddox, 1978). This has been shown especially with women as compared to men (Gilewski, Schaie, & Warner, 1983).

Neugarten realized that women and men differ in the way that they define their "age status." This is the individual's perceived life cycle as compared to others in society. Women, not men, center their ideas of their life plan based upon their families or the families they might have had (if single). Men, on the other hand, use the working environment to measure their life plan in comparison to others (Neugarten, 1968).

Neugarten created new terminology in the older adult learning field. These new terms helped others to more fully understand the nature of how older adults develop and experience life. Early in her research, she found that adults value a "social clock" for families and careers, in reference to their age, as compared to the norms of society. For example, one would be "on

time" if they were to retire at 65 years of age and "off time" retiring either before or after that age (Neugarten, Moore & Lowe, 1996, p. 25, Original work published 1965).

Neugarten realized that because the older population is living longer, old age could be divided into two groups; young-old and old-old. The young old is characterized as:

- Between ages 55 - 75
- Visit adult children often
- Have a living parent
- More educated than the old-old but not as educated as the young
- Politically active
- Good health
- Seek meaningful ways to use their free time (Neugarten, 1996 b, Original work published 1979).

Characteristics of the old-old are:

- Over 75 years old
- Dependent upon health care services
- May live independently but have some social support and are in need of special care (Neugarten, 1996 a, Original work published 1974).

These ages are dynamic and may overlap. Entering young-old status is based upon retirement. Entering old-old status is a matter of physical and mental health, and the dependence upon health care. So, one can be over 75 years old and still be considered young-old. (Neugarten, 1996 b, Original work published 1979).

Neugarten also believed that there is a "fluid life cycle." This term refers to the many role transitions for each individual because of the increasingly different number of timetables, and by the changing age related roles (Neugarten, 1996 b, Original work published 1979). For

example, people of many different ages enter and re-enter institutions of education or the work environment.

> Age norms and age expectations, thus, are diminishing in importance as regulators of behavior, and in this sense, too, we are moving toward an age-irrelevant society" (Neugarten, 1996 b, p. 49, Original work published 1979).

Age irrelevance refers to the fact that chronological age has nothing to do with economic status, intellect or social values in adulthood (Neugarten, 1996 a, Original work published 1974).

There is no "typical older adult." Neugarten's work, although dated in some cases, provides an insight into the personality characteristics of the older adult learner. Breaking the stereotypes for older adults and understanding the terminology was beneficial during the conversational and video interviews with the participants in my study. Also, realizing that individual older adult's personalities vary more than younger adults helped to interpret the findings and build a substantive theory.

Howard Y. McClusky

> No one person who has been involved with the development of educational gerontology both during the many years of evolutionary change and the recent decade of activity better bridges all three areas of adult, continuing, and community education, than Howard Yale McClusky. (Hiemstra, 1981, p. 210)

McClusky is well know for developing the field of educational gerontology; however, this review of his literature will focus on his theories and contributions to older adult learning theory. He has dispelled myths about aging, created a theory of margin, and formulated categories of need. This section will discuss the above contributions and describe how they will aid this researcher by providing an understanding into older adult learning theory.

Many myths about aging abound. Even older adults themselves question if they can learn (McClusky, 1976). These myths (McClusky, 1974 b) include the notions that:

- childhood is the time for learning and adulthood is the time for working
- individuals can learn enough in K-12, college, graduate, and professional education to last for the rest of his or her life.
- childhood is the *best* time for learning and older adults cannot be taught

McClusky has helped to show through research that these are indeed myths and that elders can learn and are an integral part of our society. He states,

> In general, then, we are justified in saying that even into the 70's and 80's, and for all we know as long as we live on the functioning side of senility, age per se is no barrier to learning. There is no one at any age, even the most gifted, who is without limitation in learning. Thus limitation per se – age-related or otherwise – should not be our criterion for appraising the capacity of older people for education. We can teach an old dog new tricks for it is never too late to learn (McClusky, as cited in McClusky, 1974 a, p. 329).

Keeping the limitations of adult learners in mind is crucial. Entering into research knowing that learning will take place, regardless of the age of the participant, is equally critical. An open mindset of both previous knowledge and current observation is the key.

McClusky developed a margin theory of needs. The aim of this theory is for the older adults to produce "margins of power" to obtain and hold on to their mental and physical health, and continue to grow toward "self-fulfillment" (McClusky, 1974 a, p. 330). McClusky describes its use as follows: one can control the margin (of energy and power for autonomy) by adjusting the ratio of power (good times) and load (hard times). This theory (Hiemstra, 1998) has been shown as a ratio of load and power equaling margin (see Figure 4).

$$\text{Margin} = \frac{\text{Load}}{\text{Power}}$$

Figure 4. Theory of Margin Visualized as a Formula.

This theory is helpful when attempting to understand that older adults are "constantly engaged in a struggle" to maintain their health, happiness, energy, and power they had when young. If they lose this battle they may die; however, if they acquire new resources or new power, they will grow to "reach new levels of development" (McClusky, 1974 a, p. 329). This information will prove meaningful to the researcher as she interviews and observes older adults as they learn online technologies. Just understanding that there is a never-ending balancing act that each older adult faces will provide a backdrop for understanding the older adult mindset.

McClusky (1971) developed five categories based on margin theory useful when designing programs for older adult learners. He theorized that older adults have these needs:

- Coping needs - basic education or a minimum capability to read and write and compute, minimum physical health, economic self-sufficiency,
- Expressive needs- recreation
- Contributive needs - the need to give back to family and society
- Influence needs - the need to make a difference (for example, politically)
- Transcendence needs - learning to balance power and load in a way that goes beyond an egocentric type of motivation.

This hierarchy of needs begins at the top (with coping needs) and culminates with the final balance of margin. Each stage must build upon the other. Although this model was designed for constructing older adult learning classes, it provides a framework that may be used when attempting to understand the behaviors of older adults.

Mary Alice Wolf

Mary Alice Wolf (1991), is a leading contemporary scholar on older adult learning She has identified three learning processes for older adults, and traits common to adult learners.

Learning and meaning-making, learning and the shadow self, and learning and cognitive reordering are three processes that older adults use as they learn. Learning and meaning-making is defined as the need to find "meaning in one's own life experience" (Wolf, 1991, p. 9). Wolf states that Bulter (cited in Wolf, 1991) describes this process of life review as "settling accounts" (p. 7). Wolf (1991) claims that meaning-making and life review are motivational factors for older adults. Wolf (1988a), describes how an interviewer can use reflection to add to the quality of the conversation, "These moments of reflection are shared with the interviewer; a moment of self-discovery is created as the subject describes his or her own world" (p. 131). The second process is called learning and the shadow self. Wolf (1991) describes this process as moving into new roles and experimenting with different parts of their personalities. This could also be thought of as the trying-something-new stage. The third process is learning and cognitive reordering. She defines cognitive reordering as "a creative tension, a wish to become more fully alive" (Wolf, 1991, p. 17) and this level is considered incorporating wisdom, more specifically, crystallized intelligence.

Wolf, who has studied aging shares her "six principles of aging" and "six principles of learning" which provide a framework to assist in understand older adults. It is important to understand the mindset of the older adult as we focus on the learning process.

Six Principles of Aging

1. Aging is a developmental process.
2. Each older adult is unique
3. Older adults should maximize physiological and psychological capacities.
4. Locus of control is a central issue throughout life
5. Continuity of self is lifelong

6. Older adults need to be meaningfully connected (Wolf, 1996, p. 13).

Six Principles of Learning

1. Learning is a process involving multiple personal changes.
2. Individual needs, emotions, and approaches to learning shape the learning experience.
3. Learning capacity is adequate for meeting life challenges.
4. The learner actively constructs the future.
5. Life experience is the foundation and resource for all learning.
6. Personal and social contexts affect learning. (Wolf, 1996, p. 35).

These principles were helpful to this researcher throughout the entire process of preparing for, interviewing, and analyzing older adult's interviews and data.

Wolf has found traits common in older adults as they learn. These traits include a low self-confidence, internal locus of control, flexibility in ambiguous situations, and enjoyment of age-related learning experiences and empowerment. Wolf (1985), states that older adult learners may exhibit "self-deprecating behavior" and low "self-confidence" (p. 8). She mentions that this could stem from a comparison to younger people or using skills learned earlier in life (Wolf, 1985). Older adults have been shown to have an internal locus of control, however, are flexible and tolerate ambiguity (Wolf, 1997, 1993). These may seem like contradictory statements but, according to Wolf (1993), older adults have a large drive for autonomy and a need to make their own decisions. Internal locus of control describes the degree that a person expects that they cause their own actions versus just plain luck. This locus of control, power to take control of one's actions, aids in motivation and decision making. Also, older adults have the ability to shift easily from one task to another (Wolf, 1997). They can endure ambiguity well, and without frustration. Wolf (1997) also reports that older adults enjoy age-integrated learning experiences or working with different age groups. This is also called intergenerational learning and has been

researched in a number of areas from computer learning to service learning programs (Ogozalek et al., 1994; Brandes & Green, 1999). Helping and working with others contributes to older adults self-esteem and self-concept (Wolf, 1993). Wolf has found that education or learning new subjects either formally or informally may lead to empowerment (Wolf, 1987, 1988a). She states that "growing old and seeking challenges go hand in hand" (Wolf, 1985, p.11). She found that older adult learner's lives were "enhanced" through social networking, support groups, workshops and lectures. (Wolf, 1987, 1988a). Women especially experienced empowerment even when they expressed disfavor with the learning experience (Wolf, 1987). It is important to keep in mind that these traits do not encompass all older adult learners, however, it may aid in the understanding an older adult learning experience. We must remember that "at each age learning is a complex interaction of motivation, cognition, and development" (Wolf, 1986, p. 4).

In conclusion, life span and older adult learning theories describe past and present research to better understand the nature of this study. To summarize life span theorists Piaget's and Erikson's work described stages leading into older adulthood. Next, older adult learning is a relatively new field. Research began with Thorndike in the early 20th century when he concluded that older adults are equipped to learn, dispelling the myth that we learn only as a child in school. Recent theorists of older adult learning theory, Neugarten, McClusky, and Wolf provided the reader with the basic concepts, theories, and set a framework from which to build an understanding of this field.

In summary, there is much written and theorized about older adult learning and computer technology in general. Reports on aging show that there are, and will continue to be, older adults who have no experience with online technologies (S. 105 Cong.2d Sess, 1999). The next section

will combine literature on these two topics, illuminate where the present study fits, and the gap that is needed to address in this larger body of literature.

Older Adults Learning Computer Technology

The following section reviews, analyzes, and categorizes recent literature on older adults learning computer applications and online technologies. A chart was created (see Appendix B) as a visual representation that lists the most recent data (to the researcher's knowledge) that inform us about how older adults learn computer and online technology. A section is also included describing a gap and where this study fits into the literature.

Recent Literature

The researcher created a chart (see appendix B) that lists recent literature describing older adults learning computer technology. This list includes journal articles, books, newspaper and magazine articles, dissertations, theses, and survey information. The chart is organized in columns of: authors, date, title, source, methodology and results. It is color coded by articles: white for informational, gray for literature review, blue for qualitative studies, yellow for quantitative studies, and green for studies that are both qualitative and quantitative in nature. The chart is a helpful visual for summarizing the research and provides information about older adults and computer learning. The research will also be presented and discussed, in narrative form, based on the main themes this researcher found in the literature. These themes include:

- age-related studies
- attitude, anxiety, and efficacy
- social support and connectivity
- quality of life and depression
- web and computer design needs

Finally, studies researching processes of how older adults use computers will be analyzed to show how this study augments the existing research.

Age-Related Studies

Research that compared computer learning of older adults to younger adults has been documented. These studies have been quantitative experiments with groups of younger and older adults using pre-tests, computer training, then a post-test (Echt, Morrell, & Park, 1998; Mead, Batsakes, Fisk, & Mykityshyn, 1999; Moore & Zabrucky, 1995; Ralls, 1997; Valasek (1989); Zandri & Charness, 1989). Kelley & Charness (1995) reviewed twelve empirical studies on this topic from 1983-1992. They determined that older adults have more problems learning than younger adults; they make more errors, take more time, and require more help from teachers. Westerman & Davies (2000) wrote a short literature review of this subject and stated that, "It would seem that older adults are only able to match the performance of younger adults if they are given more extensive training" (p. 481). The more recent studies that this researcher reviewed offered similar conclusions. However, participant ages varied and new findings surfaced.

Mead et al. (1999) tested ten older (63-76) and ten younger (18-25) adults and found similar findings as noted above in past literature. They concluded that "theory can help us predict age differences in computerised task performance, guide the development of both training and design interventions for older computer users, and help us explain conflicting findings in the literature (Mead et al., 1999, p. 569).

Echt et al. (1998) studied young-old (ages 60-74) and old-old (ages 75-89) with the same results as past research. However, the groups in this study learned basic computer skills via computer-based training (CD rom) and using a manual. New findings show that there was no

difference in performance, based upon medium used. Both groups experienced "forgetting over time" during a daily assessment test (Echt et al., 1998, p. 21).

Moore and Zabrucky (1995) also found similar results that older adults took more time, had more errors, and recalled less than younger adults. In this study, forty younger (19-34) and forty older (60-84) adults read printed material online (one sentence at a time) and from a manual. The participants were then tested on the material reading time, comprehension, and text recall. The new findings showed that there is no difference in performance based on method of presentation (Moore & Zabrucky, 1995). However, both groups scored better on overall recall using the online method of reading.

Ralls (1997) hypothesized that strengthening an older adult's fluid intellectual competence before computer training would lead to better performance. This proved to be incorrect for the sixty adults (52-87) in this experiment. He did report that during the structured interviews within the focus groups, older adults were more interested in the computer after the training, goal setting was not significant, and older adults perceived younger adults to have an easier time learning technology.

Echt et al. (1998) found that motor control problems were greater for the old-old than the young-old. Motor control problems were defined as "mouse control errors and clicking errors" (p. 14). The participants were taught then tested one week later; there were no effects of time observed. This finding proposed that practice using the mouse may diminish motor control problems for older adults (Echt et al., 1998). Milner, 1998 (cited in Kelley and Charness, 1995) describes that pointing and dragging the mouse may be difficult for older adults, especially if they have vision problems. Also, older adults may have problems using repeating keys.

These studies speak to how older adults learn computer technology as compared to younger adults. Valasek (1989) summed this up nicely by stating, "The older adult can learn, however more errors were made and more time was needed for training (p. iv). It is important to this research to note the similar characteristics, not the differences, reviewed in the literature. While observing behaviors during this study, it was important to note participants learning styles, but also to realize that they would take more time than anticipated, make more errors, forget over time, ask more questions, become more interested and skilled as they learned and practiced. It is equally important to note that this researcher studied one-on-one as opposed to the group learning that permeates the literature concerning age related differences in learning computer technology.

Attitude, Anxiety and Efficacy

Much has been researched concerning the attitude, anxiety, and efficacy of older adults as they learn or use computer technology. Kelley & Charness (1995) conducted a literature review of attitude and anxiety of nine studies with young and old participants from 1985 - 1992. They defined attitude as "a social psychological concept, which refers to one's beliefs, feelings, and behaviours toward an attitude object" (Petty & Cacciopo, 1981 cited in Kelley & Charness, 1995) and anxiety as "a negative or stressful emotional state" (p. 111). They found "weak, null, or mixed results" indicating that it is uncertain if negative attitudes or anxiety had an affect on computer learning (p. 111). Fajou (2000) defines two types of anxiety; one where the mind is overloaded with thoughts and the opposite where the mind freezes. These next studies review the recent literature not found in Kelley & Charness's article.

Morris (1994) trained 28 out of 34 volunteers 60-79 years old in a first come-first served "Computer's Made Easy (60+)" course (p. 542). Raub's 1981 attitude survey was used as a pre

and post-test. Results showed that more positive attitudes came after the volunteer participant's had taken the computer course. Morris also had the participants keep a computer interaction diary. He reported that "most participants expressed highly positive sentiments after completing the course (p. 547)." There was no analysis of this data, just summary information. He concludes, "there is a need for a positive initial experience with the computer and the attitudes toward technology brought about by such an experience" (p. 553). Zandri & Charness (1989) found that a more positive attitude led to better training experience; whereas, negative attitudes led to more time and help required.

Hollis-Sawyer & Sterns (1999) studied a goal-oriented approach vs a traditional approach (verbal feedback) of 106 adults 50-89 years old. Each participant was trained individually for two days on Excel, a spreadsheet application, tested and timed for performance. They were also given three, five point Likert scale to tests for attitude, self-efficacy, and anxiety. The results showed that the goal-oriented group scored higher on performance; however, *both* groups had a more positive attitude, a more positive feeling of self-efficacy, and lower anxiety regarding computer usage *after* training.

Kelley, Morrell, Park, and Mayhorn (1999) conducted a pre-test, post-test experiment using a computer group who chose to learn an electronic bulletin board system vs a control group who did not. The 49 volunteers were 58-91 years old and lived in a retirement community received three days of training and two months to practice on their own (with a staff member to assist if necessary). The attitude test consisted of a 5 point computer attitude scale, ranging from strongly agree to strongly disagree. The results of this test showed that "attitude increases slightly following training, and then remains steady" (p. 30) and that "brief training improves attitude toward computers" (p. 32).

McMellon (1997) sent a letters to 3918 seniors 55 years and older via e-mail from AOL, AARP, and Retire+ lists to survey mature consumers and describe their time online. Five hundred and fifty answered and were sent a questionnaire. There was an 80 percent return rate. The hypothesis was, "the more positive an individual's attitudes toward computers are, the more time will be spent on-line" (p.83). No relationship was found with attitudes toward computers as compared to the other categories. "The attitude survey scale did not produce reliability scores comparable to their original reported scores" (p.175). This is one of the limitations to this particular study.

Ogozalek et al. (1994) described a class where younger students introduced older students (average age 70 years) to multimedia via learning and display stations in a classroom. A questionnaire was given to 35 participants with varied computer experience. Results showed that attitudes towards multimedia were "overwhelmingly positive" (p. 242). The seniors also commented that the setting was relaxed through edutainment and helpful student guides. One comment that was particularly poignant was "If there is any barrier that older students will face when it comes to using educational technology, it is their own lack of self-confidence when it comes to seeing themselves as capable computer users" (p. 243).

Cody, Dunn, Hoppin, and Wendt, (1999) conducted a pre-test, post-test for 292 adults with the average age of 80 years old. They spent time learning Internet on WebTV and found that when computer efficacy was high, there were more positive attitudes toward aging. They also reported that anxiety was low. This consisted of a four-month training program once a week designed for older learners. A description of the participants showed that 57 percent had no prior experience with computer and 48 percent of the sample dropped out of the long study. This as well as self-reported data could weaken the findings.

Jay (1989) surveyed 101 volunteers, 57-87 years old from retirement communities. Ten to twelve participants were trained in each class for two weeks to use Print Shop, a greeting card application. They practiced for two weeks and were given a post-test of attitude surveys. A control group "wait-list group" was also used (p. 50); they waited one month while the other group was trained, took the pre and "post" test then got the same training. The training group had increased in computer efficacy and comfort attitudes. Both groups had an increase in equality and interest attitudes, while dehumanization attitudes decreased. This could be because the wait-listed group had a month to think about the training ahead of time. Other findings showed:

- When other technologies had been used previously more positive computer attitudes occurred.
- Attitudes did not correlate with social network factors.
- Anxiety concerning intellectual tasks and performance was associated with less computer comfort and greater dehumanization.
- Those with higher income and education showed more positive attitudes for computer interest.
- "more internal control beliefs were associated with greater computer interest, utility and efficacy" (p. 164).

White and Weatherall (2000) interviewed 6 seniors 59 to 77 years old who had been using information technology (IT). They found that "associating IT with modern life, grandchildren, and the future and feeling positive about this association was necessary for them to recognize the potential of the technology and become involved with it. Once involved,

positive attitudes toward the technology developed and was maintained by the use of and involvement with IT" (p. 383).

Rich (1993) conducted a qualitative, case study interview with seven volunteers who learned MS-DOS (operating system), WordPerfect 5.1 (word processing application) and Lotus 1-2-3 (spreadsheet application), in a class at a senior center. The classes were 4 weeks long 2 hours per week for a total of 8 hours. She conducted three one-hour interviews and observations (via videotape and field notes) with each participant and analyzed the transcripts using typological analysis and enumeration by Goetz & LeCompte, 1984. Rich describes the attitudes of the older adults in this study as "eager to learn about computers" and "not afraid" (p. 198). They did express self-doubt at the beginning of the training and were worried about losing data. "The cautiousness and anxiety seemed to stem from an uncertainty about the capabilities of the technology and an unfamiliarity with its language and operation" (p. 199). The older adults in this study "believed they were capable of learning to use a computer", thus Rich states the self-efficacy was high in relation to computer tasks.

There is a plethora of literature about older adult's attitudes toward learning computers. Different methods such as surveys (McMellon, 1997; Ogozalek et al., 1994) and qualitative interviews (Rich, 1993; White & Weatherall, 2000) have been used to study older adults' attitudes, anxiety and efficacy as they learn computer technology. Most of the designs, however, have been pre-test, condition, post-test experiments (Cody et al., 1999; Hollis-Sawyer & Sterns, 1999; Jay, 1989; Kelley et al., 1999; Morris, 1994; Zandri & Charness, 1989). Baldi's (1997) review sums up the main themes in the literature by stating that "it would appear that older adults are not afraid of computers; instead, the older adults' lack of contact and knowledge of the potential of computers are coupled with a lack of confidence in their learning abilities, resulting

in their avoidance of computers and the relevant training (p. 455). There are some limitations with this research. Kelley & Charness (1995) noted that participants who volunteered may have a better attitude and less anxiety ahead of time, knowing that they would be trained using computers. Also, many of the training classes have been short (Hollis-Sawyer & Stern, 1999; Jay, 1989; Morris, 1994; Rich, 1993). On the other hand some have lost participants by being too lengthy (Cody et al., 1999). This researcher's study did not involve a training class (unless the participants' decided to take one) and followed each participant for six to eight weeks. The participants were in control of the length of their learning process. This design helped to keep the volunteers motivated.

Social Support and Connectivity

It has been theorized that while learning and using the computer, older adults experience social support, and connectivity to their community. Limitations, types of social interaction, and online learning communities that provide a sense of support and connectivity for older adults are also listed in this section

Research by Cody et al. (1999) which included a four month training session where seniors spent time learning Internet on WebTV showed higher levels of social support and connectivity after the training. The participants were given perceived social support, and connectivity measurement scales to gauge friendship support, and connectivity to the community. They found that good relationships with friends and family prompted greater use of Internet and e-mail.

Ogozalek et al. (1994) and her students created a successful intergenerational learning environment to introduce seniors to multimedia. This benefits both the younger and older learners in the classroom. White et al., (1999) encouraged his retirement community of frail

older adults to work together because "a group context accelerated learning" (p. 372). They eventually formed a computer club, held meetings, and invited guest speakers. Also, one of the main reasons that seniors take computer courses is to meet others who have similar interests (Timmermann, 1998). Leavengood (2001) suggests that "Internet relationships can be renewed and expanded, and they can be meaningful. Activities can be enriching, helpful, and of the highest quality" (p. 70). Seniors find resources on the web to help themselves and others (Opalinski, 2000). However, not all literature promotes the benefits of online communication for social purposes.

Limitations.

Some studies raised the question of socialization or isolation? Finn (1997) suggests that "it remains unclear whether advances in technology will create new ways for older adults to stay connected and assume more responsibility for their lives, or instead promote isolation among older people (p. 6). White et al., (1999) noticed an "unexpected observation" when seniors commented about becoming possible "computer junkies" and become "socially isolated" (p. 370). The participants in this study did not become addicted or socially isolated. In fact, the average time each participant spent on the computer was 1 to 2 hours per session. However, becoming a "computer junkie" was a concern for one of the participants in this study.

Types of Social Interaction.

Opalinski (2000) posted a questionnaire with both closed demographic questions and open-ended questions on a web page. The ages of the seniors that responded were 60 to 90 years old. All of these computer savvy seniors surveyed, described the computer as "a source of communication and interaction" (p. 30). Although the quality of chat rooms was deemed very poor for social interaction; they viewed the computer in general as extremely important and

convenient to correspond with friends and family and meet new people. Others in the survey commented that the computer enhanced communication and eased the pain of losing a spouse. Many had located old friends. This study also reported a significant reduction in isolation.

Other studies have shown that seniors who used information technology (IT) saw it as a tool for entertainment, important communication and social purposes. For example, interests and hobbies (i.e. genealogy), mental and social stimulation, and to keep in communication with family, friends and especially grandchildren (Lawhon, Ennis and Lawon, 1996; Opalinski, 2000; White and Weatherall, 2000; White et al., 1999) were mentioned.

Learning communities.

There are many online communities for elders. The most popular are AARP, and the SeniorNet communities.

The American Association of Retired People - AARP is an informative website that consists of categories detailing health, politics, travel, volunteering and learning. Magazines such as *My Generation* and *Modern Maturity* are available online on this website. Although learning is just part of this massive community, computer learning has been a large issue. There is even a basic "Learn the Internet" tutorial on the website. The AARP community is not just online, they have partnered with software companies to offer face to face opportunities for elders. For example, Microsoft and AARP teamed up in 1997 and 1998 to conduct 500 "community technology seminars" across the United States to introduce AARP members to technology (Timmermann, 1998, p. 67).

SeniorNet, founded by Mary Furlong in 1986, has a website designed for older citizens interested in computer technology. This site is more geared toward elders using and learning computers. The purpose of SeniorNet is to "provide older adults education for, and access to,

computer technology to enhance their lives, and enable them to share their knowledge and wisdom" (Russell, 1999, p. 29). Members also meet face to face for educational computer classes in senior centers, community centers, hospitals, shopping malls, and other public areas, where the seniors teach other seniors. There are presently 240 classrooms in the United States (S. Jackson, SeniorNet representative, personal communication March 13, 2003). The SeniorNet web site has won the Webby Award for best online community for three years in a row (Wrixon, 2002).

Finn (1997) suggests that "we must use information technologies as tools to build communities of interest, concern, and support" (p. 6). Friend (2001) found that motivation for seniors to get on the web stemmed from an interest in specific topics, not identifying themselves with online communities. It seems that AARP and SeniorNet are excellent models to follow for other groups interested in building online communities for seniors.

Quality of Life and Depression

There have been pre-test, intervention, post-test experiments using participants from retirement communities (McConatha et al., 1995; White et al., 1999). Various measurement scales for depression, loneliness, and social support were administered. In these studies, the control groups do not use computers. The experiment groups receive Internet and e-mail training and have helpers available as they use the online technology. Findings show that loneliness decreases and e-mail and the Internet may "enhance the quality of life of older adults in congregate housing or who feel socially isolated (White et al., 1999, p. 374). McConatha, McConatha, Deaner & Dermigny (1995), found that the computer had "alleviated their depression and appeared to improve their cognitive functioning" (p. 135) and enrich their quality of life. These studies, however, had small samples, and results may have been attributed to the

Hawthorne effect[3] because the intervention group met new people and received more attention than the control group. The participants in these facilities already had high levels of social support and high education level. In the White et al. (1999) study the comparison group scored higher on the social measurements at the start, which may have had an effect on the results.

Opalinski's (2000) questionnaire did not ask direct questions concerning depression or quality of life information. However, the comments from the participants mentioned that those with health related disabilities experienced a "relief from pain" as they received enjoyment while practicing hobbies while on the Internet (p. 45) and described their computer as their "best friend" (p. 46). Quality of life was also enhanced as education on the Internet helped older adults gain knowledge and participate in activities that increase mind capacity.

Surveys of Older Adults Learning Computers

Each year surveys are funded or sponsored by AARP, SeniorNet, software manufactures, and other groups. Presently, SeniorNet is sponsoring surveys on their website exploring Internet use by older adults for the University of Maryland School of Nursing, the National Institute on Aging and for SeniorNet members (Wrixon, 2000). Other surveys are interested in marketing, via e-commerce, to this growing population (Depallo, 2000; McMellon, 1997). Articles describing survey results reporting demographics of older adults using online technology, are also published (Fox, 2001; Lenhart, 2000; Morrell et al, 2000; Rainie & Packel, 2001). The effects include unique jargon describing new trends, marketing strategies for software companies, and a better understanding about the elder population's use (or not) of online technologies.

In 2000, Pew Internet & American Life Project surveyed 26,094 adults 18 and older in the United States. Seniors over 65 years old numbered 4, 335 (Fox, 2001; Lenhart, 2000; Rainie & Packel, 2001). The findings describe that:

- 75 % of adults 18 - 29 have Internet access compared to 15% over 65 years old
- although 13% the American population is composed of seniors over 65 years old, only 4% are online
- adults 50 to 64 years old are three times more likely to have Internet access than 65 year olds
- 81% of people over 50 report that they will never go online, 56% of those (surveyed) are over 65 years old.

Because of these statistics, new terms have been coined that describe older adult online demographics such as:

- Gray gap - not many elders online as compared to younger ages
- Silver tsunami - the many 50 -64 year olds who have Internet access and will keep online service even when retired
- Internots - computer users who are not online and do not plan to go online.

Morrell, Mayhorn & Bennett (2000) also support these findings although their study surveyed only 550 older adults (40 - 92) in southeastern Michigan. They also reported that the older adults reported an interest in e-mail, health, and travel.

Some surveys are used to poll older adult's activities and attitudes about e-commerce (DePallo, 2000; McMellon, 1997). DePallo (2000) conducted a National survey for AARP concerning consumer preparedness and e-commerce for computer users over 45 years old. Results showed that only one in three present Internet users is very confident when purchasing

on the Internet. Of the seniors who do shop online, 77% are concerned about hackers tracking their activities. McMellon (1997) labeled two groups, "technology users" as compared to "technology lovers" who spent more time online, were more computer literate, and had a larger income to spend on computer related purchases. Both studies agreed that novice users spend less money on computer related acquisitions than more experienced older users. These findings may be important for new product development, and for creating media strategies geared toward the mature online consumer. The research also found that the Internet may help older adults gain control because the Internet is an activity where "the user controls the speed, direction, and most of the outcomes" (p. 165).

Web and Computer Design Needs

"Well created Web images and designs vary depending on the target audience. If the target audience is older adults, the page's content must consider not only the use of representational images that will effectively attract and retain site visitor, but also the design of the page and its friendliness to older users" (Jakobi, 1999, p. 582). This challenge not only faces web designers, but all who assist older adults on their quest to learn online technology, and the older adults themselves. A review of the literature on web design for older adults denotes the following categories: confusing websites, jargon, visual and hearing disabilities, use of color, searching for a site.

Online sites may be confusing to some older adults in their design or organization. Hutchinson, Eastman, Tirrito (1997) note that the older adults in their survey reported difficulty remembering recently learned concepts because of complex software. Some researchers proposed suggestions to eliminate this confusion, after studying older adults and online technologies. Mead et al. (1999) advise that designers should "Reduce working memory

demands, facilitate proceduralisation, and provide environmental support" (p. 569). It is also helpful to use clear and concise headings (DeOllos & Morris, 1999; Jakobi, 1999). Ellis & Kurniawan, (2000) propose highlighting important information, using grouping and well designed visual cues (text links, buttons etc.) to reduce confusion. Simple step-by-step instructions were also very helpful to older adults in these studies (Opalinski, 2000, Mead et al., 1999). Although oversimplification of content or instructions may be viewed as patronizing, and does not aid in comprehension (Friend, 2001), Jakobi (1999) specifically recommends using clear narrative written no higher than the eighth grade level.

The American Heritage dictionary (1993) defines jargon as, "the specialized or technical language of a trade" (p. 726). FAQ, shareware, RTM, newbie, wallpaper, three-finger salute and mouse droppings are all examples of jargon or hacker slang (Raymond, 1993). Research has shown that using jargon within a website or online may cause confusion and frustration, and may lead to the abandonment of online technologies for some older adults (DeOllos & Morris, 1999). Morris (1994) surveyed older adults before and after a basic computer course, and found that after taking the course, their opinions went from "agree" to "undecided" or "disagree" when asked if they were confident with computer terminology. This illustrates that even after a computer course designed to teach computer basics, jargon can still be confusing and daunting. Zandri & Charness (1989) conducted an experiment where half of the participants' (older and younger) used a jargon sheet, and the other half did not. They noted that older adults who used a jargon sheet asked fewer questions and took less time on the task. However, not all groups benefited from the use of the jargon sheet in that particular study.

Much research has been conducted observing that older adults may be hearing or visually impaired and this fact must be addressed when designing online technologies.

Jakobi (1999) noted that it is hard to find sites designed especially for the visually impaired. A review of the literature found that the most important item to consider when designing web pages for seniors, is a larger text size (Ellis & Kurniawan, 2000; Hutchinson, et al., 1997; Jakobi, 1999; Opalinski, 2000). Mead et al. (1999) found that, "In general, older adults are capable of cursor positioning accuracy nearly equal to that of younger adults" if the target is larger rather than smaller (p. 568). Hutchinson, et al. (1997) designed a screen layout where seniors were able to alter the size of the text by clicking on large buttons. Ellis and Kurniawan (2000) decided, with the help of a group of elders in a participatory design of a website, that a larger 14-point sans serif font was most effective. Lawhon et al. (1996) suggested a list of improvements such as voice recognition software, head-controlled keyboard/mouse, or text-to speech software to read documents aloud. Morris (1994) proposed that multimedia may allow elders to "overcome potential limitations" (p. 553)…for example, using a text reader or other audio for elders with visual disabilities.

Color contrasts and white space can help or hinder an older adult while browsing a website. DeOllos & Morris (1999) conducted a website analysis and discovered that even on older adult sites, it was difficult to read buttons because of the color combinations. For example, "red print, trimmed in gold makes the letters appear fuzzy on the screen" (p. 116). It was found that contrasting colors work better such as a light text on an dark background or vice versa to emphasize high contrast (Ellis & Kurniawan, 2000; Jakobi, 1999).

Searching for websites may also be overwhelming. DeOllos & Morris (1999) labeled this phenomenon the "Information Frustration Syndrome" (p. 114). Search engines list hundreds of sites after one query. Visiting each site to find the correct information would be

impossible. Using a large amount of hypertext and jumps is also frustrating when searching a website (Mead et al., 1999).

Studies Detailing Older Adults Learning a Computer Process

White and Weatherall (2000) conducted a qualitative case study in New Zealand, using grounded theory to analyze the data. They interviewed six adults, ages 59 to 77 years old, who had been using the computer. Interviews which last 40 minutes, contained self-reported data of how the elders started using information technology (IT), opinions, experiences and benefits and reasons for using IT. They coded after 2 interviews and alterations were made to following interviews. The five themes emerged from the data were:

- Computer technology was connected to hobbies and interests
- Positive aging was brought about by mental and social stimulation on the computer
- Cost of computer time and equipment was an issue
- The computer was viewed as a tool
- Communication via e-mail was important.

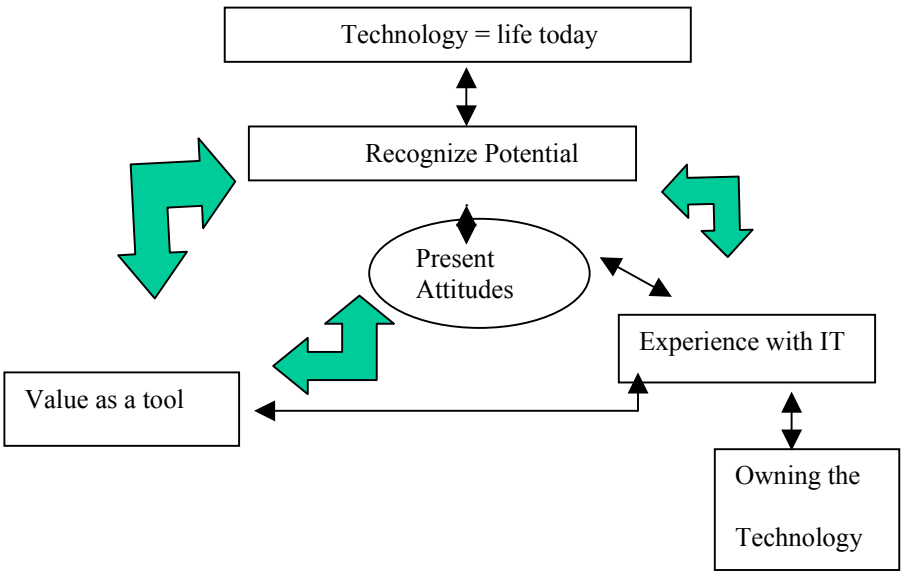

Figure 5. Process Model of Older Adults' Involvement with IT.

Figure 5 shows "entry into the process of involvement with information technology (White & Weatherall, 2000, p. 337)". This model is based on older adults' attitudes, experiences with computers, and a desire to learn information technology. Because older adults found the computer to be

useful for communication and hobbies, it promoted positive attitudes.

Rich (1993) conducted a qualitative case-study approach to examine the process of how older adults learn to use word processing software (WordPerfect®). Seven adults, 59 - 77 years old, took an eight-hour class to learn word processing basics. The classes were video taped and the researcher observed. The instructor was from a computer training company. Three interviews were conducted with each participant and one with the instructor. How and why questions about each individual's learning process were asked during the interviews. Her findings identified six themes including: the training class environment, past experiences, learning strategies and instructional preferences, motivation, attitudes about computers and computer technology, and computer manipulations skills. This research augmented Rich's study by adding a process to the way older adults learn computer technology. It also added the aspect of older adults learning online as compared to learning word processing.

Lawson (1997) attempted to better understand initiative-taking and responses to older adults learning computer technology and the implications to their future attempts at learning. Twenty-seven adults over 65 years old who had exposure to computer technology and an interest in learning more were recruited to participate in three focus groups (11, 6, and 5 participants per group). Three interviews were also conducted, two with two people each, and the final interview was one-on-one. Learning predisposition and the influences of the learning process were the two categories that emerged from her data. The themes for learning predisposition included: "self concept, family interaction, and social functions" (p. 57). The three process themes included: "speaking the language, knowing the basics, and accepting the complexity" (p. 57).

In summary, after reviewing the literature, the researcher had a better understanding of the "truth," as presented in previous studies, behind the older adult learning experiences

concerning computer technology, rather than believing the typical stereotype of the older adult who is filled with anxiety and has a negative attitude toward online technology. This information assisted the researcher during the interview process, and analysis of the data. Integrating the literature provided the researcher with a base of knowledge important for conducting this study. At the same time, the researcher was open to new findings and observations that did not coincide with the studies listed.

Gaps in the literature

This chapter has reviewed the literature on older adult learning theories, computer and online technology, and how older adults learn this technology. No qualitative study was found in this literature review that explored the processes of older adults as they learn online technologies. Specifically, there were no studies that followed the process of movement from non-literate to literate, including responses to challenges, and the consequences of successes. No previous research, to the writer's knowledge, has observed an older adult learning on his or her own, without the benefit of a class designed to aid in data gathering. Again, many articles report that older adults benefit from working with computers, word processing, and even online applications. This literature is important to consider when studying how older adults learn online technology and provides a springboard from which this study is based. The review of the literature revealed little information written on older adults and the process of *how* they learn online technologies such as the Internet or e-mail. A qualitative, grounded theory case study of individual behavior, as learning online technologies proceeds, has not been documented in the literature. It is the position of the researcher that a detailed qualitative study is needed to augment the literature on these experiences and processes for both theoretical and practical purposes. Hopefully, this research will lead to more studies based on the theory of older adult

learning and moreover add to the knowledge base of practitioners who can potentially use this information to create more effective educational procedures and curriculum.

Chapter Three: **Methodology**

"We put two particulars together and come to a generalization, and apply it to a new particular. If we have more experience, we have more things to relate to, and if our experience is of a high conceptual order and we relate two concepts to one another, the chances of achieving some kind of a relationship of significance is compounded – theoretically. If a person's learning ability, habits and skills are kept fresh, experience properly invested and properly cultured can be a substantial source of strength."

Howard Yale McClusky (1976, p. 120)

Design

The genesis for the research design occurred when I placed an article in a newsletter for a retirement community computer club for seniors. The article (see Appendix C) was targeted to those 55 years and older who had already learned online computer technologies such as e-mail and the Internet. The intent was to gather ideas for topics concerning seniors online and for the seniors to send them by e-mail. The responses I received were *not* haphazardly typed, short e-mail notes. Each e-mail response told a detailed personal story (see Appendix D for an example). After carefully reading each message, it became clear that it was important to capture the distinct stories told by each senior participant. Moreover, a review of the literature revealed a gap in the area concerning the process and experience of how older adults learn online technology.

A qualitative case study approach is ideally suited for this study because, as defined by Merriam and Simpson (2000, p. 109), a case study is "an intensive study of a particular social unit." In this research, the social unit would be a single participant. Yin (1994, p. 9) states that if "a 'how' or 'why' question is being asked about a contemporary set of events, over which the investigator has little or no control," a case study should be used. Employing a qualitative case study approach, I gathered information by using interviews and direct observations. Both techniques required sensitivity to the participant and objectivity.

Participants

The participants for this study consisted of older adults, sixty-five years of age or older, who reported that they had not used the Internet or e-mail. The rationale for deciding on this age was straightforward. Sixty-five is the traditional age of retirement in the United States and was the definition I used to define "older adult."

I pre-interviewed each participant to ensure that they were indeed novices to online technology. From a pilot study, I learned that although some older adults report that they have not used online technology, they have actually been dabbling with it for years. They just believe that since they are not as good as they would like to be, they should report having no experience or knowledge.

Participant Anonymity

Each participant was identified by his or her first name initial to ensure anonymity. Specific locations and family members' names are blacked out in the transcript used while coding with other researchers and in the final document. The participant received a copy of the transcription to review for accuracy and was invited to make changes if necessary. Also, each participant completed an informed consent form (see Appendix E) that described the basis and procedures for the research and assured that each participant would not be identified. The informed consent form was shared with the participant during the first interview in a conversational manner. This eased the awkwardness of extending a legal form when trying to stress confidentiality and gain trust (Rubin & Rubin, 1995). These practices added to my credibility as an interviewer, informed the participant, and provided a document that we both agreed upon.

Pilot Study

During the pilot study, I conducted an 8-week Internet and e-mail workshop in a seminar/lecture/question and answer format at a local University's Learning in Retirement program. Students completed an information form (see Appendix F) and introduced themselves to the class. The class participants chose the topics that they were interested in learning. They gathered into groups of eight to ten people and wrote on a flip chart the five things that they most

wanted to learn. The topics chosen for the eight weeks were turned into the objectives for the class. As the facilitator of the class, I asked for volunteers to participate in research related to the Internet. Volunteers were asked if they were new to the Internet and e-mail. It was specified verbally and on the volunteer form (see Appendix G) that it was necessary that the participants had never used the Internet or e-mail. Two participants were chosen because they reported that they had no experience with e-mail and the Internet and because of their proximity to the researcher. These two participated in a pilot study so that the researcher could fine-tune interview techniques/topics, observation forms, video-taping techniques, and the overall "interview" experience.

Recruitment and Selection of Participants

As a result of teaching the class for the pilot study, I had built a good relationship with the faculty of George Mason University's Learning in Retirement program. The Program Committee Chairperson helped by distributing volunteer forms in classes and forwarding information on students who fit the criteria. I created forms that included information about the study and a description of the ideal participant (see Appendix H). The forms were placed in a SeniorNet classroom. SeniorNet is a national program available in some shopping malls where seniors teach other seniors computer skills. The teachers were asked to support this initiative by describing the study and asking for volunteers. The forms were also posted at two retirement communities in Northern Virginia and South Western Florida. I continued to gather volunteers until there was a small set or pool from which to choose. I also asked friends, colleagues, and family if they knew of any older adult who matched the following criteria for this research.

The ideal participant had no experience using e-mail or the Internet. It was best if they had their own computer, but have not used it for online technologies (however, it was acceptable

if they had unlimited access to any computer). Another criterion beneficial in choosing a participant was a desire to learn e-mail and the Internet. It has been theorized that adults learn when they experience a need to learn (Lindeman, 1926). To encourage the older adult participants, I sent e-mail messages to periodically check that they were using the online technologies. Data gathered from each participant observed the following plan in order to obtain the detailed information necessary.

Sources and Procedures for Data Collection

After the first participant was chosen, data triangulation was used in the form of interviews, observations, and journal entries. During an analysis sequence, the data were coded after each interview to develop pertinent questions to ask and create topics to be explored in the next interview. Table 2 details the process of data collection for each participant.

During the entire data collection process, the researcher was aware of the older adult learning framework discussed in Chapter Two. Mary Alice Wolf (1988b) warned future interviewers of older adults, not to distance themselves from the "human experience of aging" (p. 129) and to "limit the professional distancing that data collection often creates" (130). This background assisted the researcher to have an open mind in order to understand each participant's experience and process.

Table 2
Procedures for Data Collection

	When	Purpose
Interview #1	Before participant uses online technologies	To collect background, demographic information, and determine how the participant perceives he or she learns best.
Interview #2	Directly after participant has started using online technologies	To gather information as to how participant learns online technologies. Determine critical points, challenges and successes to create process.
Video #1	First times the participant has gone online after he or she set up computer for e-mail	To observe the participant learning online technologies. Focus on the nonverbal behavior, questions asked. Take a baseline.
Watch Video and Comment	Directly after first video Gather data on settings, history, e-mail address book	To have the participant add anything about the experience of being videotaped.
Interview #3	After data from Interview 1&2 and video #1 have been analyzed. Participant using online technologies for a while (20 times approx.).	To gather information as to how participant learns online technologies. Determine critical points, challenges and successes to create process.
Video #2	After the participant has been using online technologies for approximately 20 times.	To observe the participant learning online technologies. Focus on the nonverbal behavior, questions asked. Look for critical points, challenges, and successes since the last video.
Watch Video and Comment	Directly after second video Gather data on settings, history, e-mail address book	To have the participant add anything about the experience of being videotaped.
Interview #4	After data from Video #2 and Interview #3 have been analyzed.	To ask specific questions about past videotapes or interviews. This interview will be customized for each participant.
Video #3	After the participant has been using online technologies.	To observe the participant learning online technologies. Focus on the nonverbal behavior, questions asked. Look for critical points, challenges, and successes since the last video.
Watch Video and Comment	Directly after third video Gather data on settings, history, e-mail address book	To have the participant add anything about the experience of being videotaped.
Interview #5	Final Interview after previous has been coded.	To ask specific questions about past videotapes or interviews. This interview will be customized for each participant.

Note. Colors denote the same day.

The interviews consisted of a mixture of questions, observations, and remarks. The first interview asked questions about the participant's background and topics dealing with the computer in general (see Appendix I). The purpose of this interview was to establish good rapport with the participant and gather information about previous learning techniques. The second and third interview sessions were conducted to discover how the participants used online technologies after they began using the Internet and e-mail (see Appendix J). Challenges and successes were defined individually by each participant in the study. For example, they were asked, "What do you see as a success and what would you deem a setback?" These questions were modified as the study progressed. Such an approach permited adapting the plan for the research to include variables that were not anticipated before the study began. The final interview was customized for each participant and consisted of specific questions concerning the previous interviews and observations (For an example, see Appendix K).

The participant was also videotaped three times during the process. The first videotape was used as a baseline to determine that the participant's knowledge, skills, and experiences were indeed novice. The participant was told to use her e-mail and then search for anything of interest on the Internet. As the observer, I took notes quietly and was in the room in case of a problem with the video or audio equipment. If the participant asked a question during the videotaping, I responded by asking her a question in return. For example, I asked, "What do you think you should do"? If the participant asked a direct question after she had determined that she could not find the proper command or answer, I offered a suggestion and directed her to other resources. I also recorded the problem carefully in each case. When she made a decision (correct or not), I asked her to expand on why she chose that particular direction or made that choice. This teachable moment was important to document and examine closely.

Transcriptions from the pilot study were analyzed to help create questions, topics, and, most specifically, probes and follow-up questions to help the participant best describe the learning process. Also, during the interview, the participant was asked to listen to what she had just answered (rewind, then play the tiny tape recorder) in order to better clarify her statements, if necessary. I also studied the body language on the videotapes and asked the participant what she was thinking when that specific body language occurred. Follow-up with e-mails and telephone calls to the participant as well as asking more in-depth questions in the final interview was also a method by which the researcher gathered, clarified, and detailed data.

The videotaping was also recorded and transcribed. During the pilot study, I created observation forms to document the videos. These forms proved to be cumbersome when used by a group of Ph.D. candidates and me as an exercise in a grounded theory coding class. I decided to transcribe the tapes and type nonverbal behaviors of the participant in an all caps, to be coded along with the original transcription. Nonverbal behaviors were also documented and evaluated by the participant as she watched the videotape. These comments may define a success or challenge or help to clarify a behavior. For example, during the pilot study one of the participants sighed heavily. At first, I thought it was out of frustration. When I asked her, "Why such a big sigh?" she laughed and said, "I was just a bit tired, I guess." She then went on to say that she had been up late the night before cooking, because her family was visiting for the weekend. Hence, the nonverbal behavior was labeled tiredness instead of frustration. This process helped to clarify the participant's behaviors. Next, this updated transcription was coded along with the interviews. The above mentioned grounded theory coding class also watched the videos and assisted with comments and the coding process.

I used memos in Ethnograph□, as well as a journal, to document the progress of the research. The participants were given a journal (during the first interview) and asked to record notes, ideas and thoughts about using online technology. They were asked to keep the journal near their computer workspace so that it would be convenient when they were online. They were asked to make notes about any reflections. Meaning-making and critical reflection are important to adult education (Brookfield, 1986; Wolf, 1994). Clark (1994) suggests that journals provide an outlet for growth and critical reflection. Observing and recording participants' experiences is vital, but "equally important is the ability to make meaning out of what is expressed" (Clark, 1994, p. 355). Daloz (1986) suggests that teachers provide a "mirror" for their students in order for the students to see their progress. Learning journals provide a method for documenting this process (Wolf, 1991; Kerka, 1996). This medium is also applicable to goal setting for older adults (Clark, 1994). To encourage the participants to journal, I sent e-mail notes asking them to document any web sites they had recently visited. I also asked them directly to write a brief note in their journal about the past week. Journal entries informed this study by detailing the participants' thoughts as they proceeded along the journey from non-literate to literate with online technologies. In this study, the journal entries were also coded using the grounded theory approach as described in the following section.

Once all of the data were analyzed from the first participant, another participant was chosen. This was an iterative process in order to get a better understanding of how the participants learn online technologies. The second participant was chosen from the pool described in the previous section–recruitment and selection of participants. It was difficult to gather a pool of people to meet the strict criteria. I interviewed two people who realized that they could not participate in the study because they lacked access to a computer at this time.

Thus, timing was an important criterion in this study. The second participant was demographically different from the first participant in that she had never worked full time outside her home. She was chosen because she met the criteria and she volunteered her time and energy during the data gathering process.

Theoretical Sensitivity

Theoretical sensitivity as defined by Strauss and Corbin (1990) includes "seeing beneath the obvious to discover the new" and this happens to "prepared minds" (p. 46). Professional experience can be seen as promoting theoretical sensitivity. My qualifications as a computer instructor for ten years gives me the ability to anticipate challenges, the knowledge to understand the material, and vast experience with the software. However, I realized that I must maintain objectivity and restrain my passion for helping people learn. As I learned in the pilot study, I must be a quiet observer and offer direction only after the participant has expressed a verbal request for specific assistance. As Strauss and Corbin (1998) suggest, "…it is not the researcher's perception or the perspective that matters but rather how research participants see events or happenings" (p. 47). Being aware of these factors led to a more informed analysis of the interview process between each participant and me (Merriam, 1998).

Data Coding and Analysis

The interviews, observations, and journal entries were coded using the grounded theory method (Strauss & Corbin, 1990, 1998) using open coding, axial coding, selective coding and coding for process. I used Ethnograph□ software to code the transcribed interviews.
I have been using this software for three years and have also studied the manual (Seidel, 1998) and trained others in its use. The coding process is documented in the following paragraphs.

Open Coding

First, I begin analysis with open coding. During this process, the transcription of the interviews and videotapes was imported into Ethnograph □, examined, broken down, compared and labeled, word by word, sentence by sentence, and paragraph by paragraph. Specifically, I read a sentence or a line or two of text and asked myself, "What is the main idea from the participant's point of view?" I then labeled (coded) that idea by describing the properties and dimensions of the idea in order to compare it to other codes in the axial coding process. Strauss and Corbin (1998, p. 101) define these terms as:

Properties: Characteristics of a category, the delineation of which defines and gives it meaning

Dimensions: The range along which general properties of a category vary, giving specification to a category and variation to the theory.

Axial Coding

Next, in the axial coding process, open codes were categorized and put together to form new codes, categories, or subcategories. For example, I had lines of data that were open coded and labeled "ask Lori," "son help," and "husband help." Using axial coding I asked myself, "Do these codes belong together? Do they have the same meaning?" I was also looking for patterns and subcategories. In order to do this, I went back into the context of the transcript to read for the exact definition. Using the coding example above, I used an axial code called "help at side" to show all of the dimensions that she used as support as she used her computer. This code was then placed under a category called "Resources" in the code book family tree.

Code Book

I also used a code book family tree to help organize this process. Ethnograph software provided an option to view codes in a tree-like hierarchy. This visual image was helpful to see the categories and subcategories. It was also simple to move one subcategory to another category if necessary.

Selective Coding

During the selective coding process the core categories were discovered. According to Strauss and Corbin (1990), the core category is the "central phenomenon around which all other categories are integrated" (p. 116). Then, other categories were compared and related to the core category. The first step in this procedure was to create a story line. This story line was based on the data and detailed each participant's process and their end result. The story line was documented by using a chart, using critical incidents (gained from the data) as squares on the chart. The story is also expressed in narrative form. The next steps consisted of relating the data to the categories and finally to the core category. The goal is to list the properties and dimensions of the central phenomena that emerge from the data. They can then be grouped, compared, and related to each other at a more conceptual level than axial coding. Strauss and Corbin (1990) state that, "validating one's theory against the data completes its grounding" (p. 133). This feat is accomplished by creating narrative memos that are compared and "validated against the data" (Strauss & Corbin, 1990, p. 134).

Memoing

Throughout the entire analysis, memos were created to help with future coding processes. I used memos to aid in the interview process. For example, I realized after the first interview, during the coding process, that more information was needed regarding efficiency, so, I wrote a

memo. Memos were used to create or update questions for the next interview. These memos were also used during selective coding in order to lead to the process step. Memos were used to document why certain codes were used and helped to define and dimentionalize concepts during the coding process.

Coding for Process

Finally, the researcher looked at the methods that each older adult used as described through the coding process (as "snapshots") and tried to describe the process in as much detail as possible. Process is defined as "to give the reader a sense of the flow of events that occur with the passage of time" (Strauss & Corbin, 1990, p.147). I also determined "phases or stages" to describe the process (Strauss & Corbin, 1990, p. 153).

Criteria for Judging the Quality of this Research Study

Trustworthiness

At the conclusion of this study, audiotapes, videotapes and transcripts will be destroyed to preserve the anonymity of the participants. If the participant requested to share something "off the record" I complied by turning the recorder off, and listening. I let the participants read their transcript as soon as it was transcribed. I also answered all of their questions and let them know that it was permissible for them to ask me questions. At this time we became partners in the hunt for the truth (Rubin & Rubin, 1995). Sometimes, when a participant asks a question it is to make sure that I am trustworthy.

I used the four criteria of the GUBA model: truth-value, applicability, consistency, and neutrality to ensure that my research was trustworthy (Lincoln & Guba, 1985). These criteria

can be compared by research approach (see Table 3).

Table 3
Comparison of Criteria by Research Approach

Criterion	Qualitative Approach	Quantitative Approach
Truth Value	Credibility	Internal Validity
Applicability	Transferability	External Validity
Consistency	Dependability	Reliability
Neutrality	Conformability	Objectivity

NOTE: (Krefting, L., 1999) p. 176. Adopted with permission..

Next, I addressed each strategy to increase the trustworthiness in a qualitative research approach. The focus of each strategy was based on the research.

Credibility

Five techniques described by Lincoln and Guba (1985) were used in this study to establish credibility to instill trustworthiness. First, prolonged field experience was demonstrated by using a detailed interview and observation process to ensure an understanding of the context for each participant. Meeting with each participant five times helped build trusting rapport. Next, persistent observation helped me to "describe in detail just how this process of tentative identification and detailed exploration was carried out" (Lincoln & Guba, 1985, p. 304). Thirdly, triangulation was implemented by using multiple, iterative interviews, videotaping observations, and journaling by the participants and the researcher. Peer debriefing was also used during meetings as fellow Ph.D. candidates met to review transcripts of the data, ask questions, offer advice, and provide catharsis throughout this process. Finally, I let the participants read the transcript of the interviews after the interview phase was complete and the data had been transcribed. The participant read the documents, commented, and clarified. Also,

during the interview, I may have played back a participant's response to ask for further clarification. Using these five techniques assisted to ensure credibility in this study.

Transferability

As a qualitative case study with a low number of participants, this research is not generalizeable to all older adults. Phenomena were discovered, however, that may warrant further research in this area. To establish the best transferability, I attempted to gather explicitly detailed information from each participant to better understand the process of how older adults learn online technologies.

Dependability

Grounded theory (Strauss & Corbin, 1990, 1998) was used to guarantee that dependability was met. A group of Ph.D. students and their professor in a grounded theory coding class conducted a dependability audit. They analyzed the procedures, offered advice and ideas. The data were also coded and re-coded in order to ensure dependability.

Confirmability

Working with a committee, I conducted a confirmability audit. The organization of the data, research notes, memos, and coding process was documented in my journal during the research process. The goal of this strategy was to make sure that the "findings are grounded in the data" (Lincoln & Guba, 1985, p. 323).

Reporting the Findings

The findings are described and analyzed. The interpretation of the results of the study are presented in Chapter Five. The results are presented in narrative format, describing the process and experience of the participants, grounded in theory. According to Merriam and Simpson (2000, p. 177), "interpretation may be interwoven with factual results" in a qualitative grounded

theory study. A chart is used to denote the process and document critical incidents that occurred for each participant. The final section explains the conclusions and suggestions for further study.

Conclusion

Since there will be an "age wave" in the near future, and technology is increasing exponentially, we must be able to better understand just how to more effectively help older adults learn to use online technology. This study will inform our understanding of the process of how two older adults learned online technologies, so that future generations of older adults may learn impending technologies similar to the Internet or e-mail. Moreover, this research augments the literature detailing older adults learning online computer technology.

Chapter Four: Findings

"Three developments or trends that exemplify modern, post-industrial societies are: the invention and proliferation of the Personal Computer, the emergence of the Internet as a technological and social force, and the inexorable aging of our, and other populations."

DeOllos & Morris, 1999, p. 107.

Introduction

The findings are presented in the form of two case study narratives: RJ and Em. As indicated in Chapter Three, *each* participant was interviewed eight times and video taped three times during a time period of six to eight weeks. These findings are depicted via a description and analysis of the process of learning how to use the Internet and e-mail. Both behavioral steps and cognitive transitions are detailed in each case study.

A visual for each participant is depicted (see Figure 6 for RJ and Figure 7 for Em) to describe the learning process. Each chart was created using a grounded theory methodology (Strauss & Corbin, 1998). The transcripts were coded until the codes formed a tree. This tree listed the process of how RJ and Em learned and experienced online technologies. Each code was defined within the context of the narrative transcription. Next, the researcher triangulated the information on the tree by re-reading the transcriptions repeatedly from start to finish, to discover a sequence in the process.

Quotations from the transcriptions are used in the narratives below. They are labeled using the participant's pseudonym, number of the interview or video, and lines of text.

Narrative ~ RJ

Background

RJ is a healthy seventy-two-year-old woman who lives with her husband of fifty-two years in a single family home in a suburban neighborhood in Northern Virginia. She has been retired for 11 years and enjoys traveling the world with her husband.

She received a degree in psychology then got married. She stayed home with her eight children and performed "pretty high level" volunteer work. She now has 8 children, 7 in-law children and 11 grand children all of whom use e-mail.

After 25 years she went back to work for the county. RJ is always learning; she received a Masters in Public Administration 30 years after her Bachelors degree. She had a stressful job where she intensively supervised a non-violent criminals and felons program. She started the program by herself. When she left 10 years later she was directing nine employees.

She retired when all the agencies were becoming computerized. She knew she could learn how to use the computers but realized that it was more efficient (at the time), for her purposes, to direct her secretary. She said it was almost a relief to retire.

> The office and all of the county agencies, of course, were going on computers. So I'm relating this to computers, that is not why I retired, but that may have something to do with it. My secretary was much more useful than I. I was at a point where I could tell them what I wanted: to be able to find out quickly on computers. I was a little leery of the whole process. So when I did decide to retire because my husband had already retired, it was almost a relief, that I didn't have to worry about the computer or computerizing of our program, and left it up to others who understood computers better than I. RJ#1 lines 15 - 30.

However, RJ did realize that she could learn, although she did not have to at the time. She could tell others what she wanted done and they would use the computer to perform the task.

> Although certainly I could tell them they were in the process of planning what to do and I could tell them what we needed. And if I had intended to stay I'm sure I would have managed to deal with this. But, I think I escaped to little extent. RJ#1 lines 32 - 38.

She recently quit all of the committees she was working on (big wig county stuff i.e. : abused children, charities, etc.) and returned to working one-on-one with people. She is now a hospice volunteer (once a week for 2 hours) and helps people who are dying. She still works with the county to interview people at the jail to make determinations on inmate's futures with the supervised work program. She now interviews to see if inmates are appropriate candidates for the program. She also works with church, social action work, and network services.

> And just about 4 years ago I quit all the committees I was on. I decided I wanted to get back to people. I was on 2 or 3 county committees when I retired, I said

> you know [refers to a friend], I just need to deal with people again. When I stopped working you carried them on your shoulders all of the time whether you know it or not you carried it around. And I just didn't want to do that. So, I just wanted to, I went on 2 or 3 committees, I was involved with which is abused children, I was involved with some Catholic charities committee, and committees for the county which I had gotten on once I quit work. So I just quit those 3 or 4 years ago and told her I was going to deal with people again. RJ#1 lines 1076-1094.

She enjoys a challenge.

> RJ: I'm 71 years old! I would like to be able to say ok, I've mastered another task. I mean this is why you go to class, you learn things. This is why you start new things. As you're older you begin because you want to. This is just another thing new thing that I never had the courage to work on. RJ#1 lines 832 - 839.

Environment

RJ's computer is set up in the lower level of the ranch tri-level house. A small set of steps led to the main level where we conducted our interviews in her comfortable living room, near the kitchen and front door. The third level was separated by another small flight of approximately five steps and housed the bedrooms. Her computer room consisted of a computer desk, chair, couch, coffee table, and another desk. It was filled with pictures and large volumes of books of slides from their many trips. The room temperature was excellent, especially in the summer months, and within speaking distance from the other floors.

The interview process lasted just over six weeks and generated over ten hours worth of data. The researcher met with RJ five different times. RJ was interviewed eight times (two times during three of the days) and video taped three times (see table 2 for a visual of the process).

Past Processes of Learning How to Use Computers

RJ had tried to learn how to use the computer before this study. She took two computer courses in the early 1990s but they did not help her learn. She decided that the computer classes

were not aimed at learning how to use a computer but based more on terminology. That was not her style of learning for a novice like herself. She also was not interested in what they were teaching. She could not remember using the method learning by rote or blindly following the directions of the instructor.

Courses

> I took two computer courses, which you can see did nothing for me. I took one from the county. A beginning computer course, and took one at L. R. I.. A beginning computer course. Most people in both classes were used to computers, which made it difficult for someone like me who simply was coming in completely new. RJ#1 lines 196-203.
>
> Ahh, they seem to be taking the approach that you had to know how a computer works, before you could use it successfully. RJ#1 lines 208 - 211.
>
> I didn't care, and I went through, probably eight hours each class at the time, kind of understanding what they were saying, doing what they told me to do on the computers that were in the class. I had no idea what I did. I don't remember any of it. I think I am blanking out computers. I really do. RJ#1 lines 216 - 224.

Husband as Teacher

She also tried to learn from her husband, P. He wrote step by step directions on a sheet of paper, which was kept near the computer.

> There is a piece of paper that I can show you downstairs that my husband has there for me, and tells me step by step what to do to retrieve e-mail. I can do that step by step. I have no idea why am taking the steps. I just follow directions. I follow directions well. (Laughs) RJ#1 lines 41 - 48.

If she had a question that was not on the paper she would maybe try 1/2 an hour later or months later. When or if she got a bad error message she did not try again for several months.

> I haven't actually gone after e-mail for several months, because the last time I tried the machine said nasty things to me about what I have done to it. It said I made some dreadful mistake, and that I had to correct it. My husband was out of town, which was the only reason I was doing it [working on the computer]. So following his intricate directions, which [I did] when things get really bad. I just shut it off. It happens a lot (laughs).
> LORI: When was that?

> RJ: Oh, maybe six months ago.
> LORI: laughing. Okay. So you have not touched the computer
> RJ: I don't think so. (Laughing) RJ#1 lines 92 - 112.

Son as Teacher

RJ was determined to learn the computer and had a plan for her son, E, to teach her. She decided that he would be a good teacher because he is patient, but it never worked out because of scheduling.

> One of my sons said he would come up and do it regularly with me. RJ #1 lines 484 - 486.

> And he is a good teacher He is very patient to be the teacher. RJ#1 *lines 491 - 492.*

> With E, I probably would not become as frustrated. But somehow we never worked that out. I mean with all of the good will in the world it never worked out. *RJ #1 lines 497 - 501*.

Past Learning Methods

RJ has learned how to use technology in the past. She can use her VCR and regularly uses an ATM machine. To learn the VCR, RJ read the manual that came with the machine. She followed the step by step instructions, practiced about five times and learned the method.

> Friends of mine say that they can't use VCR. I had no problems with that. But I learned, I taught myself how to do that by using the book. I follow directions; it tells you how to do it. Step-by-step and if you follow the book about five times. And then you know it's happening I can just remember to do it and I don't need the book anymore. I guess that's how I learned it. Just following the reasonable directions from the manual that you push program, then you press set, and then you go up or down; it made infinite good sense. So, I've never quite understood why people can't program a VCR.RJ #1 lines 558 - 574.

To learn the ATM machine RJ had her husband by her side. She read the directions on the machine and used a trial and error method to remember. She found the entire process quite simple.

> RJ: I probably was not alone. I probably had my husband at my side.
> LORI: okay
> RJ: And I said, show me how
> LORI: okay
> RJ: But then when I realized that all I had to do was the to make sure that that I put the card in right and if it doesn't work [it is] because it [the card] is upside down. But you put the card in right and you follow the directions, it's perfectly simple. RJ#1 liness 696 - 712

What She Does Not Do and Why

No Notes

RJ does not write notes at all. She has determined that it is quicker to know the material and not to rely on paper. She thinks this is a very efficient method to be able to remember the directions.

> RJ: Because I don't want to use a piece of paper. I mean that's stupid.
> LORI: Why do you say so?
> RJ: that shows such a supreme lack of ability. You have to go step-by-step at someone else's word. I just want to be able to do it myself.
> LORI: is there a pride factor in that?
> RJ: I think probably as much as anything. It would be quicker. We're back to efficiency
> LORI: got it.
> RJ: It would be much quicker not to have to check that list to figure out what I Xed out what I say okay, and what I cancel. You know. RJ#2 lines 580 - 604.

No Classes

As mentioned earlier, she does not like to learn in a class environment. She thinks that maybe if she were in a class with all seniors that might be more helpful.

> And I have occasionally been tempted to and if they got handed to me I would have done it I guess. They give special courses for seniors. I know they had some at the Jewish community center. And they had some down at route one, it was not the Adult Ed program but it was a private program. But it was geared for seniors. I just have a feeling that might do. Because it is geared to people who for some reason have reached the age we are at. We have not grown up with computers as our children did. RJ#1 liness 235-249.

No Husband as Teacher

She does not learn by using her husband as her teacher.

> My husband's infinitely patient. But I have always found it difficult to learn from him. I get frustrated learning from him. That's because we're close. RJ #1 lines 493- 496

No Terminology

She does not feel the need to learn computer terminology. At first she saw this as a problem, then realized that she does not need to know how the computer works in order to learn how to use it.

> My problem is I don't know the proper terminology. The icons that come up at the very beginning, what do you call that? RJ#4IVAV lines 103-106

> I believe that's what we'll call it and it will disappear, it's calling out something and I'm not sure why is it through the modem? I guess because they asked for a shortcut to my connection to think now is when I double-click on that Netscape communicator. I'm not sure but we'll find out. POINTS. HAND TO FACE OVER MOUTH
> LORI: is that the communicator thing you were talking about before?
> RJ: this Netscape, right, communicator, right, I'm sorry. Yes. That was what I was really talking about when I was saying navigator. I meant Netscape, okay. And I think, I think I start communicating. *RJ #2 vid1 lines 34 - 51*

> RJ: I sort of saw it as Netscape and I thought, I used the wrong name for some reason. and I knew what I had meant when I had been talking about the icon. It said Netscape, it didn't say navigator. I knew there was a connection and that is why
> LORI: Because when we were doing the computer you actually saw it that it said..Navigator at one point and Netscape at another point.
> RJ: And then I realized then, that they were the same thing. That I had been ok on everything. Because you knew what I meant when I said navigator. RJ#2IVAF liness 17-31

RJ realized that the terminology got in the way of her learning process. She does not care to know the terminology in order to do what she is interested in doing, which is reading and sending e-mail and searching the Internet.

> I think that's one of the things that turned me off, was trying to remember correct terminology and I don't. You can tell, I don't know. I had to ask PJ three times what the name of the page was that we were missing, because I just knew that we were missing that one, but I could never remember what it was called, I mean, I

> was trying to tell some of my children, you know, we've lost this page and I had to keep asking him what you called what disappeared. RJ#$IVAV lines 211-223

> RJ: I know what I mean, you know what I meant, but I didn't know the name for it and I don't. I keep not knowing the names when I'm trying to describe something to someone.
> LORI: Has that hindered you at all?
> RJ: Oh no, because what difference does it make for what I want to do. It just doesn't matter for me. If there's something wrong, I have to go to someone else to help me fix it and they can figure out what page I'm talking about. But the few things that I really want to do with this I don't need that. RJ#4 IVAV lines 266 - 282.

Does not call for technical problems

She does not call the company directly, she has PJ or one of the kids do that. And when she is really stuck, she has PJ try to fix the error. If PJ is not able to fix it she has one of her kids fix the error while visiting.

> I had problems with Netscape, freezing frequently, PJ's working on that. uhhh We lost the message center page, which was kind of intriguing, because we couldn't get it back. But, PJ got around it by going through tools and message center, so I can do that. Only one of our kids was here yesterday and went down and took care of it, because it has to do with – PJ, what are those little bars called that he said I probably clicked on, or someone had, and it lost the message center page? RJ #4 iv lines 105-112.

Does not call Researcher

During the weeks RJ was learning online technologies she never called me at home. She also never e-mailed me with questions. I was obviously not one of her resources that she felt inclined to call or e-mail. However, when I was in her house she considered me one of her first choices to ask if a question came up.

RJ's Process Learning Online Technology While Participating in This Study

Motivation to Learn

RJ was motivated to learn about the computer for a number of reasons. She felt left out since her entire family and many of her friends use e-mail and the Internet. She seemed to need a reason to learn because she is an intelligent woman and does not want to waste her time.

> I went to my 50th college reunion last year and my ex-roommate and I were catching up with each other. As she said I suppose you use the computer. I said no way. As she said I'm so glad (laughing). She said, I thought was the only one, I was sure that you were using it. So, you know, there are some of us just in many ways don't think it is a necessary item of equipment for us at this point in our lives, obviously if we were in school it would be quite different, quite different if you're using it to write papers to research. Quite different. But now I don't have the need for it. I can live quite happily without it. I am just frustrated because I'm not that stupid that I can't learn. But I haven't.
> LORI: Right because you haven't felt the need yet.
> RJ: Not really. Well I have a desire but not a big one. RJ#1 372 - 398.

As the researcher, I did not realize this at the time, but, I motivated her to keep learning. I have an upbeat personality (smile often) and love to help people learn. This fact and the nature of the data collection process helped motivate RJ. For example, if we set up a meeting and she had not worked with her computer she would feel embarrassed.

> I am motivated, I think, out of sheer embarrassment. I did not want to [waste your time] that's part of [my] motivation. It is that I didn't want you come today and find that I had only spent one 1/2 hour on it, which I could have done. But I said I'm going to accomplish something. RJ#2 lines 285 - 292

> LORI: It's funny, because you said in the learning process what we did and you kind of implied that I helped you out somehow.
> RJ: Well, you were there behind me. You were also a very good oh, pompon girl.
> LORI: I've never been called that before.
> RJ: Well, you know, you were motivating me because you were coming to do something each time before you came back. And that kept me moving.RJ#5 lines 794 - 808.

RJ said that she would feel a sense of gratification after she learns this task. It is important to her that she can show her kids and grandchildren that she can learn the Internet and converse with them via e-mail.

RJ: There's a piece of me who besides being gratified for me to learn how to do it, I would like to show my kids that I can do it.
LORI: And that's important?
RJ: Sure
LORI: What do you think they'd say?
RJ: Right on! High-time! They would think it was funny that it took me this long to get around to it. RJ#1 848 - 860.

RJ has a Plan

RJ realized that these past efforts to learn the Internet and e-mail did not work for her. So, she called the researcher after viewing a sign at the Learning in Retirement Center at George Mason University. She was not sure exactly what was required of her before the study began, but decided that she wanted to learn how to use the Internet and e-mail for the many reasons mentioned. RJ devised a plan that provided structure and support. She revised the plan as she recognized what worked for her and what did not. She accomplished her goals in six weeks.

The Learning Process

This next section will describe RJ's learning process on two different levels. A visual chart (Figure 6) lists phases of learning and the behavioral steps involved in her individual and unique journey. Transitions describing her underlying process of cognitive changes are also illustrated on the chart. What follows is the description of the phases of RJ's process, detailing the behavioral steps and cognitive transitions.

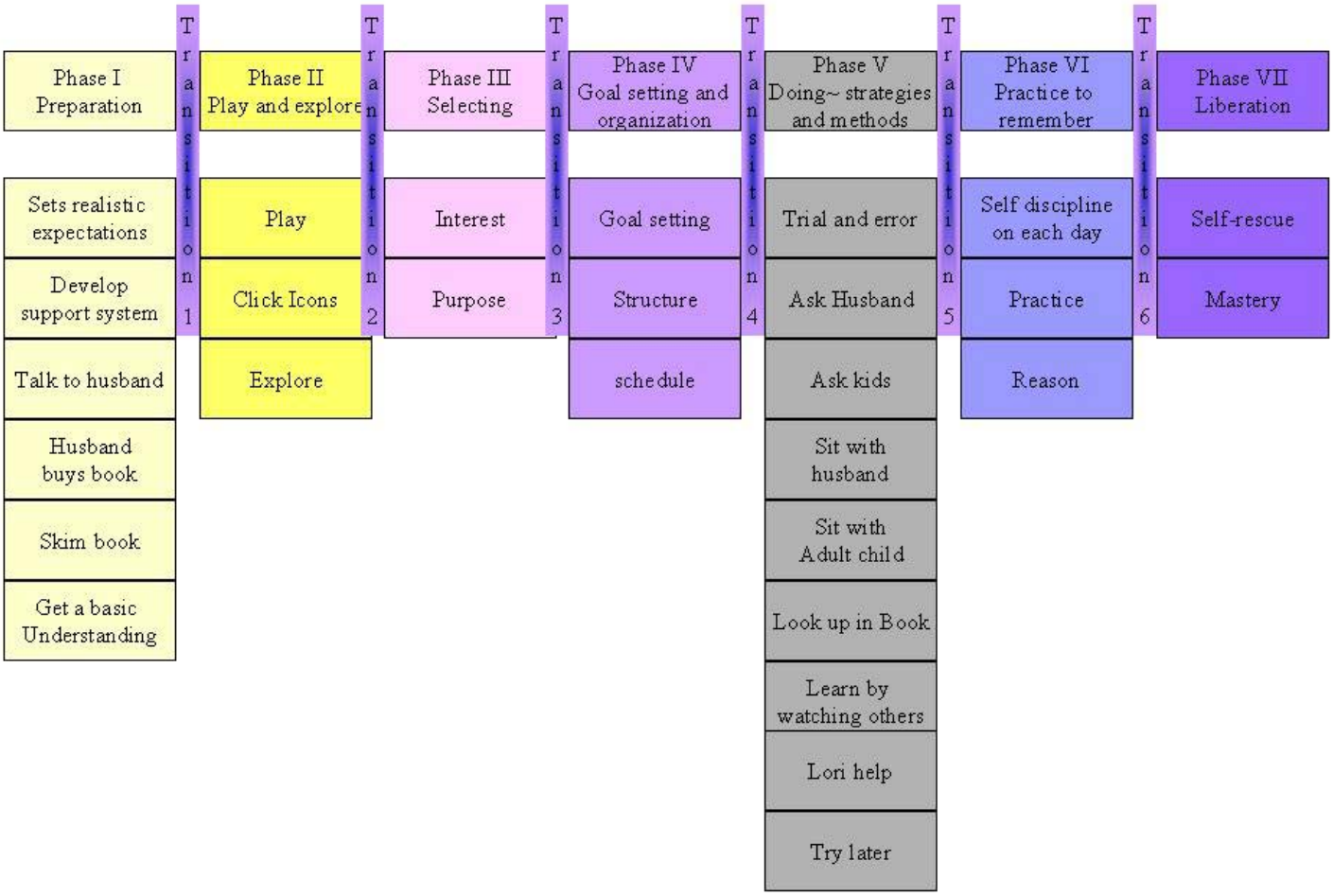

Figure 6. **RJ's Process**

Phase I ~ Preparation

Develop Realistic Expectations

The first step in her process was to think about her topic and decide what she wanted to learn. It was important to her to be interested in learning and to actually understand the process and get e-mail herself. She set small realistic expectations for herself. RJ realized that she did not want to know everything about the Internet and e-mail. She just had a few areas that she wanted to learn. She set limited but practical goals immediately to give her direction and provide an ending point. RJ decided that she would learn how to use the computer, as she perceived that children learned how to use the computer. She would play with the screen, mouse, and keyboard. She would just click on icons to see what happened.

> I am interested in getting and receiving e-mail. As I say I can theoretically get it now. But that is theoretical. And I would like to be able to send it. But I think I would like to be able to say I want to get more information about something. And go on the Internet and use it. RJ#1 lines 137 - 144 .

> And I go into places now…kids in there just (makes fast typing noises) and they have no problems at all and I think I can do that , I could do that if I learned if I took the time to learn. I don't want to do what they are doing, I just want to learn a few things. RJ#1 lines 814 - 820.

Develop a Support System

RJ devised a large support system with many back-up options. First, she recruited her husband PJ to assist her as needed. She invested in a book to serve as an introduction and back-up in case PJ was not available. Her largest source of support consisted of her adult children and in-law children. This group of experts worked for various high tech companies in the area. She could call these experts if PJ was not available or if he did not have the answers. PJ and/or the adult children would also be available to sit with her as she worked on the computer. The idea of

creating a backup system of support was important to RJ as demonstrated in this snippet of information.

> It's like when I went in to buy the book, I was at Borders and the young man came up and he said,' are you learning to use the computer?' I said 'I'm working on it.' And I said, 'I can't decide which of these books is simpler?' He said 'what are you trying to do?'. I said 'I am trying to send e-mail.' He said, 'you don't need a book'. I said 'Yes I do need a book', I said' yes, I do, I really do.' He said 'I can teach you in 2 minutes', I said 'yes but you are not in my house when I need you then'. Laughs. RJ#2IVAF lines 350 - 364.

Discuss with Husband

She then discussed ideas about the computer and her learning process with her husband. RJ and her husband PJ have been married for fifty-two years. Since they both worked full time and retired around the same time, they share the house as partners. RJ seems independent, but values her husband's ideas and thoughts. She realizes that he has knowledge about the computer and often asks for his advice and help. She tried to buy a book but was not successful because she bought a book that had too much detail about the technical aspects of the computer. So, she asked her husband to buy her a more appropriate book. PJ understood exactly what she wanted and bought her the perfect book for her needs.

> I got, actually I got the Internet for dummies that's thicker than this. But it didn't tell me enough about the e-mail to help. And they can't find it. PJ went back the next day with it and he got the smaller one, which he said had a little more information, basic information. RJ#2 lines 3 - 10.

She gets ideas and learns from her husband and also from reading the book her husband bought for her.

> LORI: How did you learn about Google?
> RJ: I guess I asked PJ about which of these search engines he used and he said there are six possibilities and he would usually use Google.
> LORI: How did you get to the search engines? How did you figure that out?
> RJ: Maybe it was Internet for Dummies? I don't know? It just said go to search, or something said go to search so I pushed search and got a list of 6 things and clicked off on Google and put in what I was looking for. RJ#3 lines 441 - 457.

Skim Book

She then skims the book to gain a basic understanding of the topic of the Internet and e-mail. She wants to know why she is doing something as opposed to following her husband's cheat sheet directions. She says that learning and remembering the information is faster than looking up the directions. She needs to make sense out of the topic in order to remember the information and steps.

> I will probably use my Windows for Dummies book, which as I say I kinda read the first few chapters when my husband brought it home for me. I intended to sit down and go over it chapter by chapter. Maybe you'll inspire me to do that. Maybe that's how I will do it. Don't know how it will work…[I need] the reasons of why and to give me a sense of why I'm doing something. I don't like just following the directions on paper. I'd like to have an idea why. Why when I click there something happens. I don't need to know the mechanics of a it, I'd just like to [have] a feeling of the whys. Of what I am doing because that is the only way I can remember. That's why have to use that paper because I do not know the whys. If I have some idea of why then I can make some sense out of the paper then do it without the paper. I think. I'll probably start that way. RJ#1 410 - 435.

Reading the book made her feel comfortable with a general idea of her topic. She read the book before she even tried to use the Internet or e-mail.

> The whole thing I did, getting the books, looking at the books, starting with what I learned there from the Internet books, which wasn't a great deal, but at least it got me moving. RJ#5 lines 785 - 789.

Get a basic understanding

RJ said many times that she needs to understand the theory behind the learning before she starts performing tasks such as learning the Internet and e-mail.

> Yes I think that's why I was saying, I need to be able to know some theory behind how to get to the e-mail. Instead of just following [rote instructions]. RJ#1 lines 737 - 740.

It seemed to help her learn and remember when she discovered that in order to get on line for the Internet and e-mail she clicked on the navigator. Since the two tasks that she wanted to learn were similar in theory, it was easier for her to remember.

> RJ: Well, okay like I say I was so surprised to find out that was basically the same approach to do the e-mail and the Internet.
> LORI: Because last only we talked you were mentioning the philosophy of the thing. You said if you can understand the philosophy of it…
> RJ: Well, I still don't really, but it's getting better. There are a few things that, you know, well I don't really want to understand a lot. But I want to understand enough to know whether I should click here or there or what is it they are asking me, instead of just doing it by rote -which is what I'm really doing down now. RJ#2 lines -175 193

She takes the information and puts it in her own frame of reference to get the understanding of the basic concepts. She does not want an in-depth explanation, just a basic understanding of the concepts in order to start.

> Like I just said Lori, I just like a vague idea of why I'm doing it. RJ#2 lines 386 - 388.

She just wants a basic idea or understanding of how to use the computer for her own reasons.

> No. I think that's probably one of the things that are like when I took the classes and they tried to do definitions and I didn't care. I don't care how many bits and bytes and all of this stuff. I don't care that they're programmed with 0's and 1's or whatever it is. That's not why I use it. I don't care. RJ#4IVAV lines 223-232.

> LORI: What it is interesting is that you get some ideas from husband. And then you put them into your own framework. Then you find out what makes sense to you. It was important to you and then you learn that way. That's what I am trying to get, what's in your mind, and how you take information from wherever. It could be your husband, it could be a book, it could be something you've heard, and then you makes sense of it, and then you do something.
> RJ: it's kind of both. I mean I am doing the book. I'm reading. Then when I go down to put in use …
> LORI: Does that help you?
> RJ: Oh yeah. Because I don't have to keep trying to figure out which paragraph I'm on. What to do, you know, I've read it. So I've got some idea. A concept. RJ#2lines 416 - 441

RJ believes that there is a difference between knowing the theory about e-mail and actually doing the behavior. When I asked her to tell me what she has learned so far she needed to understand if I was asking about her physically using the e-mail or her understanding of the process. She needed to separate the two in her own mind.

> LORI: I believe that. Now tell me exactly what you've learned on the Internet, e-mail, what ever. What you've learned so far. You said you've learned to send an e-mail.
> RJ: You mean not the theory but what I've done. I have sent one e-mail. And I'm proud of that. I sent one e-mail. RJIV#2 lines 550 - 559

So, the preparation stage showed an underlying pattern of planning the groundwork. RJ was orientating herself towards understanding the subject matter for learning e-mail and the Internet. In this stage, she gathered her resources and prepared her platform for learning.

Transition 1

RJ realized that she needed to know how to build her lifeline, as she prepared to jump into the water of learning. She anticipated what she needed in order to be in control of her learning process. RJ set up the playing field to prepare for her success or did RJ prepare so that she would not fail (or drown, as the analogy surmises)? She had now reached a new mindset of comfort, and was ready to begin working on the computer. She now had enough confidence in her support system and her basic knowledge and understanding to go ahead into the next stage.

Phase II ~ Play and Explore

Play

RJ decided that she wanted to learn how she believes children learn. When suggesting this idea to her son she used the word "play" and described how she believed she would like to learn.

> And he understood what I was trying to say about playing with it. Learning like a child learns, so maybe that's what I'll do start with a simply punch buttons on it. Okay? Children do that. RJ#1 lines 505 - 510

RJ decided to play solitaire first because she had seen someone do this in the past. She saw the icon under games and decided to play.

> And I did remember I got to solitaire the first time that I did it. And I remembered seeing in one of those crazy classes I did or my grandchildren's or somebody was dragging things. So I did play solitaire. RJ#2 lines 117 - 123

Explore

She thought that by playing with the icons she could lose some of her fear of the computer. She thought she would feel a bit more comfortable with the computer in general before diving into e-mail or the Internet.

> I wouldn't start playing with e-with. I would start playing by clicking on those icons that come up. Just try to find out. RJ IV #1 lines 438 - 441

> But, I'd like to lose some of my fear of the computer, which is of course because I think that somehow I will dissolve the machine. I don't know what those icons are for. A couple times as I sat down and clicked on something, and really had no idea what was what, so I just didn't bother to proceed with it. Maybe since I have to do this for you I will proceed a little deeper. RJ#1 lines 446 - 458

After RJ played with the icons and explored Windows for a while she realized that she was not interested in this method and labeled this venture a waste of time.

> RJ: Now I did fool around with the ..you're asking what I did. It wasn't an accomplishment. I just decided I would run through those icons. That was a waste of time.
> LORI: Why do you say that?
> R. J: Most of them I couldn't have cared less about. They had to do with the machine. The original set of icons, except for the accessories. But, I got up to that. That's the second level though isn't it? I got to accessories. And found that, that was the more interesting one. And that was where you find your games and where you find other things. Now there are a lot of things in there that obviously, [I have] no interested in. So there's nothing really there. It just kind of told you how to do something which I had no interest in. RJ IV#2 lines 671 - 654.

This step in RJ's process, however, was not a waste of time. After clicking on the icons and exploring, she realized that she was not going to break the computer, and if she did get an error message, her support system could help her. This was a useful stage, also, because RJ tested her support system that she created in phase one.

Transition 2

RJ completed this step when she felt comfortable with the computer. When she realized that she would not damage the hardware or software she transformed into a serious learner, ready to tackle what she was interested in - not just play. She had given herself a much-needed (for her confidence) orientation to the computer, via the first two phases, preparation and play, and was now ready to focus on her interests and goals. This was a huge step for RJ because previously, she had just turned the computer off when she ran into problems. She would not use that method after this phase. This transition from play to selection changed the problem for her. She now needed to decide what she really wanted to learn now that she realized that she *can* do this. She was ready to continue with a newly found focus on learning.

Phase III ~ Selection

Interest with a purpose

RJ needed to be interested in the process and the subject matter in order for her learning to take place. She realized that she couldn't learn how to use the computer in the classroom environment. She stated that the information "…just left me as soon as I was finished with the class. It was no interest to me whatsoever." RJ#5 l 530 - 534. She decided that she had to take responsibility for her own learning structure and process. RJ also realized that this had to be a fun process. "There was no way I was going to bother to do this unless I enjoyed it" RJ#4IVAF lines 55 - 56.

RJ realized that she was interested in learning e-mail and the Internet at this time and could learn other aspects of the computer at another time. She narrowed her interests by deciding not to learn word processing at this time because she could get her husband, PJ, to write her lists for her.

> When I have to keep lists of things and he does this. I'm not sure if I care enough to get into that too much but I might eventually. But, you know, it's something I can get someone else to do if I have to. RJ#3 lines 695 - 699.

She used her book *Internet for Dummies* to find topics of interest. She would skip the topics that she found did not apply to what she wanted to learn. She would list topics that interested her and make them goals to learn when she was using the computer.

> I have been reading quite a bit of the e-mail for dummies actually. I don't always understand it because a lot of that has to do with setting up the computer. And I had to skim through this to make sure that there is nothing to do with anything I care about and move on. So I had several days where I was just reading, several chapters. I have a list of things in here that eventually I am going to try to find information on the web, you know, several things that I thought of, like getting map directions, telephone directory, you know that kind of thing. RJ#3 lines 128 - 143.

While RJ was learning she only wanted to know what she was interested in learning and did not care about the details of the computer. She would ask the researcher questions during the video and be able to sort out extraneous information from what she needed to know to reach her goals. She realized that she could learn how to use the Internet and e-mail without learning everything.

> RJ: What is 9K, 13k. I'm just curious. SITS BACK AND CROSSES ARMS LEANS FORWARD
> LORI: K is kilobytes.
> RJ: Oh, OK see I don't really want to know that. SHAKES HEAD I have an interest in perhaps that 25%? Which should make that up to 100? RJ#3VID2 lines 922 - 930.

RJ suggested that seniors should learn as children learn because they are both learning for the sake of learning. In contrast, high school students, young adults and people in the workforce learn for job related reasons. RJ postulates that maybe it is important to consider the purpose of why people learn as well as the technique.

> RJ: And children don't even think in those terms. So, I just think maybe there's a connection that could be made.
> LORI: Okay.
> RJ: Maybe it's a purpose as much as the technique. RJ#5 lines 1115 - 1123.

In the selection phase, RJ realized that she could direct her own learning. She selected what was practical and relevant to her life and learning. RJ focused on her interests and her purpose for learning in this phase. She prioritized what she wanted to learn. She realized that she knew enough about the topic (from the preparation phase) to be able to perform this critical step, to direct her own learning.

Transition 3

Once RJ selected what she was interested in learning about, she set goals and a structure in which to learn. This was a smooth transition because once RJ knew her topics she just had to write them down and decide when, where, and how to learn. It was as if she had all of the materials and the foundation to build her house in Phase III and in Phase IV she constructed the framework.

Phase IV ~ The Goal Setting/ Organizational Phase

Goal Setting, Structure and Schedule

RJ realized that just having an interest and playing as children do, by exploring, did not help her to learn the Internet and e-mail efficiently. She began to set goals each week to reach her ultimate goals to learn enough to communicate with her children and volunteer work and to be able to get information from the web. During the last interview the researcher asked her to

create a chart that showed her progress. When RJ started she realized that she had zero knowledge and skills of how to use the Internet.

> RJ: So, that was a zero.
> LORI: Yes, you started way at zero.
> RJ: Yes, way at zero and stayed at zero for a week. RJ#4 lines1511 - 1516.

She also realized that she couldn't learn from her husband or classes and had to learn by using her own methods. RJ had to take control of her own learning and the structure of the research process might help.

> When I was using PJ only as my teacher, he's very patient, (pause) but maybe you have to, you have to, learn a lot on your own. Because a lot of people say you can't learn anything from your husband, which may or may not be true, I don't know, but I had to do it more independently and I guess this way of doing it gave me an opportunity to do it with relative independence. RJ#5 lines770 - 780.

> Well, yes, I wouldn't have called you if I hadn't want to do it to at least give it a try in a different way from what I had tried before. I knew what I had done before hadn't really worked. It hadn't really worked when PJ was working with me; it hadn't really worked when I took these classes and, you know, I just hadn't really accomplished it. So, yes, I did want to do it, but then knowing that we, you and I were on some kind of a schedule really kept me moving through this time and I would have felt bad if you had come back in a week and I hadn't done anything. That would have been certainly a waste of your time. Not so much a waste of mine, but a waste of yours and I would have felt bad. RJ#5 lines 836 - 855.

She realized that she had to set goals and maintained a structure. She is the type of person who normally sets goals and just does not drift through life.

> RJ: Unless I set goals I'm not going to accomplish anything. I would just drift along. And actually I think I have said that when I retired I had to set goals if I was ever going to do anything or I just drifted day to day and it took me about two weeks to realize that. I started getting a little more structure in my life, because without structure, I don't accomplish anything. So, I guess that's why you set goals is because you're structuring. It's not so much setting goals maybe as setting a structure to work...
> LORI: And that word structure is really important, because that's exactly what you did when you did this whole process. You set your own structure.
> RJ: Exactly. Exactly. RJ#5 lines550 - 571.

RJ defines structure as leading to efficiency. Efficiency was a theme that ran through the coding of this case study. It is important to RJ that her time is being spent well. Here she defines the meaning of structure and efficiency and how it fits into her learning and goal setting.

> RJ: Efficiency just means that you are accomplishing something within perhaps a reasonable length of time. And if you could that, then you're reasonably efficient. I don't mean that you have to be a terribly efficient person, because efficiency sounds that way. But, it's really more of a case of you utilizing your time and your resources so you're not wasting time.
> LORI: How does efficiency and structure fit in together for you?
> RJ: Well, without the structure, there'd be no efficiency. The structure says what you want to do, when you want to do it and if it takes you longer that's fine, but at least you have attempted to make your time worthy of it's being spent. RJ#5 lines 632 - 653.

RJ began her quest on the computer by exploring different icons on the desktop screen. This was a part of her learning process; however, she felt that it was not necessary in learning how to use the Internet and e-mail. So, she decided to hone in on what she was interested in learning and set goals.

> I was fooling around, checking into different [icons] that did different things, most of which made no sense to me. I had no interest in. So, when I dropped that and decided okay, I'll just concentrate on what I want to do and I forgot about the icons. RJ#4IVAF lines 115 - 121.

> What I thought I was going to do at the beginning I didn't do. That was I wanted to play around and find out what all those icons were and where they would go and just fool around with it. But actually, I realized that that was not going to get me to accomplish what I wanted to do. So, I actually had to hone in on those things that I wanted to do one at a time and learn how to do them and then just keep repeating them. RJ#5 lines 144 - 160.

In retrospect when asked what she would have done differently she replied …

> Skip the first couple of days when I was playing around with icons, trying to find out where I was going to go. I wouldn't have bothered to do that. I may go back sometime and try it again, but to accomplish what I said we were going to accomplish, I had to skip all of that. RJ#5 lines 317 - 324.

This action of playing with the icons, however, was an important part of her learning process. It made her more confident on the computer in general and less afraid of the nasty messages the computer had to offer. This realization that RJ needed to set goals and not just play, showed a major perceptual transformation. RJ saw the play stage from a different perspective. In the play stage, RJ could not recognize what she saw in retrospect as so obvious; that she needed to decide what she was interested in learning and set goals and a structure in order for her learning to take place her way!

Also, at the start of her learning process, she was very afraid of the computer messages.

> I can think of one thing that I would want to do but I have to clinch these things first. Cause I am not that secure in any of it. Umm especially when the machine comes up with hateful messages. C and her spouse were here one night when we were talking about it. This was last week when they were over for dinner. And you know, I said those messages are so nasty! They just laughed and I said they certainly are; they scare you to death. RJ#3 lines 782 - 794.

> But they like to scare you. Yes, this is what they do. Well, when you are just starting they succeed very well in scaring you. So, yeah, it's moving along. RJ#3 lines 809 - 812.

RJ defined many specific goals in her learning process. She made a list of her goals and accomplished them between interviews with the researcher. She decided that she would learn how to use Amazon.com, use e-cards, explore e-bay, use Mapquest, and search for relevant information that she needed quickly. She wrote down these goals in her journal.

> Internet for Dummies -chapters_ made list of things I'm going to go for on the Web - Weather, Phone directories, Map Directions, COPD, Web for CASA, Green Spring Village. Questions: 1. Cookies p. 20 2. Padlock on web page, secure mode 3. SSL built in? page 18. RJ Journal lines 88 - 95.

> 7/1 to 7/5 3 goals: 1. Ordered books (with gift certificate) from Amazon.com-- did it! 2. Checked out free cards -- sent reply to L & B. 3. Visit E-bay. RJ Journal lines 226 - 229.

It was truly exciting when RJ would set a goal at one meeting and successfully complete it at the next meeting. For example, while she was being video taped using the computer she stated…

> RJ: I want to see if I can print out some e-mail that we get. I think that's very simple. I know how to turn the printer on. I think that all you do is get it and then you say print but, I'm not sure, I'll find out.
> LORI: OK, so the things that you are going to work on is...
> RJ: wwws and continuing on once I get something, you know, using my clicker to get down to something I am more interested in and then printing. Printing out e-mail. RJ#2IVAF lines 381 - 394.

At the next meeting with RJ, approximately two weeks later, during the interview she explained how she met her goal of printing an e-mail.

> RJ: OH! This was exciting. Well, it got me a little confused. I'm still not too sure about it. One of the kids sent an itinerary [they are] flying out to Minnesota Thursday, so I went to print it out. And I printed it out.
> LORI: So you printed an e-mail?
> RJ: I printed it just by pressing print. RJ#3 lines 390 - 401.

> RJ: Umm I did that, that was, then I went back down later and did it myself, managed to letter, I 'm not sure if I can do it again. But, I'll try just for the heck of it.
> LORI: I remember that was one of your goals from last week. RJ#3 lines 412 - 420.

She also met her goals that she wrote about in her journal. She had three goals that she was going to accomplish before the last interview. First, she wanted to use electronic cards for free. Next, she wanted to use amazon.com to buy a book with her gift certificate that her son gave to her for her birthday. Thirdly, she wanted to check out E-bay, the auction website.

> So, I did send a card back to her on Web Shots, I think, I mean,. I'm assuming she has it. That was just yesterday and she hadn't checked last night when I saw her. And I bought two books from Amazon.com. RJ#5 lines 47 - 51.
> What was the third thing? (Pause) Ahh, I was going to check on e-bay, so I did. That's about what I did. RJ#5 lines 70 - 72.

RJ's children also set goals for her to help her with her learning process. They would send her electronic birthday cards from websites such as www.bluemountain.com and www.webshots.com and hope that she would send one back. One of her sons gave her a gift certificate from Amazon.com. He hoped that she would get the gift herself instead of asking her husband to do it for her. She ended up buying two cookbooks. Her grandchildren also helped her by answering her e-mails quickly, hoping for responses back from their grandmother.

> RJ: But, you know, they just think it's great that I'm trying it, so they're tempting me with different things.
> LORI: Oh? like what?
> RJ: Well, like the amazon.com gift certificate, making me read birthday cards, even if they send one, that kind of thing. Make sure that I'm so far.
> LORI: How about your grandkids? Have they gotten in on the action too?
> RJ: Well, they just sent me answers to the letters I sent. Yes, they all did. RJ#4 lines 304 - 323.

Near the final interview RJ realized that she had met all of the goals that she had set for herself. She realized that they were limited goals; however, this is the method she used to succeed. She set limited goals to begin, realizing that if she were interested, she could learn more at a later date.

> LORI: Do you feel right now that you've reached your goal?
> RJ: I've certainly reached my goal, my limited goals that we set. I have more things I'm going to want to do, but not many. Not really many. I don't have the need to do. RJ#4IVAF lines 311 - 318.

RJ also believes that it is fun to reach her goals. She shared some of her thoughts about getting older and meeting goals to learn something new.

> But, now I feel as if I have done something. And that's good. You know, Once you get older there aren't that many brand new things you learn, so it's kind of fun to learn them. RJ#5 lines 930 - 935.

In this phase of goal setting, organization and structure, RJ laid out her process. She tied in her style of being efficient with the nature of her problem, what computers are like, in order to

create a process of goal setting and structure. She set up realistic goals and a time frame in which to reach them. During this very pragmatic learning process, she created her own framework for meeting her goals. RJ structured her own learning process. She imposed *her* system on this problem and controlled her learning process, environment and structure.

Transition 4

RJ's view of the world changed at this point. She realized that she could learn *her* way. RJ knew herself, her styles of learning, likes and dislikes, and structured her goals to her own unique needs. She recognized during this transition that she, indeed, could learn how to use computers. RJ structured her learning process so that it was open enough for her to learn She was in control of her own learning process and confident enough to try many behavioral methods unique to her learning style.

Phase V Doing ~ Strategies and Methods

RJ had many strategies as she worked on the computer. Her main method was using a trial and error approach. She used this strategy often and it worked most of the time. When this strategy did not work, however, she would ask her husband or adult children or use her book to find out her answer. She also learned by sitting with her husband or adult children as she used the computer and they watched over her shoulder. Watching and listening to others helped her as well.

Trial and Error

RJ realized that she learned best by using a trial and error approach when she was using the computer. She would make mistakes and learn from them. In the ten hours of interviews and video taping RJ, there are many examples of how she used this method. Following this trial and error code would be the code ambiguity. RJ could deal with not knowing why something went

wrong or did not work as she thought it should. The ability to deal with ambiguity helped her while she used a trial and error approach. Also, her intuition led her to try new ideas as she clicked icons, menu items, or hyperlinks. She figured out many problems by using her intuition to decide that there must be some logical way of solving the problem, then using trial and error to actually solve the problem.

When asked about her successes, she answered that she learned how to send e-mails and use the escape key. When asked how she managed to learn these important goals she said that she learns by doing.

> LORI: And how do you think you learned those things?
> RJ: By doing.
> LORI: OK
> RJ: I mean just by doing them. RJ#3 lines 936 - 943.

Her husband, PJ, agreed that she learned best by using trial and error persistently. She just did it! He called it learning from the bottom up, as opposed to having someone teach her.

> PJ: The way you learned this time instead of the class or asking me to teach you. If you go the other way around and work from the bottom up so to speak, rather than from the top down, starting with me.
> RJ: I think that's what I was trying to say.
> PJ: When you get your fingers in it, you know what you want to know.
> LORI: Describe what you mean by working from the bottom up.
> PJ: Well, instead of sitting down and saying okay, teach me how to do this, she started in and worked her fingers and did things. And as I said, sometimes that worked and sometimes it didn't, but we always managed to work our way through it to find out what did work, which had never occurred to me before until now. RJ#5 lines 986 - 1010.

RJ joked about using trial and error as her main method of learning. She was having great successes using this method to meet her goals and realized that she *was* learning from her mistakes.

> RJ: Maybe I should stop following directions on this and when it says punch this, I should not punch this. I should punch something else, I mean just for the heck of it to see what happens, but I don't know. (Laughs)

> LORI: Do you think that would help?
> RJ: No. Laughs. But I find out what happens when I do the wrong thing.
> LORI: OK and then it will help you understand better?
> RJ: No, it will just keep me from doing the wrong thing again. RJ#2IVAF lines 466 - 478.

RJ was persistent and had the attitude that she might have to start from the beginning, as she had so many times in her past learning experiences. She was very willing to try and try again, learning from her mistakes. She gave herself credit for just being willing to try even though she might fail on the first or eighth try.

> …being willing to keep trying to click on things to see what would happen when I clicked on that. And sometimes having to get out of it and going back and starting all over again, but sometimes just getting out of it again. RJ#5 lines 185 - 191.

Making mistakes was also part of RJ's learning process. She would make the mistakes and learn what not to do next time. At times she mentioned that this was even a fun process.

> Well, there are a lot of things I did that didn't work, but then I learned not to do them. RJ#5 lines 242 - 244.

> Because making the mistake was not irretrievable. It didn't flag anything, itdidn't do anything; it just made a mistake. And either I corrected it or I went back and I started all over again and was more careful. It got to be more fun than work, which is important too. RJ#4IVAF lines 41 - 48.

Sometimes she would accidentally solve her problem and not realize how she managed to do that. However, this gave her confidence that she could navigate without breaking the machine.

> Actually, I did it by mistake once, which made me feel rather good. I was playing around, trying to find, trying to see what I could do and I think I went to file and then I went across to something else and I ended up getting the message center back temporarily so that I could write a message, so I could send out email. But, I'm not even sure what I did. RJ#4 lines 143 - 151
> So, I had done it once playing with it, but I don't think I could have done it again, because I wasn't sure what I did to get there. RJ#4 lines 158 - 163.

Throughout these interviews and videotapes there are many, many examples of RJ using the trial and error method. She would feel lost and in need of direction, but instead of quitting or asking or reading, she would just click. She would use her best judgement or just guess. Sometimes she would sum up her successes to "sheer blind luck" RJ#5 line 299.

Using this method of trial and error, she developed strategies such as moving the mouse to find hyperlinks, deleting from a shopping cart, and persistence.

> But when I don't know what to do and I'm running down a website or playing with something, trying to figure out what to do next and it doesn't tell me anything, it doesn't tell me to click here or there, and I run the mouse back and forth until I find a hand. And then I can do something. I know that if I have a hand I can click, which I'm not sure how I learned. I think I saw that happen once when I was.... I think it started with the birthday cards because you have to click on Blue Mountain.. RJ#4 lines 831 - 845.

> RJ: Delete, I wonder what delete does? Let's see. That makes sense.
> LORI: Is it gone?
> RJ: I don't know. I don't see anything here. Cart empty, it's deleted. How about following directions? Okay. LOOKS AT ME AND SMILES. RJ#4Vid3 lines 100 - 108.

> Anyway, let's try this. You know well ok, this is a reply to check it out. Check it out originally a message from my son that showed the pictures. So I want to be going in the other direction. Try this. Maybe that. Yeah, I think maybe that may be it. Yeah! Ok this is the one that had his picture on it. LEANS BACK AND LOOKS AT ME. SHOWS ME THE MESSAGE. RJ#4vid3 lines 88 - 99.

> Now that did not work so... okay let's keep trying. Come on. RJ#2vid1 lines167 - 168.

In this example RJ learned that the computer will automatically word wrap. She used a trial and error approach and repeated what she had done in order for another line to word wrap.

> LOOKING AT SCREEN
> RJ: Now I don't know what's going to happen when I get to the end of the line. SHE PURSES HER MOUTH. We'll find out. Whoops. Okay now that didn't take. Backspace. HA! LEANS BACK HEAD NOD SMILES HANDS UP!
> LORI: Now tell me what you just did?

> RJ: Well I wanted to put the quotation mark in, which I didn't get [the quotation mark] to go in. Oh, Neat! It went down to the next line! Without me dong anything!
> LORI: Describe just happened?
> RJ: Well, I put in a word and I guess it didn't quite fit and I was wondering what would happen when I ran out of space and it worked out fine. LOOKS AT SCREEN AS SHE TALKS. It went down and it started a new line. Well, there's a little extra space there but I am not going to worry about it. And anyway I want to find out ... pause. SIGH. Well if I keep going we'll see if the miracle occurs. RJ#2Vid1 lines 278 - 304.

Ambiguity

Often an ambiguity code would follow a trial and error code. It seems as if RJ would try something, and if it would not work, she would not belabor the point. She could deal with the ambiguity of the moment and try again later or just sum it up to…"it worked," and move on to another item on her list.

> Labeled **Trail and error** ~ Let's see what happens if I do this. RJ#3vid2 lines 67 - 68.
> Labeled **ambiguity** ~ HAND ON HIP OTHER HAND ON MOUSE I don't know how. Or what I did to get there. But that's all right, I did it. Ummmmm Ok let's do this. RJ#vid2 lines 78 - 81.

> Labeled **Trail and error** ~ POINTS TO SCREEN. I don't know if that's always there or not; however, I'm assuming... no. Okay well I'm going to try this. uhhhhhhh, Now where is the thing. HANDS ON KEY BOARD LOOK AT KEYBOARD. You see I've never used this here. Yahoo... Okay, it's sending it to. Yes okay it's something it took a while. LEAN FORWARD HANDS ON MOUSE
> LORI: what are you thinking when it takes a while like that?
> Labeled **ambiguity** ~ RJ: did I not do it right so I have (HANDS UP PALMS UP) persuaded to do something. Why does it take a while? I don't, I guess I'll have to deal with it. RJ#2vid1 lines 242 - 259.

One strategy that did work for RJ was the ability to accept ambiguity. She did not need to know why some occurrences happened, as long as she did what she wanted to do at the time. She had the ability to focus on a goal and continue trying through trial and error even if she did not completely understand why she got an error at the time. This ability to accept ambiguity

helped her to move forward in her progress and not get bogged down by details that she did not want to know. Here are some examples of RJ accepting ambiguity with the computer.

> It is taking longer to do something than it should. Umm, you know, it is taking a while to get to what… to do what I want it to do; which doesn't make a great deal of sense to me. But I am willing to accept it. RJ#2IVAF lines 85 - 90.

> RJ: And when I did it his way my box [error message], it turned out did not have on it what his had. So I said, we'll get together someday and we'll try it again, because his is different.
> LORI: And you're ok with that? For example, if something doesn't work, you say OK we'll try it later.
> RJ: Yeah, I'll ask somebody about it. RJ#3 lines 560 - 571.

> HANDS UP PALMS FACING UPWARD [asking why]… Why does it take a while? I guess I'll have to deal with it. TYPES RJ#2Vid1 lines 256 - 259.

One would think that all of this ambiguity might lead to frustration. RJ specifically stated that this was not the case. Also, when looking at the coding process frustration did not take place during or after ambiguity.

> I didn't have a lot of frustration. The frustration mostly lay in the machine not doing what I wanted it to do or freezing up or just not doing something that I thought it should do, because I have faith that the machine has great abilities and sometimes it doesn't have all those abilities. But, I didn't get that frustrated, because when something would mess up or go wrong, I could usually ask PJ and he would help, if it was something I was doing wrong. Or he'd tell me it was okay. I didn't have a lot of frustration really or not very lengthy anyway. RJ#5 lines 612 - 627.

Intuition

A code that was labeled intuition also played a part in RJ's trial and error strategy. Many times RJ would reply that, "something did not look right, I just figured this would work, or that there must be a way to do this." She summed it up to logic or common sense.

> Well, it didn't look right, and I knew it didn't have the right words in the right places. RJ#2IVAF lines 246 - 248.

> I had stopped what I was doing and went back and clicked on addresses and I think there should have been a way that I could go straight from what I was doing

> to the address book in there. I don't know how, you know. Some day I'll learn that. RJ#4IVAF lines 377 - 384.
>
> They were talking about that and I figured it had more to do with than just the length of that. RJ#3 lines 710 - 712.
>
> RJ: I was trying to send a card to someone and couldn't remember their address. I could leave what I was doing and go to the address book and get it and come back. Which, again, I think I just did from fooling around saying I should be able to do that. I shouldn't have to go to the address book, write down their address and come back and do it. And I didn't have to. I could use the address book to do what I was doing. And that was just because I thought there should be some way to do it and there seemed to be.
> LORI: That seems a lot of your strategy too. You think to yourself there should be some way to do this and I asked you a couple of times and you said, you know, it would just be common sense.
> RJ: Yes.
> LORI: Now, how would you explain common sense to somebody who didn't have common sense. What do actually mean by that?
> RJ: Well, if you have an address book, you should be able to use it when you want. It's in that machine someplace, right?. Now, if I could just get to it at the right time and click on where I want to send something, I mean, otherwise, only being able to do that when I want to send a specific email to someone. That's fine, but it does seem that you should be able to use it more than that. And so I found I could use it to pick up when I needed it at another time, like to send a card from Blue Mountain or Web Shots or something like that. It just seems logical that somehow I should be able to get into that address box without starting all over again. And it worked. RJ#5 lines 347 - 395.

So, RJ used her logic and common sense to give her ideas how to proceed in her learning. This method of using an educated guess or reasoning helped her to reach her goals. She would use her common sense, as she called it, then try her idea (via trial and error) or ask her husband or children what they thought of the idea. This sequence of methods that she used was consistent during her learning process.

Ask Husband

When RJ's method of using trial and error did not work when she was using the computer, she resorted to asking her husband. At times when she was not using the computer she would also ask him questions about information she heard about or read in her book. She

would also let him solve all of the technical problems related to the computer. RJ's use of words when she described asking her husband for help was interesting. She would say, "he rescued me or helped to avert a catastrophe." RJ trusts PJ. He was usually available, knowledgeable, and helpful when she was frustrated.

> LORI: And how did you learn that?
> RJ: Asked my husband.
> LORI: OK. And you believed what he said?
> RJ: Oh yes, he is right. It made sense. RJ#3 lines 26 - 32.

While using the computer, RJ would often call upstairs to ask PJ a question or just to check to see if she was on the right track.

> I thought I'd better check with PJ and he said it was ok, so I did and got back to start and shut down the computer at 4:15. RJ Journal lines 23 - 26.

Also, when she didn't remember a command or how to do something she would ask PJ.

> I didn't remember, I asked PJ. RJ#3 lines 83-84.

> I put in HYPERLINK http://www.anyone.com www.amazon.com to see what it would be like but had to be reminded (by PJ) to press enter key. RJ Journal lines 74 - 78.

PJ was her savior. He saved her and rescued her many times according to RJ. Sometimes he could not answer her questions but she heeded his advice. PJ overall made her learning experience enjoyable.

> I called PJ in - to avert catastrophe - and he wasn't sure about it either, but played with it for a while and decided we were safe. RJ Journal lines 37 - 41.

> I kept bumping keys and getting messed up and having to get PJ to rescue me or starting all over. RJ Journal lines 102 - 103.

> [Asking husband] PJ what did I get into that I called down there in a panic because it said 'if I didn't it's all do something I was going to lose all ability to get or send mail? RJ#2 lines 696- 701.

PJ was usually available, was quicker to ask than using the book and he helped RJ to avoid frustration.

> So the easiest answer is to ask him [PJ] and if he knows the answer then I won't do anything. RJ#2IVAF lines 58 - 60.

> LORI: How do you propose to learn this?
> RJ: Ask PJ.
> LORI: Ask PJ?
> RJ: I am close enough to it to ask him, instead of looking it up in that book.
> LORI: And the reason you mentioned to ask PJ is because number one it is the most efficient.
> RJ: Of course, it's quicker, I mean you saw what that book is like. RJ#2IVAF lines 327 - 338.

> And of course, PJ's always available. RJ#5 lines 665 - 666.

> But, I didn't get that frustrated, because when something would mess up or go wrong, I could usually ask PJ and he would help, if it was something I was doing wrong. Or he'd tell me it was okay. RJ#5 lines 620 - 625.

Also, RJ would leave the technical challenges of modems, phone lines and Internet access to PJ.

> I had problems with Netscape, freezing frequently PJ's working on that. RJ#4 lines 105 - 107.

PJ was her first resource when she had simple questions.

> LORI: So he's your first number 1 resource?
> RJ: For this, for now yes, for something that is quick and simple. I mean this is much to quick. RJ#2IVAF lines 348 - 350.

When asked about her process of learning she realized that PJ was her main source of support. But her adult children were her back-up in case PJ could not answer her questions or tell her to where to click on the computer. At times, even when PJ was correct but not completely sure of the answer, she still asked her children for support.

> But I was trying to figure that out. I called G [son-in-law] and umm. Let's see what PJ said about that. He agreed with PJ on that. Oh I guess, I could, PJ said I

> could get it back if I got and I did get through, I haven't tried it again. RJ#3 lines 237 - 244.
>
> 6/4 20 min. PJ says I can get the message back to complete by clicking on Unsent Messages and then on Draft and it will reappear. He did it for one and it worked, but at that point we just got rid of it. Called G and he agreed with PJ's above solution. RJ Journal lines 134 - 140.
>
> So, I'd rather just fool around with it myself and see if I can do it. And then if it seems to work, have someone else who knows what they're doing check it out and see if what I think worked, did what I wanted it to. And I think that's the only way you can learn. Or maybe the only way I can learn. RJ#5 lines 432 - 440.

Ask Adult Children

RJ has 8 children, 7 in-law children and 11 grand children who all use e-mail. She looks to her adult children as experts to help her when PJ is not available or does not have the answer, or just to double check on an answer. She realizes that her children lead very busy lives, however; they all seem very willing to answer her questions and help her with her quest.

> RJ: I have to get it and so G did tell me that I could get out by pushing escape usually.
> LORI: And G is your son-in-law?
> RJ: Yeah, he comes home early so I tend to call him before I call anyone. Poor G. Umm, so I called him a couple of times. RJ#3 lines 74 - 80.
>
> But, I called S [daughter] and said what in the world are they talking about? RJ#4 lines 275 - 277.

Her daughter C, has helped her with her confidence when she was faced with error messages.

> "I keep thinking about C saying to me, "It's trying to scare you." The way it words things. It psyches it up and it makes it sound like it's the end of the world is in the next hour or so. And she said it's really just trying to scare you.
> LORI: That's what it seems like sometimes.
> RJ: Yes. But, it really isn't going to do any great harm and you haven't done anything that's going to ruin the computer. RJ#5 lines 218 - 232.

At times she would ask her children instead of PJ because of convenience and their expertise.

> LORI: Now, what was the reason that you asked E [son] rather than asking PJ or reading it in a book?
> RJ: Because E gave it to me. He was here. RJ#4 1030 - 1035.
>
> It didn't occur to him (PJ) what had happened. In fact, I don't think he knew that that happened if you clicked over there and E did. But, E works on them, he works with computers all the time and he does web sites for things, so he's really, very good. RJ#4 lines 1067 - 1074.
>
> RJ: Sure. I'll ask them why they use that, if they've used others. I have to go back and see if L sent one on that Blue Mountain, because I've forgotten what hers was. RJ#4IVAF lines 428 - 433.
>
> So, I would go back and decide which one to use and then figure out what it says about how to pay for it if that's what I decide to do, which is what I think they do and I will ask them (her children and in-law children) if they're paying for this. And then, I'll do it. RJ#4IVAF lines 437 - 444.

RJ had a goal to explore ebay, the online auction. PJ had never used the service, so she investigated the web page herself. When she realized that she did not feel comfortable, she called her children to ask for advice.

> I got there and I really felt as though I was way over my head and I didn't know what I wanted to check on, so I did talk last night to some of the kids who have used ebay and I said I'd like to see it in action. RJ#5 l 73 - 79.

So, RJ has much support from her husband and her many children and in-law children. It seems that if PJ cannot answer a question or is not available she has many children to call for answers. The children are her experts for computer questions and problems. She feels more comfortable after double checking with her children and just talking about her fears and questions.

Researcher Helps

During the taping of the videos, RJ would log onto the computer as she had done previously. She would then show and describe to the researcher what she was doing and why. The researcher would sit behind RJ and keep quiet. When RJ would ask a question she would

receive a "what do you think?" or "what would you normally do it I was not here?" If RJ were persistent in asking the researcher, she would answer the question. RJ did ask the researcher many questions during this process. RJ never called the researcher at home, nor did she e-mail questions. She just asked questions when she was face to face with the researcher. She would also repeat the directions out loud to herself to clarify the information.

RJ realized that the researcher was not going to answer her questions and wanted her to figure out problems and procedures on her own. RJ wanted to know the answer, but playfully responded and continued.

> RJ: What if I click on that mail?
> LORI: Go ahead and try
> RJ: If I loose everything I'll kill ya. RJ#3 Vid2 lines 628 - 631.

RJ would use a trial and error method most of the time and ask questions. When she got a question for an answer she would continue to try. RJ did ask directly for help when she was stumped while she was being video taped on the computer. The researcher would answer her questions when asked directly and realized that RJ had tried previously and needed an answer to continue her learning process.

> RJ: Now, I don't know what size paper is there now. So I should probably check it to see right?
> LORI: Show me what you do.
> RJ: I think I click file, I think well, that's how I did it before, yeah, uhh I think. See this is the part I'm not sure about. Yeah, I think I did but it doesn't say what size paper. Oh, properties has something to do with it. See this is what I …I only did this once with PJ hanging over my shoulder. So, I don't really know now how to find out what size paper. You are going to have to help me. How do I find? LEANS BACK.
> LORI: Legal paper maybe?
> RJ: Legal. Did it! SMILES AND LOOKS AT ME. RJ#3Vid2 lines 122 - 140.

RJ would also ask simple general questions of the researcher as she was working with the computer while being video taped. She would also repeat the answer in order to gain her own

meaning to remember in the future. She did not like long complicated answers, just the facts, so that she could rephrase the idea in her own words.

> RJ: You know what I am not quite sure of? LOOKS AT ME HAND OVER MOUTH (THINKING) USE HAND MOVEMENTS. What does OK mean?
> LORI: OK means…choose all of the selections that I have just checked off and close the box.
> RJ: OK it just means remember everything I've done. I mean it's still there. I like what I did. I like what I did, OK do it. RJ#3Vid2 lines 336 - 349.

When the researcher or her husband would lead her step by step through directions, she would not be as attentive or interactive with the computer. It was as if she were a robot just following directions. She even reacted as if PJ and the researcher were using the computer and did not take responsibility for what had just happened. Nonverbally, she would lean back in her seat and just click on the buttons passively.

> PJ: Go back to the … oh wait a second…Click on this little block right here
> RJ: What does that do?
> PJ: To get the mirror, the window out of your way. So you can see what else is going on.
> RJ: What if I do escape.
> PJ: I don't think that… Well, try it. NOT AS ATTENTIVE
> RJ: Nothing happens here either.
> PJ: [It closed] by itself.
> RJ: It did? Well, well, well, OK I am back where I want to be kind of.
> LORI: The bottom
> RJ: There ok. I don't know what you just did. RJ#3 Vid2 lines 839 - 855.

> LORI: I think multiple pages will come out… see?. Come here I'll show you how you can change it.
> NOT LEANING FORWARD RJ#3 Vid2 lines 1003 - 1006

> RJ: I see what you're saying. NOT INTERACTING WHILE I TELL HER DIRECTIONS RJ#3 Vid2 lines 1013 - 1016.

As soon as she took control of her own learning, however, she was most interactive and attentive. She would lean forward and sit up straighter in her seat.

> LORI: We'll do it again, then.

> RJ: I want to go back to where you printed. VERY INTERACTIVE WITH SCREEN HAND ON MOUSE. To printing. I want this to come out. Where you said print. OK ..ummm. I'm going to go back to file. And print… come on guys. SHOWS ME PRINTED PAGE. Oh, Maybe it can't do it when it is printing. It doesn't want to. It doesn't want to do anything. It won't do it. INTERACTS STEP BY STEP WITH SCREEN AND MOUSE 2ND TIME THROUGH HAND UP TO CHEST PALMS UP. Now let's see if it will do something. Let's try file. RJ#3Vid2 lines 244 - 261.

When the researcher did not know the answer or did not help, RJ had plenty of back up support. Her process would be to ask the next available person, who was her husband.

> RJ: PJ, you've never used Mapquest have you?
> PJ: I think so.
> LOOKS AT PJ. ARMS CROSSED.
> RJ: Really? Did you because we just couldn't make it work. RJ#3Vid2 lines 737 - 742.

If PJ, did not know the answer, or RJ wanted to double check the accuracy of the answer, she would call one of her children. If the issue were of the nature that software needed to be installed, or her questions could not be answered over the phone, she would have one of her children visit to help her fix the problem.

> RJ tries to solve problem. Asks me (I am closest) then PJ. We call C [daughter] on the phone. PJ logs us on and we continue. RJ#4 Vid3 lines 11 - 15
> .
> PJ has already, I think, I think, I don't have the right terminology, re-put in Netscape, whatever the terminology is and G, who is one of our real computer geek son-in-laws is going to come over. RK#4 lines 514 - 520.

The process would start with RJ trying to solve her own problem. If she had a quick question she would ask whoever was closest or most available (PJ or Researcher). If her first line of support could not help, she would call her children on the phone. If her children could not help her over the phone she would ask them to come visit and sit with her at the computer to help solve the problem.

Sit with Husband

PJ was often available and knowledgeable when RJ had a problem. She often asked him questions, but if he needed to see the computer screen he would sit near her to help. She did not enjoy her husband "teaching" her; however, she did feel comfort as he sat next to her as she learned by herself. He would tell her immediately if he did not know the answer or could not solve her problem and she trusted him. At times they would work out the problem together. Many times she referred to this process as "PJ over my shoulder."

> …then spent 15 (minutes) with PJ over my shoulder getting to e-mail site and sending my first message! RJ Journal lines 55 - 57.

> RJ: Yes. And I also used a little bit of help from PJ, though, because he was hanging over my shoulders… RJ#5 lines 56 - 58.

> So I clicked on, so I wanted to print it out. Cause it was a lot and so I think I, I think I got PJ to help me to make sure it worked out. To make sure it got to the letter size not legal. Then I printed nine pages of Two Gentlemen of Verona plot. RJ#3 lines 480 - 487.

Sit with Adult Children

When the problems got more difficult, RJ called in her experts, her adult children. RJ realized that they lead busy lives of their own; however, they were more than willing to help her with this goal. She did not hesitate to call them on the telephone when neither she nor PJ could solve the problem; however, she did not ask them to visit immediately. She would ask a child if they are at her house at the time, or ask them to help her the next time they came to visit. In this segment, RJ called G and C (husband and wife) on the phone, but they could not help her without actually using the computer to see her problem.

> No, he had no idea; neither he nor C had any idea about how we lost the message thing. But, because I was just doing it over the phone with them, so when I came up and C was here yesterday, not G and I said now I've found it. And she asked what was it and we explained, and she said, oh yes. RJ#4 lines 1117 - 1126.

In this example, she explains how the kids helped her. During her explanation, she cannot remember a term, so asks PJ for clarification.

> But, PJ got around it by going through tools and message center, so I can do that. Only one of our kids was here yesterday and went down and took care of it, because it has to do with… – PJ? (pause, she calls to PJ), what are those little bars called that he said I probably clicked on, or someone had, and it lost the message center page?RJ#4 lines 109 - 118.

When RJ was interested in ordering a book from Amazon.com, she realized that she knew how to go to the website and place the order up to a point; however, she still had questions. She felt more comfortable walking through the complicated process of ordering a book while her son E was available.

> …which I am right now finding a little complicated. I think because I haven't followed their directions, because I'm not ready to order. I can only go so far with it and it's fairly complicated right now. It feels that way. I think once I am willing to put in my email address and get a code number or whatever they give you, I could probably keep going step by step and do it. But when E was here yesterday and I said this is what we haven't dealt with [money issues], E is using less than the $30 gift certificate or more than [$30.00] and how does that work? And then I said then I suppose … if I do more, then I will be putting in my visa number and if it's less I'll have some kind of credit there. But see, I haven't reached that point, because I haven't been ready to order. So, that will be something I'll have to do this week is figure out which book I want to get. RJ#4 lines 699 - 722.

She decided to ask her son E instead of PJ because he gave her the gift certificate to Amazon.com, was available, and knowledgeable. She realized that if she were to make a mistake, he would be there to help immediately. RJ also wanted a second opinion for this complicated task.

> LORI: Now, what was the reason that you asked E rather than asking PJ or reading it in a book?
> RJ: Because E gave it to me. He was here.
> LORI: He was here, he gave it to you, and you figured he knew how to do it.
> RJ: Yes. I was thinking he can come down and make sure I'm doing it right, because I told him I'm not ready to order, I don't know what book I want. So, he

> just came down and he was looking at a website, so I said show me if I'm doing what I'm supposed to be doing. RJ#4 lines 1030 - 1047.

Look in Book

RJ would read her book to get ideas for goals. She also read for general knowledge. She seldom used the book to look up information unless she knew that she had read it previously. When RJ was not sure what to do and PJ was not available, she would use the book. RJ did not like to use her book because it took a lot of time to look up the information and because she only wanted a vague idea of the topics. She did not like the amount of detail in the book. She preferred to ask PJ; however, when he was not available, she would use her book. RJ would not use the book for complicated tasks, she preferred to call or sit with her adult children.

> RJ: And partly the book helps me decide what I want to try. It talks about doing something.
> LORI: Sometimes you don't know what you don't know.
> RJ: Yeah
> LORI: And the book gives you ideas.
> RJ: What I should do next, what I should try? Then I go down and maybe I'll try it. Maybe if it doesn't work I'll talk to PJ and he clues me in enough so I can move forward on it. And when it gets too complicated then I have to talk to G (laughs) so that's where we are.
> LORI: I think you've got a good process. And a good support system too.
> RJ: Yeah, I don't know what I would do. I wouldn't be able to do this alone. Cause that Internet for Dummies is not precise enough for someone like me. It really isn't basic enough. That sounds silly but it tells you too much. RJ#3 lines 742 - 771.

She also would rather remember how to perform a task than use the book as a crutch.

> RJ: HTTP or something if I put that in again and there was some symbol after it. I'm blanking. Was it just a slash? I really have no idea what was in there.
> LORI: Well how you suppose we can find out what was there? What would you normally do this situation?
> RJ: Go look it up in the book and see if I can find something that looks familiar.
> LORI: Okay let's do it. Where's that book?
> RJ: I think it's still upstairs. I wasn't going to use it. LOOKS AT ME AND STANDS UP HANDS ON BACK GOES OUT OF ROOM TO GET BOOK Right? What I need to know is why did that happen? What did I do wrong when I thought I was just getting rid of letters, I got rid of the entire phrase. The trouble

> is, it may take quite a while because I don't know where it all is. RJ#2Vid1 lines 381 -405.

Watch Others

RJ was not afraid to try something new when she had seen someone else perform the task. She remembered how to print, scroll, and delete e-mail by watching others. These simple tasks were all learned by RJ while watching others, then trying while she was using the computer. She realized that it could be done and, she has a support system if necessary.

> RJ: I printed it just by pressing print. Cause I remember PJ had done that once. I remember seeing it so I just did print. RJ#3 lines 400 - 403.

As RJ and I were visiting Mapquest, I suggested that she scroll down the page. She was very new to scrolling, but, understood what I was talking about because she had seen PJ scroll previously.

> LORI: Maybe you could scroll down a little bit.
> RJ: This way.
> LORI: Yeah.
> RJ: Ahh huh. Yeah I see. LOOKS BACK AT ME, LEANS BACK. Now that never occurs to me. That's something else I have to learn. Except I know PJ does that a lot and he'll tell me to. And I don't think of that. I assume it should have everything right there. RJ#3Vid2 lines 561 - 572.

Persistence and Try Later

When RJ would hit a snag, she would try again later. This strategy helped her not to become so frustrated during her learning process.

> …to stick to it, keep working on it, go down every day and if what you were trying to do at the moment didn't work, go back and do something else. Just because, Keep working at it. Give yourself the time on the computer. RJ#5 lines 879 - 885.

During this "doing" phase, RJ used her methods of learning without having to worry about the infrastructure of the learning process. She had already created a framework and structure in the earlier phases. She knew where she was going because she had built herself a

floor plan. During this phase, she could confidently start to learn without worrying about failing. RJ was not afraid to use these methods, such as trial and error, and watch and learn, because she now had the courage, knowledge, and skill to accomplish the learning process.

Transition 5

At this point, RJ knew enough computer terminology and was sufficiently familiar with the computer icons and environment to feel comfortable enough to ask for help. She realized that if she did get into trouble she had enough intellectual insight to back out of her dilemma, or get rescued by using the support system she had created. She knew the consequences of her actions and understood the process that she had created thus far. So, she was ready to stop learning new material and begin practicing in order to remember. At this time, she literally *stopped* her *learning* process. She paused at this juncture, in order to reflect on all that she had learned, to assimilate her knowledge, and practice her newly learned skills.

Phase V - Practice to Remember

In this phase, RJ practiced her skills in order to remember what she had done after using her strategies to meet her goals. After she had learned many new tasks, she felt uncomfortable learning any more. She decided to just practice what she had already learned until the task got easier, in order to remember. This practice phase helped RJ solidify her learning and helped her meet her goals.

Self Discipline on Each Day

One of her strategies in this practice phase was to use the computer each day. She would discipline herself to practice and persevere in order to remember.

> That it did take a level of self discipline to go down almost every day and spend half an hour, 40 minutes. And if I hadn't done that, I wouldn't have accomplished anything. RJ#5 lines 873 - 878.

> 6/17, 6/18, 6/19 about 1/2 hour daily mostly receiving and sending e-mails - occasionally foray into a search or looking at a web site.
> 6/20 to 6/30 Daily (almost) getting new messages - RJ Journal lines 207- 213.

Practice

In the earlier phase, RJ used strategies to learn how to complete a task. In this phase she realized that she remembered best by practicing the tasks.

> LORI: Did it help to do it over and over again?
> RJ: Oh yea, yes, that is the only way to remember it if I have done it. That is why I am working on the web right now. Trying to master a few of these things. RJ#3 lines 334 - 341.

At one point RJ stopped learning any new tasks in order to practice so that she would not forget what she had learned. She did not want to write anything on paper. And she did not use the paper directions that PJ had created for her in the beginning of her learning by rote experience.

> So, I pulled it out this morning, but I haven't looked at that paper. I mean I don't need to. Well, like I said, I've been doing it over and over. So, you know, I'm not doing it once a month, so I think we're getting it down to be a habit. RJ#4 lines 579 - 585.

She also wanted to remember how to get out of tricky situations and not have to relearn how to escape. She entered this phase when she realized that she needed to practice by refining her skills that she had just recently learned.

> RJ: This week I am refining.
> LORI: Ah haaa.
> RJ: I would say.
> LORI: That is a good word. I like that word.
> RJ: Just thinking, finding what happened that was wrong, that I can get out of it. I'm not sure that I…that is why now, in the next week or two I intend to just practice. Because I am not sure how much of it I will remember, unless I go over it. RJ#3 lines 1199 - 1214.

RJ would set a goal, learn how to complete a task by using her various strategies, and then practice one task at a time until the process became easier.

> And I guess that was the whole learning process, taking them (her goals) on one at a time and just keep repeating and repeating them. RJ#5 lines 157 - 160.
>
> It may take me a couple of tries, but I can still do it and that really doesn't take me a couple of tries now anymore. I usually do it the first time around. RJ#4 IVAF lines 353 - 357.
>
> But basically doing it over until it became much easier to do. RJ#5 lines 176 - 178.

The perfect example of this was when she remembered to use the "enter" key after practicing.

> LORI: What did you use to remember that? I mean did you have any type of way to remember or…?
> RJ: No, the feeling that it was so dumb not to remember. … It was just that I was frustrated by not remembering, so when I realized it was something as simple as pushing an enter key, I said Oh for Pete's sake. (laughing). So now I remember. You know it was just so simple. I mean with all the things I am trying to learn, I had forgotten that.
> LORI: absolutely.
> RJ: But it is rather important, so now I have been using it more. So now I am doing it. You see I had only done it maybe once or twice, and that was probably with PJ looking over my shoulder… RJ#3 lines 133 - 156.

Reason

RJ also needs to understand why she is doing a task. She needs to make sense out of the process, so that she might be able to use reason to get the correct response at a later time. This helps her remember how to do the task. She does not memorize — she actually learns how to do a task, then practices until she is sure she can do the task without writing anything on paper or memorizing.

> LORI:…Why is it important to know why when you are doing stuff on the computer?
> RJ: Because If I don't have any idea why, I will not remember. I will have to just memorize and I am never really comfortable with it. uhh I could do that.
> LORI: You mean you are not really comfortable with just memorizing?
> RJ: Nah,,, I've got a good memory. But it doesn't seem like it is making the best use of my brain just to memorize this. And if I forget it then I will have to go back and read it. Where if I have some [idea], I think it would help me do these

> things without having to reference anything. If I have an idea of why I am doing it. And then I can make some sense, if it says, do you want to do this or do you want to connect, or do you whatever, and then I can answer it with some sense if I know why they are asking the question.
> LORI: OK, let me paraphrase and tell me if I am right.
> RJ: mmmm hmmm
> LORI: So the reason that you need to know why is to remember it better because if you have some idea in your mind as to how it works, then it is sort of a memory trigger, that you don't have to look at a piece of paper. It helps you remember how to do it, by knowing why to do it. Is that correct?
> RJ: Exactly. But if I know. It means I don't want details, I don't need details. I mean that's fine. I mean if I were interested in it then I could deal with it but if I'm not interested in the details of the why... I just want an idea. RJ#2IVAF lines 483.-527

During the practice phase, RJ decided not to learn any new information and refine the skills that she had recently acquired. She reached a plateau in her learning process and resolved to practice by using repetition and a daily schedule. She consolidated her thoughts during this phase and made sense out of her newly learned knowledge and skills. RJ took this time to reflect on what she had already learned. She practiced to become more proficient so she would not forget her newly learned proficiencies.

Transition 6

During this transition, RJ experienced a transformation. She realized that she could perform all of the tasks that she had planned to learn. She was also getting faster and more efficient at each task. A memo in Ethnograph described this phenomenon, "Each time she does a task she gets faster and faster and can remember it better" RJ#3vid2 Practice Memo. She had also conquered all of the errors and mistakes she had anticipated. At this point she was in complete control of her learning and was ready to begin her success as a computer literate woman.

Phase VI ~ Liberation!

After the practice phase RJ felt that she had mastered her goals. She had learned how to correct errors by herself or ask the correct support person for help if needed. At this point she felt liberated.

Self Rescue

When RJ uses the word liberated she believes that she can "rescue" herself. She does not need the lifeline of support.

> LORI: You've practiced quite a bit. And then reaching that turning point where you felt liberated.
> RJ: Yes, able to do these things.
> LORI: Do you think that was a turning point? Because that's my own words, I just wanted to know.
> RJ: (pause thinking) It was more gradual. It was realizing I could do the email, even though I messed it up a lot at the beginning. Then I learned how to rescue myself when I next messed it up and that was good.RJ#4IVAF lines 326 - 340.

Mastery

When RJ realized that she had mastered her goals her confidence level increased. After successfully mastering each task her confidence built, which lead to an increase in motivation and a passion to continue.

> LORI: Well, you're smiling a really big bright smile right now (laughs)
> R. J: Well it was just kind of funny and I suddenly said if I can just remember how to get there. I can do any of these things that I really want to do. RJ#2 lines 91 - 98

She confirmed when she had reached her goals…

> So, I guess I had to do it by myself and it worked very well. Yes, very well. RJ#5lines534 - 536.

Finally, RJ had reached the liberation stage. In this stage she was independent in her learning process. Of course, she relied on her support system, but on her terms and only when she decided that she needed assistance.

In conclusion, RJ created her plan for learning based on her knowledge of how she learned best. She realized that she needed to be interested in the subject and have a practical reason for learning. In the preparation phase, RJ built a foundation for learning. She set realistic expectations, developed a support system, and got a basic understanding of the subject by talking to her spouse and using a book. In the play and exploration phase, RJ investigated the programs on her computer desktop. She tested the foundation of her system that she had created in her preparation phase. In the selection phase, RJ chose exactly what she was interested in learning about and why. The goal setting phase consisted of setting goals, building a foundation for how she was going to learn, and setting a schedule of when she would learn. In phase five, she was not afraid to try different strategies and methods because she was satisfied that her learning system's foundation and infrastructure were capable of managing problems that might arise. In phase six, RJ consolidated her thoughts and reflected on her learning process, to remember her newly acquired skills and knowledge. The final phase in RJ's learning process resulted in liberation or the idea that she has not only mastered the goals, but that her self-created learning system was a success.

Challenges

RJ never saw the experience as challenging. She just realized that she had goals to meet, then met them.

> Well, I didn't think of anything I did as a challenge, but if setting a goal is a challenge, then yes, it played an important part. A challenge sounds a little bit as if I was fighting my way through desperate odds, but it wasn't that. But, just deciding that there were things that I wanted to do next, setting goals and setting a structure. RJ#5 lines 718 - 727.

Successes

RJ started at ground zero in her learning process. She had never used e-mail or the Internet. Behaviorally, RJ achieved much in her learning process. She learned basic computer terminology, how to search and navigate the Internet and to read, send and print e-mail. Cognitively, RJ designed and created her own learning process and changed her way of thinking to achieve a level of confidence in order to reach the last phase of liberation!

Em's Narrative

Background

Em is a healthy sixty-seven year old woman who lives with her husband, Jm, and two dogs. They live in a single family home in a suburban neighborhood in Northern Virginia. Jm is a retired military officer and West Point graduate. Em has spent years managing and keeping the household while he worked. She raised four children and now has six grandchildren.

Em is very active at the local recreation center. She and I met at a rowing class at the center. She and her husband took the class and were very good at this extrememly vigorous exercise. She also takes classes in water aerobics regularly. Em is active as a volunteer at a military base about fifteen miles from her house. She is devoted to her family and enjoys visits from her children and grandchildren.

Since Jm retired, he and Em have had territorial struggles on the home front. Em is used to being independent and alone in the home. Since Jm is now at home they are learning to adjust to retired life in the family domain.

Environment

Em's computer learning environment is enviable. Her computer is located in an upstairs bedroom, which was made into a library/computer room. It used to house only a small laptop on a tiny table. The laptop screen was very small and there was a horrible glare so that Em could never see the screen.

Then her husband, Jm, bought a brand new iMac® computer and bookcase/desk/cabinet. The cherry wood cabinet/desk holds the printer on the bottom shelf and papers on the above shelves with cabinets. A huge working desk space allows for a new "cute" mouse and a 20-inch flat screen monitor/computer. Jm bought the cabinet before he got the computer. There is no

bulky CPU, just a small round base and the large flat screen (with no glare). My comment when I saw her environment was, "He went from little to just grand!" EM#1 lines 1422 - 1423.

Em also has an intercom system on her phone so that she can call Jm if she has a problem. She quickly presses a button and beeps her spouse downstairs to ask questions. The only problem with this system is that they only have one phone line. Therefore, if Em is on line and calls on the phone, the computer goes off line. She must then sign on to AOL again to go online.

Em broke her ankle a few years ago and is conscious of comfort while she sits at the computer. The chair she uses is very comfortable and also good for her back..

Past Processes of Learning How to Use Computers

Intimidated by Technology

Em has never been a technical person. She has never used an ATM machine and is intimidated by the multitudes of remote controls that power their in-home audio/visual television/speaker system. Jm, her husband, runs the technology in their household.

> I do not use an ATM machine. I haven't learned that technology and I manage just fine without it and I feel a little intimidated, perhaps using an ATM from all that you read in the newspapers…although I understand that is not a reason not to. Our TV and VCR and all that…I think of it as so complicated. JM of course keeps buying the latest you know and I said…I tell the guy that…our Sony rep…If Jm goes, you're going to have to come here…and show me how to use all this… EM#1 lines 883 - 895.

Husband Researches for Her

In the past, Em would ask her husband to look up information on the Internet for her. She did not know how to use the computer and thought that this would be the best method to get her information. She realized that he would look up the information for her most of the time;

however, it was on his time schedule. She would rather look up the information in a timelier manner.

> I find that if I ask my husband, look for such and such, …it's at his convenience. EM#1 lines 150 - 152.

> Em: and so we found it…but you know…as I say, it's taken me several weeks to get that man to do that for me.
> Lori: And you want to do it all by yourself?
> Em: I want to be able to do it myself, because I feel like I'll have more patience. It's not that he doesn't have patience…may be he's not as knowledgeable or have the patience to search for things that I would have. There are you know, other little things that I get curious about. EM#1 lines 177 - 194.

Children "Help"

Em's children tried to help their parents by donating old computers. This strategy did not work for Em because the computers were either too slow or their screens were too small. Em found this process to be inconvenient and uncomfortable.

> Em: It will be two years ago this coming Christmas that our daughter-in-law gave us her castaway laptop.
> Lori: You tried it but it was too inconvenient? It was too small? You couldn't see?
> Em: It was even bigger than this…it was so incredibly slow. I mean…it was really a dinosaur. .EM#5 lines 182 - 191

> And I found that if he can see the screen, I can't. You have to get the light…so we got this shade that blocks out all the light so that he could see the computer…I found it extremely inconvenient. EM#5 lines 200 - 206.

Em felt that her family left her out of their e-mail communications.

> Previously they only communicated with Jm…it would bother me…but obviously it was directed at both of us, but always addressed to Jm. EM#5 674 - 678.

So, in the past, Em's family tried to help her learn to use computers. Em was intimidated and felt left out of family communications, but wanted to learn anyway. Em realized that she could not learn by using certain methods, she had to do it her way!

What She Does Not Do And Why

Husband as Teacher

Em has said that her husband is a great teacher; he is patient and has taught her four children, and now grandchildren, how to drive. However, Em does not learn best with her husband as *her* teacher.

> Em: He gets real frustrated at me. It's like…he has a lot of patience teaching someone to drive…he's taught our four kids and now he's working with the grandchildren…our 17 year old granddaughter…I credit Jm's patience…the experience before she was turned loose and I feel so safe with her. Because she had the experience before she got her driver's license…
> Lori: But with him teaching you, it's a little bit more frustrating?
> Em: Yes. He raises his voice at me. Like why aren't you understanding this? But anyhow, yes, we got through to it. But, he's learning himself. You know, Try to get the information EM#3 lines 146 - 163.

Her husband had tried to teach her how to use technologies. She was frustrated with the old equipment and having her husband watch her every move. Also, Em realized that she did not learn best as a student of her husband.

> I'm…I would have used the Compaq laptop except I have a very difficult time with the screen…it's just so small. It's about like a 12 screen and it'll get …a glare on it. EM#2 lines 18 - 24.

> Before that, Jm tried, to show me, but it was…looking over his shoulder or sitting at it and have him looking over my shoulder…it was very frustrating. A little tiny screen like that and then you had to have it angled…if I saw it, he couldn't…of if he saw it… EM#3 lines 892 - 899.

> JM gets very frustrated with me…I told you…first punch this and then punch that and then this translates to that…what happened to on and off? I guess with the satellite thing…oh my gosh…your options are just incredible…, but I sometimes have a hard time getting it and then when I finally get it…then he changes the technique or the…you knowEM#1 lines 901 - 919.

Does Not Call for Technical Problems

Em delegates the technical problems with the computer to her husband. She realizes that he has the expertise and has been responsible for this territory in the past. Jm set up their

computer environment, complete with cabinet, chair, computer, printer, and online connections. She has never called the phone company or America Online about a problem; this is Jm's responsibility in their separation of household duties.

> EM: Most of Jm's email is all from Tm [son in law].
> Lori: Shouldn't you be getting some from Tm soon?
> Em: Probably. But you know a lot of Tm's email is more technical stuff. EM#5 lines 156 - 161.

> Jm spent most of the 21st trying to call someone at AOL. We definitely had a problem. Finally talked to someone and was walked through. It's all Greek to me! EM Journal lines 105 - 109.

> Now that Jm got things straightened up on AOL now, I will be going back to that. EM#5 lines 37 - 39.

Does Not Call Researcher

During the weeks Em was learning online technologies she never called me at home. She also never e-mailed me with questions. I was obviously not one of her resources that she felt inclined to call or e-mail. However, when I was in her house she considered me one of her first choices to ask if she had a question.

Does Not Practice at Class

Em decided that a class was a way for her to learn. However, she did not take the time to practice after the class or on the practice days. She felt more comfortable practicing on her own computer in her house rather than in the classroom at the Mall.

> Now…that Senior Net facility that they have at the Mall…they have all kinds of hours where you can come in and use it and there is someone there to help you. So it's not because it's not available, it's because I just didn't take the time to do it. EM#5 lines 218 - 225.

Does Not Read the Manual

Em is the type of person who does not like to read directions. In contrast, she stated that her husband Jm is an avid reader of technical manuals. She has read manuals in the past. For

example, she learned how to use her microwave by reading parts of the manual. Even though she would like to read books about her operating system, she thought she might misunderstand the directions and terminology. EM was more successful by using methods of learning.

> Em: No. I'm one of those they wrote about just recently about so few Americans read instructions…did you read that?
> Lori: No.
> Em: I fit into that category where Jm is very…he reads every little thing. He doesn't turn anything on until he has read all the instructions and it doesn't matter what it is. That's niceEM#1 lines 925 - 936.

> Em: I do know how to read (laughs), but sometimes I have found, especially more recently that I don't…do I want to say comprehend as well…I misinterpret directions. EM#1 lines 1001 - 1003.

Em realized that she had methods that did not work for her in the past. She also wanted to learn how to use the Internet and e-mail "her way. " She did not want to have her husband teach her, call the researcher at home, deal with technical problems, read the manual, or practice at another location.

Em's Process Learning Online Technology While Participating In This Study

Motivation

Em was motivated by her own insatiable curiosity and by the practical reasons of staying connected to others. She did not want to be left out of 21st century communications. The class she took also helped to encourage her to learn as she compared herself to other learners.

Em was very curious to learn more about topics that she had seen on television shows. And she confirmed that she is just a curious person in general.

> That I get curious about. On the TV program…you know…the PBS programs say you can go to such and such web site and get more information on this or that…you know, I'm curious. What kind of information do you get? EM#1lines 194 - 198.

> Em: I'm just…I don't know…I'm just kind of curious. It helped the first person why do you need to know? I don't know, I just do. How can you not know? How can you not be curious? EM#3 lines 411 - 415.

Em was fascinated with today's technology; its speed and connectivity.

> Yeah. I'm more fascinated in all that is available…going to Yahoo and Google. EM#5 lines 545-547.

> To me it's fascinating that you can go here and go here and here and here and get different things. EM#2 lines 663 - 665.

She talks about MapQuest and the way people can find directions quickly.

> That capability fascinates me and I'd really like to see how it's done. EM#4VidA lines 432 - 433.

Em wanted to stay connected to her family and friends and did not want to feel left out of the times.

> Em: I think more than anything, the email…staying connected to people.
> Lori: That's important to you?
> Em: yes. I feel that both Jm and I are very bad about staying in touch with old friends and actually it was an old friend that somehow…I guess she called us and asked us if we were on the Internet. EM#5 lines 778 - 788.

> I feel that people who speak this language just assume that everybody else does too. In this day and age, why wouldn't you? You are looking at one that doesn't…I just kind of got left behind. EM#3 lines 868 -875.

After Em had worked with email and the Internet for a while she felt like she understood the technology better and that she could fit in with modern times.

> Em: Because I feel I'm out of the dinosaur age.
> Lori: Describe that more to me.
> Em: Well I wasn't around 50 million years ago…compared with today's technology; I could have felt like I was there. Really. But I'm out of it now.EM#5 lines 754 - 762.

Also, by comparing herself to others in her class, Em felt a sense of hope. She realized that she was not the only person having trouble learning this technology.

> This lady next to me…she really had a hearing problem and I felt…and former school teacher…who quit teaching 16 years ago…so they were just bringing computers in and I thought…I didn't…when I learned her problem, I felt…I didn't feel alone. RJ#5 lines 361- 367.
>
> …everybody I think…I find that a lot of my classmates had an even more difficult time than I did and I thought…maybe I'm not so…there's hope for me.EM#5 lines 386 - 390.

Em Has a Plan

Em realized that these past efforts to learn the Internet and e-mail did not work for her. So, she was thrilled when the researcher asked her to become a participant in this study. She was not sure exactly what was required of her before the study began, but decided that she wanted to learn how to use the Internet and e-mail for the many reasons mentioned. For Em, this was perfect timing because she was just beginning a class called "Introduction to PCs" at the SeniorNet facility. She created a plan that provided structure and support for her learning process. She revised the plan as she recognized what worked for her and what did not. During the eight weeks of data collection, Em finished her class and practiced at home. She did not meet her goals; however, she is well on her way to sending and receiving email and surfing the net.

The Learning Process

This next section will describe Em's learning process on two different levels. A visual chart (Figure 7) lists phases of learning and the behavioral steps involved in her individual and unique journey. Transitions describing her underlying process of cognitive changes are also illustrated on the chart. What follows is the description of the phases of Em's process, detailing the behavioral steps and cognitive transitions.

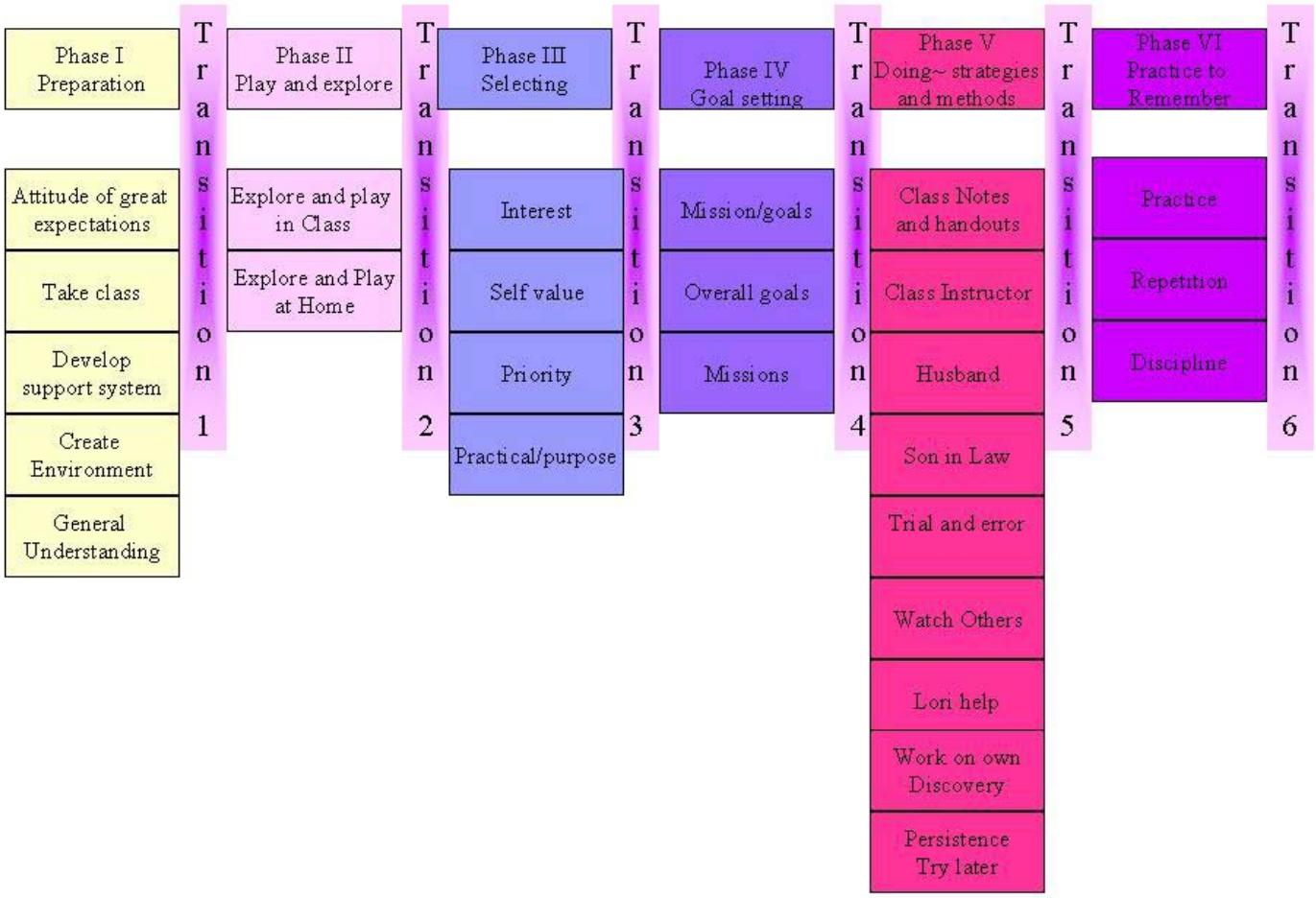

Figure 7. **Em's Process**

Phase I ~ Preparation

Attitude of Great Expectations

Em started with an attitude of confidence. She knew that she could learn this new technology and had the belief that she could proceed quickly with little trouble.

> Well it never occurred to me that I couldn't do it. I wish I had done it sooner. EM#5 lines 694 - 696

When asked if she wanted to be able to learn this herself she replied "I want to be able…I want it now!" EM#1 157. She wanted to be able to learn this technology quickly and often got frustrated when she did not learn immediately.

> Em: I would like to be able to sit down at the computer and get to everything fast…well, faster than I can get there now…at the rate I'm going, it's very frustrating. EM#2 lines 511 - 515.

> Em: Are you terribly disappointed? LOOKS AT SCREEN
> Lori: No. That was great. You did very, very well.
> Em: No I did NOT.
> Lori: I think you did wonderfully for the first time. Very wonderfully.
> Em: Hopefully next time I'll really be good at this EM2vid1 lines 371 - 391.

After she had played with the computer for a while, I asked her again how she thought she was progressing. She was not satisfied with her progress. She thought that she should perform better and faster.

> Lori: Well how do you think your third day on the computer went so far?
> Em: Disappointing?
> Lori: Really. Why do you say that?
> Em: Because I felt like I should have been better at it.
> Lori: Why do you say that?
> Em: Well that I should have remembered. Okay. After this I do that. And if nothing else, how to get off of it. EM2vid#1A lines 226 - 240.

> Em: I don't feel successful yet.
> Lori: Really? Tell me why?

> Em: Because I just can't come click it on and quickly come up with what I'm looking for.
> Lori: Is that important to you? To do it quickly?
> Em: Yes. EM#3 lines 698 - 709.

So, Em had great expectations for herself and her learning processes. She knew that she could do it, but wanted to learn faster and more successfully according to her plan.

Take a Class

Em decided to take a class offered through SeniorNet. SeniorNet is a program to help seniors learn how to use computer technology. It is for seniors (55 and older), taught by seniors at shopping malls throughout the country. There are many instructors and volunteers to help learners during and after classes. The location was close to her house and offered at the correct time to fit her schedule. Em learned about SeniorNet from a woman in her swim aerobics class. When she took her first class, she decided that she was satisfied with the patient instructors and felt comfortable asking questions at any time. So, the convenience, comfort, affordability and patient instructors were very important aspects in Em's game plan.

> I wish I had discovered this Internet…this Senior Net…that it was available to me. And that's what really prompted my starting it. EM#5 lines 696- 699.
> …decided I will learn this technology…this skill some other way, so when I heard about the Senior Net, I said that's for me. EM#1 lines 549 - 552.

> And it's convenient…very convenient. It's affordable. And I didn't feel uncomfortable being among people in my…more my age group. EM#1 lines 567 - 571.

The class was also a benefit for Em because she could see the screens. She also felt comfortable asking questions and did not feel lost at all.

> And, yet, I've found that when I was in class last Wednesday, hey…they go at my speed and perhaps because they have the big screen EM#1 lines 126 - 129.

General Understanding

During her class, Em got an understanding of computer terminology and basic PC commands. Her "Introduction to Computers" classes helped her feel more comfortable with the computer in general.

> Em: Oh, he explained to us what the World Wide Web was. What AOL is. Although most of those people had Internet access…am I saying this right? Internet connections.
> Lori: Okay.
> Em: Am I saying it right…you know…most of them had AOL. So he took time to explain what all of that was and what it had been and what's become of it and that sort of thing and how easy it is to communicate with people all over the world. EM#2 lines 132 - 146.

Em realized that it was important for her to know the terminology. She devised a plan to sit close to the instructor in class so that she could hear.

> …so this has been my biggest problem…all this terminology…and stuff. EM#3 lines 58 - 59.

> I'm still having a lot of trouble understanding some of the terminology. Okay? And how things work and what are they talking about? Even our instructor yesterday…of course I got to class a little bit later than I normally do…I try to be there early so I can sit on the front row so I can hear well and the instructor that we have is…I thought he was very good EM#3 lines 31 - 40.

She also needed to learn the terminology so that she could recognize what people were asking her to do.

> I might know what I'm doing or what to go for…what to search for. EM#2 lines 255 - 256.

Towards the end of the classes, Em realized that she was starting to understand the terminology. This gave her more confidence and made her feel more connected.

> Because different people are telling me to do this, now do that. I can follow their directions. I feel that people who speak this language just assume that everybody else does too. EM#3 lines 868 - 871.

Develop Support System

Em decided that since asking questions was important to her way of learning she needed knowledgeable and patient experts to help her in her process. The instructors and the volunteers in her SeniorNet class were part of Em's support system.

> I'm the only one (in the class) that had a whole lot of questions. Like this…when you see http…is that right…and then two slashes? What does that mean? Now that he couldn't really answer for me. What that means. I wanted to know why someone like himself who is obviously retired, he and his wife would have their own web site, but apparently he had been in business for himself at one time or another and now uses it…so he kind of explained that to me…why you would want that. And of course, I wanted to know if there is a fee for that, you know? But I don't know if it doesn't occur to the other students in the class or they just not speaking up? But I don't know enough to say have organized thoughts and questions. I feel like maybe I'm going here and there and, you know, around…like I could be dangerous in my questions. EM#2 lines 93 - 114.

Even though her husband was just learning how to use their new iMac® as well, he still had more computer knowledge than Em and was a source of support. She also realized that when Jm could not answer her questions, she had a backup in her son-in-law Tm. So, Em realized that she could rely on her family and SeniorNet instructors to offer support if she had a question or reached an impasse in her learning.

Creates a Comfortable Environment

As previously described, Em's earlier learning was hampered by old, slow, and small equipment, glares on the too small monitor, and a physically uncomfortable computer room. Em realized that she valued comfort in her learning process so, she created a learning environment that was both physically and emotionally comfortable. Her husband bought a beautiful cherry wood computer cabinet/desk and a comfortable chair that adjusted for back problems. He also

bought a beautiful brand new iMac® with a large flat glare resistant screen. Some of her comments about her new system were:

> But it's cute, don't you think? EM#1 line 1568.
>
> Oh, It's just…I like the way the screen is. It's much more attractive then that ugly thing we look at in class. I can live with this. EM34 lines 428 - 431.

Em also realized that she thoroughly enjoyed her workstation environment. In fact, she decided to practice at home rather than attend the SeniorNet practice sessions.

Em prepared for her learning process thoroughly. She began with an attitude of confidence and great expectations, she had a comfortable environment created for her, and she developed her unique support system. She also took a class based on its convenience, comfort, and the patience of the instructors in order to gain a general understanding of the computer and terminology.

Transition 1

During this transition, Em had prepared to succeed. If she steered towards failure, she had a support system for backup to keep her on track with her learning process. At this point, she needed to test her system of preparedness. She was confident enough to play and explore and had the hope that she could learn.

Phase II ~ Play and Explore

Explore and Play in Class

Em's SeniorNet class helped her to learn computer terminology and become acquainted with the computer software and hardware. She explored the Windows software in class and learned how to turn the computer on and use the mouse and keyboard. She called this step in her learning process "play." She used this term because she contrasted play with work. She was not getting paid; therefore, this must be play.

> EM: Yes. And we got familiarized with the keyboard
> Lori: Oh good
> Em: I learned about…I have to go over…you know the menu…is that on top? What's on the bottom? The bar? |EM#1 92 - 99

> Oh yeah. When I use the word PLAY, I'm trying to find my way around…discovery. Teaching myself I guess how to get from here to there. Because I was not able to just come home from class and sit down and do it, I feel like I'm PLAYING and I think a lot of it for me…it's not like I'm trying do something professionally. It's…I'm not getting paid for that. EM#4 lines 531 - 540.

Play and Explore at Home

Not only did Em explore and play during her class at SeniorNet, she also played at home on her iMac®. At this point, she had no missions, just the willingness to investigate the different functions and applications on her computer.

> And the mouse…you know, the arrow…click…I'm still having…I don't understand why sometimes I have to double click. But that is…it's just one of those things that someone has to repeat to me…this is why you have to double click. But I haven't taken the time to play around with it…to look at what all those icons will do, what the task bar…which is the task bar? On to or on the bottom? EM#2 649 - 658

> Last night when we were at the computer, I decided not to go on line. We started to and then I said…I want to check out what all these other functions were…EM#3 lines 352 - 355

Em found the technology fascinating and used the discovery method to just click on icons.

> The bottom? To me its fascinating that you can go here and go here and here and here and get different things and that's what I mean by playing. I guess. What functions and once you get the menu over here…there are 10 or 20 other things that it does, I mean…to me…the technology of it is just awesome…is the best way I can describe it. EM#2 lines 663 - 672.

> So far I feel like a lot of it is play. I'm discovering things. What's available out there. There is so much and I went to get some health (information). EM#4 199-202.

This play phase was important to give Em the confidence she needed to continue into the next phase. It also gave her an orientation into the basics of computer hardware and software.

At this point she was not pressured; she just played. She had no mission, no great goals. She was open to make mistakes because she had no objectives at this point.

Transition 2

During this transition, Em often became confused and frustrated. However, she would test her support system and general understanding of computers that she had learned from her class. She realized that playing and exploring was helpful in learning general computer tasks such as scrolling, clicking and terminology. But Em longed for a more practical application for using her new skills. Therefore, she moved into the next phase of selecting. At this time, Em was familiar enough with the computer and was ready to choose her priorities for learning.

Phase III ~ Selecting

Interest

Em needed to be interested in order to continue learning. She discussed her interests with her husband and selected interesting topics during class. She realized what she was not interested in learning and did not waste her time.

> Evening -Decided not to go on line but instead tried to discuss what I had. Not much was of interest to me. EMJournal lines 43 -46.

> 7 August - Class was mostly a review of all that we learned plus learning about the audio capabilities. Definitely not interested! I haven't mastered our Sony turn table for playing CD and DVDs. EMJournal lines 69 - 74.

Self Value

Much of Em's interest, she explained, was just her natural curiosity. She downgraded her learning about certain subjects because it was of no value to others. In this example, Em was very interested in finding a location in Australia. She mentioned that she would not pay for a program to find out this information, but she was very interested because it had to do with her family.

> I question if it would be…just because I'm curious of where Arlie Beach is. Do I go out and spend…let's say $15.00 just to find out. If I was a travel agent it would be different. If it's just for my own general curiosity and I use that because it was one of the first things I was searching for, I don't think so. Especially when I have a pretty general idea of where it's located. EM#5 lines 863 - 873.

Em describes her interest in finding more information from TV shows. She realizes that she is interested in this subject and that it will not help others, it just satisfies her interests. Her intense curiosity helped her select subjects that were of interest to her and spurred her learning process.

> Well because the things that I would like to play around with or discover are not of any value to others…certainly in my household then they are to me. They don't have the same value. It's more of an intellectual curiosity that I have. As I had mentioned before, PBS programs…they say if you want more information…go to PBS.org…I'm curious what does that? What information does that give me? EM#2 lines 567 - 577.

Priority

Em realized that she has a very busy life and prioritized her many activities. She had to choose what she was interested in learning about instead of wasting her time playing.

> Em: Yes. Because I have so many things to do…other things to do…only for that reason. And usually I'm doing it in the evenings, you know, …after dinner…after the dishes are done and…but maybe when I get successful at it, I will make more time at a different time of the day.
> Lori: To make more time. Tell me what you mean by that?
> Em: It will become…it will have a higher priority than what? Right now I'm taking…I have so many things to do every day. I go to computer classes, I volunteer at ACS; do things like that… EM#3 lines 709 - 725.

Practical/Purpose

When speaking about learning to use the microwave oven she stated, "I learned what I needed to learn." EM#1 lines 1109 - 1110. Em also used this philosophy when learning how to use the Internet and e-mail, and the computer in general. She wanted to learn what she wanted to learn, so created her *own* missions and goals.

Transition 3

At this point in Em's learning process she knew what she wanted to learn. She was ready to create a plan for learning based on her choice of interesting and practical topics.

> I just felt like…kind of taking a little bit of the attitude of my youngest son…if it's something you want to do bad enough, you learn. You'll do it. EM#5 lines 396 - 399.

Em felt comfortable and confident enough to devise a framework for learning the Internet and email. She knew herself well enough to select her topics of interest and to set missions in order to learn what she chose to learn.

Phase IV Goal Setting

Mission/Goals

Em decided that she wanted to learn how to use the Internet and e-mail. This was one of the reasons that she was an excellent volunteer for this study. For the purposes of this research and terminology, the terms "goals" and "missions" are defined by Em. She had one overall goal and many missions (smaller goals) to complete in order to finalized her overall goal.

Overall Goals

Em had an overall goal to learn how to use the Internet this year. It was almost like a New Year's resolution. She mentioned this goal during our first interview.

> Lori: But you sound like you have a plan in mind.
> Em: Oh I do. I do. It's my goal for this year.
> Lori: Good.
> Em: …to learn to use the computer to go online and to be able to email. EM#1 lines 206 - 215.

When I asked her if she usually set goals for herself she replied…

> No. I'm not a goal oriented person, but that was a goal I had, so that I could…all the young people communicate on the internet you know, …go online EM#1 lines 695 - 698.

So, Em did not usually set goals for herself. Learning how to use the Internet and email was an important task for her to learn this year. She devised smaller missions as sub-goals in order to complete her ultimate goal for this year.

Missions

Em decided that she would devise missions, or small projects, to gain information that she really needed or wanted to learn about. She would set her missions based upon her interests and curiosity. She also created missions in order to get information, tickets or phone numbers to help others.

> That's a mission. That stuff I really do need to know. Other stuff as it comes along…as my…as it gets my curiosity. Last night we were watching a program on PBS. EM#3 lines 449 - 452.

> But I have a mission…I have a mission and I'm running out of time. EM#2 lines 281 - 283

> Then Monday night, I have a few missions…you know…from the computer. One of which is to get information with my grandchildren…grandsons coming…get some information on tour of the Washington Monument…10-year old boys like to do these sorts of things. And getting tickets…also wanted to go to the Air & Space Museum and they want…I'm sure that they would like to ride or go on the simulator that they train the top guns on… EM#3 lines 99 - 110.

During our last interview, Em decided her many small missions had helped her continue to learn how to use the Internet and Email.

> Yeah. I also needed to have a mission or a project or whatever you wanted to call it. EM#5 lines 654 - 655.

This goal setting phase motivated Em to persevere in her learning process. As she completed each mission, she gained a modicum of hope. This hope built her confidence to continue.

Transition 4

By creating small missions, Em propelled herself into the world of learning the Internet and e-mail. These were meaningful and practical missions for Em. These missions gave her the reason to complete a task on the computer. When she had completed a mission she had more confidence than before trying. This confidence led to motivation to continue to develop new missions to continue learning. She called this motivation "hope." This new confidence launched her to learn by using many different methods and strategies. She was not afraid to try strategies such as trial and error, reading class notes, or working on her own to discover new ways of learning and completing her missions.

Phase V ~ Doing - Strategies and Methods

Class Notes and Exercises

Em brought home outlines of each class and instructions on how to perform certain tasks. She would also do exercises in class and review at home.

> Okay. Then yesterday we went on the Internet…this is in class. And we went to Yahoo and we registered with Yahoo and then when I got home, there was already confirmation of my registration. EM#3 lines 284 - 288.

Class Instructor

Em decided that the instructors and volunteers in her SeniorNet class were patient. That is very important to her. Also, Em needs to ask plenty of questions. The instructors made her feel comfortable and knowledgeable.

> Oh yes. Oh Yes. All those instructors are very patient. They don't think any question is too dumb. And they keep telling you that. Nothing is dumb. EM#3 lines 945 - 948

> I thought it was great. They seemed to be incredibly patient…no question is too stupid to ask. Do I want to say I feel a little intimidated? I think if I was in a class with a lot of young people…college age people…I might feel a little intimidated.

> I would be embarrassed to show my ignorance or my lack of ability to learn… EM#5 lines 342 - 350.

Husband

Even though Em's husband, Jm, was just learning his new iMac®, he had used PCs and laptops with the Windows operating system in the past. Jm was usually around the house when Em would play or practice on her computer. She could call him on her intercom system to ask a quick question or to beckon him upstairs to sit with her while she experimented.

> Is that what it amounts to? Let me give Jm a quick call here. CALLS ON INTERCOM. EM#3vid2 lines 93 -94.

> EM: then again I don't understand why it doesn't get highlighted.
> LORI: What would you normally do?
> EM: call Jm.EM#4 vidA lines 117 - 123.

> Em: I'm…a lot of it trial and error and hollering at Jm to come up here and help me with something. EM#5 lines 46 - 48.

She would also discuss her computer learning with her husband. They would talk about Em's learning process continued during the day without even being near the computer.

> Just this morning I said to Jm, because in class about 2 or 3 weeks ago, they taught us how to do document how to file them, using a floppy disk and I asked Jm if we have a floppy disk and he says, no we don't. It [the iMac®] doesn't have that. But I noticed that he has files. Like banking and checking. EM#4 lines 408 - 415.

Jm would sit with Em and help her translate her learning from the PC in class to their MAC at home. She sometimes surprised me by knowing how to do something that was difficult, and when I asked her how she had learned this task, she would reply that Jm taught her.

> Well, this is when my husband was asking me…well, what did you do in class…let's go over it and I'll show you how it's done on the iMac®. #EM#2 lines 452 - 455.

> Lori: I noticed you slip that by on the upper left hand side…that button way up there? Upper left hand side…I'm sorry…click that button up there? Here, you took your mouse and you clicked that button.

> Em: Oh
> Lori: Did you learn about that in your class?
> Em: POINTS AND LEANS BACK No. Jm taught me this last night. EMVid2 #1 lines 157 - 170.

> Lori: How did you learn about my favorites?
> Em: Jm. That's something that you may want to go back to. EM#5vid lines 160 - 164.

Jm also helped Em remember commands that she would often forget.

> Lori: How did that work? How did it click?
> Em: Jm repeatedly telling me…up here!! And then I think I finally learned how to get off the computer. #EM #3 lines 773 - 778.

Jm was Em's main support system. She relied on him to help her through error messages or when she just could not remember what to do next. She also trusted him to tell her the proper methods and share the correct knowledge.

> Em: I clicked on the wrong thing or I didn't click it. Jm reassures me there is a isn't anything I can do that'll break it down and then it will break down.
> Lori: You believe him?
> Em: Yes I do.
> Lori: How come?
> Em: I don't know. It's blind faith. Just I'm of the generation, you know, that he did everything, that he knew it all. And I guess he'll say I don't know how to do that.
> Lori: So if he knows how to do something, he'll tell you and if not he'll just say I don't know.
> Em: Yeah.
> Lori: Just years of trusting him?
> Em: Yes. Absolutely.
> Lori: Yes. 45 years is a lot.
> Em: For sure. And there are so many things that he does and Jm is a very practical, logical person.
> Lori: So when he says something you know its right?
> Em: Yeah. Very…I don't know if he says it and he does it…then I know that he's done it right. It's just the way he learns things. EM#4 lines 636 - 668.

Em felt intimidated and often judged by this retired army officer, but she realized that he really did want her to learn this technology.

> Lori: Seems like Jm was your support system. We were talking about that earlier.
> Em: Absolutely.
> Lori: Was that a factor when you first started? If you didn't have Jm here at all, would you have started?
> Em: Oh yeah. Absolutely. But he wants me to learn as much as I want to learn. EM#5 413 - 425.

So, Jm was Em's main support system. He would discuss the computer with her, answer quick questions, and sit with her while she learned. She sometimes thought that he was not the best teacher and would rather learn on her own; however, she realized that he was an excellent source of help. And he really had her best interest in mind.

Son-in-law

Em used her Son-in-law Tm as part of her support system as well. He lived near by and enjoys computers. She once said that he would rather be on a computer than do anything else. In the past she would call him to get information.

> Anytime I wanted information, I called my son-in-law. EM#5 lines 640 - 642.
> Absolutely. It's an excuse to put his hands on the keyboard. And he tries to close his eyes as he goes past it so that he won't sit down at it and up until recently when Jm would say to me…I can't find that…I'd call Tm. EM#5 lines 142 - 148.

Jm, however, had other ideas about Tm helping Em, as shown in this segment.

> Well…my inclination was to call Tm and Jm says…you're not going to learn anything from Tm. Because Tm is not a teacher. Doesn't know how to explain what is happening and why it's happening and what you have to do to correct it. EM#5 lines 123 - 128.

Em would also get e-mails from her son-in law. This helped her to learn e-mail faster and made it more fun.

> Em: SMILES AND LOOKS FORWARD. I'd do that. That's exciting. Food and wine, no subject. This is my son-in-law. He sends me recipes from… EM#5vid lines 41 - 44.

Tm would sit with Em and change things on her screen to make her learning experience more enjoyable.

> Em: this is what I've done. I'm going to go check out what the El Paso Times has to say today. This is something my son-in-law did. See the highlighter in red? POINTS TO SCREEN. EM#5vid lines 177 - 181.

So, Em would call her son-in-law in the past, in order to get information from the Internet. Her new strategy was to call him when Jm was not available or could not answer her questions. Tm also sat with Em and helped her as she practiced. He supported her by sending her e-mail and adjusting her screen.

Trial and Error

Trial and error was Em's main strategy when learning commands on her iMac® computer. Here are many examples of Em using her trial and error technique. During the video taping she would sometimes ask me what a command would do or how to solve a task. I either would not answer or ask her what she thought she should do.

> Now, I'm going to try…I haven't tried this ever, but I'm going to see what shopping…what shopping gets me. SMILES CLICKS LOOKS AND READS EM2vid1 lines 40 - 43.

> Jim told, me to use this little thingy-do there, but I can't remember what it was about. LOOKS AT ME QUICKLY THEN BACK TO SCREEN. But, I think I'm going to try it…(mouse clicking). Oh! EM#2 vid1 lines 252 - 255.

> …does it? LOOKING AT SCREEN CLOSELY. So I don't want that. Key word? Let's see what GO does for me. EM3 vid2 lines 47 - 49.

> Now I am going to bring this bar down again for the other line. LAUGHS. Nope, Let's see, what the return key gets me. EM4vidA lines 81 -84.

> Em: I don't know. I don't know. I'd have to do it again to say, well, it's just…this one didn't work, I'll try that one. EM#2vid1A lines 214 - 217.

> LEANS BACK AND LOOKS AT ME TO ANSWER (I DON'T) PAUSE, SIGH Let's see. Don't want classics. Maybe if I drag it down here…if I get this page up a little bit…I might find the category LEANS FORWARD READING oh, that I

> want…do you suppose? SMILES Let's see. C'mon arrow… .Let's see…toys…no…hey look at that! Let's see I'm going to do a book search…your recent history. Should I go for…LEANS BACK SCRATCHES NECK HAND ON CHIN ummmm…no, I wouldn't want book search, I would want books. C'mon…go over here…. See what that gets me. HAND ON NECKLACE, LEANS BACK I'm going to try biographies. EM#2vid1 lines 103 - 114.

> (types in Jimmy Doolittle on search) TYPES LEANS FORWARD LOOKS AT KEYBOARD AND MOUSE Hey, that isn't right. Something I'm not doing right. Should I click this? That's what I'm looking for! (laughs) Let's see…(mouse clicking) TYPING LOOKS UP AND DOWN, SCREEN KEYBOARD, EM#2vid 1 lines 285 - 291.

Em was quite surprised and very happy when she chose the proper command and got what she wanted. However, when she did not choose the correct command she tried again and again until she got it right, or she gave up. If she gave up, Em would try another method or she would wait until a later time and try again.

Watch others

Em learned by watching others and remembering what they had done. She then would use their methods. Em gained confidence by watching others, mostly her husband Jm, work on the computer. She realized that they were not breaking the computer so, maybe she would not.

> …but I see my husband…well, gee if this doesn't work…well, I'll try over here. And I see him playing around a lot. This morning, he discovered how to get on the world wide atlas and I said…look at Australia…EM#2 lines 599 - 605.

Lori Help

Em asked me many questions while she was being video taped and I was silently sitting nearby. Sometimes, I would answer her questions correctly. Most times, I would ask her what she thought she should do or just not answer. Other times, she was quite surprised when I did not know the answer.

> Okay. Now to go into the Internet, I have to go to AOL…right? Is that right? SMILING EM#2vid1 lines 14 - 16.

> I'm not sure what I want to do. What I should do? LOOKS AT ME, LOOKS BACK
> Lori: What would you normally do?
> Em: Wish you would tell me what to do. LAUGHS EM#2vid1 lines 298 - 305.

> EM: Oh, a question that I have had is let's say you want something in Spanish and LOOKS AT SCREEN AND ASKS ME. I will tell you specifically…my cleaning lady…she has some health problems that I'm not sure that she understands what it's all about. LEANS BACK AND LOOKS AT ME. Is it possible to get it in Spanish?
> Lori: I really don't know.
> Em: You've never come across that? EM#5vid lines 76 - 87.

> Em: Okay. Should I be registering with Google as well?
> Lori: I don't know.
> Em: You don't know?
> Lori: I really don't know. I'm writing down your questions though.
> Em: I will ask because next week we'll continue with this point on the Internet. EM#3 lines 300 - 311.

So, Em would ask her class instructor or her son-in-law Tm.

Not only did I help Em by answering some of her questions; I also helped (unknowingly) her with her motivation to continue learning each week.

> You know what…because I felt from week to week I better spend some time at the computer so that I can answer some of your questions. If you hadn't been coming, I might not have been pushed to do that. EM#5 lines 282 - 287.

Work on Own/ Discovery

Em enjoyed working on the computer by herself. She enjoyed the feeling of discovering how to learn and how to search for information on her own. As we saw by her trial and error method, Em decided that she learned best by making mistakes and learning not to do that again.

> Em: I will try to get some help from Jm or I kind of just like to discover it a little bit by myself.
> Lori: Tell me a little bit about that. Why would you like to do that?
> Em: I just…I think I learn by my mistakes. You know…where he'll come and he'll punch it in and he'll get it right, but that's…now…you go yada, yada, yada…there it is! I didn't learn anything that way.
> Lori: When he does it you mean?

> Em: Yes. I don't learn as much when he comes and does it, whereas if I, and if I can remember what I did or didn't do, that's pretty tricky. EM#2vid1A lines 109 - 128.

Em realized that she learned best by doing. She would learn on her own by using a discovery method.

> Lori: You probably heard about it, you probably read about it and maybe you've seen people do it, but now you are actually doing it.
> Em: Oh, I love doing it. I love doing it. EM#1 lines 1017 - 1023.

> Okay. I prefer to work on my own. And I haven't had the alone time. EM#1 lines 110 - 111

> Em: I want to be able to do it myself. Because I feel like I'll have more patience. EM#1 lines 187 - 189.

> Em: Because I see that it takes so much time. First of all, (pause) ahhh, discovering…I think you have to do a lot of your teaching yourself…EM#2 lines 595 - 598.

Em needed to visualize (and do) and not just hear or read about a topic.

> Em: Don't know why it's important to me, but it is. I can visualize it better. . . but it means nothing to me unless I can picture where it is
> Lori: Is it important for you to picture things?
> Em: Yes. EM#3 lines 397 - 406.

> Em: The only thing in class the first week he was talking to us about Internet connections and yes I had a fairly good idea of what he was talking about. But if we had not had a computer in this house, and no one was not using the Internet, I would not have had any idea. EM#5 lines 625 - 632.

Persistence/ Try Later

Em would keep trying via different learning methods. By using her trial and error, class exercises, asking her support system or discovery methods, she would usually find her answer. She would often start at the beginning and try again. If she got frustrated, she would stop and go back later using another method. Usually, if she could not get the correct answer after three tries, she would try at a later time, using another method. Em did not give up. Her insatiable curiosity

would entice her to try again or use another method until she solved her problem and found her answer.

> I just keep plugging at it until I get it right. Until I get it. Until learn it. EM#4 lines 687 - 689.

During the video taping of Em learning on her computer, it was obvious that she does not like to give up. In fact, if she got too confused, she would start over at the very beginning where she knew what to do. As soon as she got to a part where she was not sure which command to use, she would call upon one of her learning methods such as trial and error, asking her husband or asking the researcher.

> Put my daughter's address into my address book is here. I see it. Oh maybe I didn't click it right. TRIES AGAIN. I typed in the address but nothing - it's not typing in? Where it says address book - I figured I do this before I go to messages. But maybe I'll try it right here now. EM#4vidA lines 37 - 44.

> …so I'm going back to square one. Oh I know what I have to do--- Write - (pause). EM#4vidA lines 20 - 22.
> LORI: what's square one?
> EM: just quit and start over. Sign off maybe. EM#4vidA lines 105 - 108

In her journal she wrote that she planned to try at a later time.

> Finally connected on the 19th but question if it was the…article. Plan to go back and try again. EMJournal lines 101 - 102.

In summary, Em felt comfortable using her trial and error method or working on her own because she knew that her support system was in place. If she had a problem during one of our video taping exercises, she would either ask me or ask her husband, Jm. If neither of us could answer her questions she would save it for Tm. She would then ask him at a later time or she would try to work on her own to discover the answer. If she still could not find the answer she would wait and try again at a later time. Em was very persistent in her learning process.

Transition 5

At this point, Em felt comfortable enough to make mistakes. She had a realization that she could not break the computer and if she was stuck, she could contact her support system. Em wanted to learn this technology and not just guess at how to use a command or get e-mail or search, therefore, she decided to practice in order to remember.

Phase VI ~ Practice to Remember

Practice

Em knew that she had to practice to remember commands as simple as hitting the enter key. She did not take many notes, except to jot down websites. She learned through practice and repetition.

> Thursday. I will. As soon as he gets home, I'm going to see if I can't spend some time on that…just practicing what I was supposed to have learned this far. 1590 -#EM#1 lines 1586 - 1590.

> Jim emailed her back and he must have told her what I was doing…learning how…practicing…EM#4vidA lines 328 - 329.

> Lori: And when you come home, you like to practice by yourself?
> Em: Yes. EM#5 lines 112 - 113

> Lori: What did you think at the beginning?
> Em: Oh that I was going to come home and I was going to play with the computer every afternoon.
> Lori: And it was different. How come?
> Em: Well because Jim would be at the computer. Paying his bills…or whatever. Em#5 lines 294 - 304.

> Em: Yes I do. For me. Being able to come home and sitting down and trying to work through what we had been taught in class that day. EM#5 lines 322 - 325.

Repetition

Em believed that repetition was the best way for her to remember commands and sequences. She had used this method to learn many things in the past. She found that it worked for her in this case as well.

> Em: I don't know how to…I guess repetition is the best way. EM#1 lines 870 - 871

> Lori: That seems like YOUR method. You said that you learn it by doing and then you just do repetition. That's what you've done in the past?
> Em: Yes. Yes. EM#1 lines 1025 - 1030
> Lori: What do you usually do to remember something?
> Em: Repeat it to myself.
> Lori: Okay. Do you think that strategy will help you lean this stuff? Just repeating it over and over…and using practice?
> Em: Yes. Well I can pretty much relate to names for instance. In my mind…I try to remember names that way. For instance…but a lot of it is I think repetition or the frequency with what you come up with…my volunteer work…EM2vid1A lines 140 -153.

She generalized that older people need repetition in order to remember.

> … that once before and I don't know the aging process takes its toll where we need repetition, that could be. I don't really know. EM#2 lines 300 - 303.

As she started learning more on the computer, I was amazed how she remembered so many commands and recognized so many different screens so quickly.

> Lori: How do you do that? How do you remember this stuff because it seems like a whole lot of stuff.
> Em: Repetition. Repetition. EM#3 lines 820 - 824.

She enjoyed the fact that her SeniorNet Introduction to PC's class had a clause that said they could repeat a class for free if necessary. She welcomed that policy but realized she was learning the information in the class and would not need to repeat.

> Em: So…but I really like it. I like the fact that…let's just say I was a thing or two I wasn't completely clear on…I can go back and sit in on future classes.
> Lori: Oh good!

> Em: And I don't think I will have to repeat this. This is very basic…EM#2 lines 118 - 128.

Discipline

Em realized that she needed discipline to sit down and practice each day in order to learn. For Em, practicing and repeating tasks each day helped in her learning process. In retrospect, she recognized that she had had quite a busy summer and could not concentrate on learning the computer as much as she had anticipated.

> Em: I would have not taken it this summer because of…so that I could focus on it better.
> Lori: And you think it's important to focus on it to learn it?
> Em: Yes I do. For me. Being able to come home and sitting down and trying to work through what we had been taught in class that day. EM#5 lines 315 - 325.

This last behavioral stage for Em was bittersweet. Sweet because she was out of the "ice age" and understood what she needed to do in order to learn to her satisfaction. Bitter because she realized that she had not met the goals she set. Em knew what was required of her in order to meet this goal. She just needed time to focus. She had created a personalized and unique learning process that worked for her.

Transition 6

Em's last transition will lead her into the next stage where she will realize that she can confidently navigate the web and send email efficiently and effortlessly. Em never got to this final behavioral step because she did not have the time to practice. Cognitively, she realized that she had set up a process for learning, and she could learn how to use the Internet and Email to her satisfaction.

> Em: Well, I don't consider myself there yet, but I feel like I've made progress and it's exciting. EM#5 lines 407 - 409.

Em realized that she had made the effort. She had worked through many challenges to get to this point.

> I can remember my mother making a comment one time…it's not fair that I don't know these things…well no one is going to come knocking on your door and teach you…it's available to you. But you've got to make an effort to boot. But at that time, I hadn't made an effort. I don't know if at that time...that I had that desire…that burning desire to do it…now I do. EM#5 lines 761 - 773.

Challenges

Em never learned the Internet and e-mail to her satisfaction within the researcher's time frame of data collection. Despite Em's many successes, she had more challenges to her learning process. Physical challenges provided discomfort in her learning, but she tried to overcome most of these problems by creating a comfortable environment. Since her husband bought the new iMac®, they were both learning how to use the unfamiliar system and competing for time. Time was also an important aspect. Em had more meaningful priorities in her life.

Physical Limitations

Em does not have perfect eyesight, and the glare on a computer monitor was detrimental to her learning process. She also broke her ankle a few years ago and was very cautious of how she sits for long periods of time. Em was looking into buying hearing aids so she might hear better. So, Em's physical limitations provided a challenge to her learning. Em, however, had managed to overcome most of these problems. Her new iMac® had a glare resistant large screen. And her new desk and chair were very comfortable. She also tried not to sit for long periods of time.

Converting PC to Mac

Another challenge that Em had to face was the process of converting her learning in class using a PC to learning on her home iMac® computer. These computers are similar but, have

significant differences, including the operating system. The PC (at her class) used a Windows operating system and her iMac® (at home) used a system 10 operating system. This conversion process was frustrating and confusing to Em, and may have slowed her learning process.

> Yes exactly. iMac® is a little bit…I guess a little bit different I'm told. I don't know. I haven't figured that out yet. EM#1 lines 467 - 469

> I'm not sure how I turn that thing on you know, …it doesn't look like what we use there in the classroom. EM#1 lines 1560 -1562.

> Anyhow, you know, the mouse on the iMac® doesn't have the left, the right and the little wheel in the middle.
> Lori: Oh, okay. Like the one at Senior Net?
> Em: Correct. But I'll figure it out both. So when the instructor asked if there was anybody else in there with a Macintosh and no, I was the only one EM#2 lines 209 - 218.

> So I think one of the big challenges for me is translating what we learn in class to here. But I'm not discouraged by it. EM#4 lines 416 - 419.

> I think my biggest obstacle was going from Windows to the OS10. Trying to translate what I had learned in class to home EM#5 lines 212 - 214.

> But there again, it's Windows. I don't know that I will use it…but maybe when I get comfortable with one then I can go to the other system before it becomes too confusing. After I've separated the two systems. Then I can go to Windows and spend more time on Windows…EM#5 lines 1033 - 1039.

So, Em had a challenge learning windows on her school PC and practicing on the iMac's® system 10 operating system. She did her best to make the conversion and had a terrific attitude and confidence that she could learn both technologies.

Competing with her Husband

Em's husband spent a lot of time on the only computer that Em could use for practice and learning at their house. The competition for time was a huge obstacle for Em, and she never found a method to overcome this challenge.

> 13 & 14 August Finally able to spend time on the computer but had to compete with Jm for time. EMJourn lines 80 - 83.

> …and he's been playing around with it. You know, He's hardly been off the computer and since he bought it…which I think was about a week ago. EM#1 lines430 - 432.

> My biggest problem is computer time. Because I've got competition with Jm. EM#4 lines 18 - 20.

> Well because Jm would be at the computer. Paying his bills…or whatever it is he does. Sometimes I would find him…playing solitaire…now of course I get this business of you ought to use a mouse…it's a good exercise…I don't' buy that anymore. EM#5 lines 303 - 309.

> I understand why my husband doesn't garden anymore. He use to…that was a hobby with him and between the dog and the computer, he doesn't do much gardening. Any gardening…hardly any gardening. EM#2 lines 528 - 533.

Em had to compete with her husband for computer time during the entire process of the researcher's data collection. This was a problem that Em never solved. She decided that it was easier to allow her husband to enjoy his time on the computer than cause household stress.

Priorities and time

Priorities were another factor in her learning process. Her family came before her learning. For example, her grandsons visited for two weeks. She did use the Internet before they arrived; however, once they arrived she did not use the computer at all.

> And I think by the fact that it was inconvenient that my grandsons came when they came…EM#5 lines 656 - 658.

> Because I haven't been as committed over…during the time that my grandsons were here…I'm back on track you might say. EM#4 lines 15 - 17.

EM is a busy person. She has many priorities in her life and many responsibilities to her husband and household. She did not have time for extras at this point in her life.

> Because of other commitments I didn't have time to play with this technology. This will be a challenge. EMJournal lines 51 - 53.

> I feel like I will have interruptions. I have to stop to fix dinner. After dinner. I was so tired. I was just too tired to establish an address book. I wasn't interested.

> I was too tired to be interested. …that's when the time factor comes in. EM#4 lines 614 - 620.

> Well this phase of my life, no I wouldn't go there because I have enough to do to do the things I want to do. EM#5 lines 854 - 856.

She realizes how and why people get hooked on the computer and neglect their priorities in life.

> It's very frustrating and I have other things to do besides play at the computer. I can certainly appreciate why people don't do other things. I hear among my…especially this one young friend that I have from the Rec center. Her mother is my age…she says…same history…broke ankle…about a year before I did. And she says all her mother does is sit there at that computer…in the meantime she is growing sideways and kind of [developed] an addiction to it. EM#2 lines 514 - 526.

Finally, Em debated with herself during the learning process.

> … ask myself if I really need this technology and do I have the time to learn it. - #EM Journal lines 39 - 41.

So with all of these challenges — self-doubt, possible computer addiction, lack of time, competing with her husband, conversion of operating systems and physical limitations — Em still achieved success. Her success did not measure up to her great expectations; however, she realized that she could learn how to use these new technologies if she chose to consider this a priority in her life.

Success

EM's great expectations and hope helped her achieve success in her learning process. Em started at ground zero in her learning process. She had never used e-mail or the Internet before. She started the process in class and continued at home. Behaviorally, Em achieved much in her learning process. She learned basic computer terminology, how to search and navigate the Internet, and to read, send and print e-mail. Cognitively, Em designed and created her own

learning process and changed her thinking process to achieve a level of confidence in order to continue her learning.

Em realized the difference in her process between luck and successfully learning the material.

> …success is when I go looking for something or and finding it and realize how I got there not, not…. Luck has nothing to do with it. Just that I did the right thing at the right time. EM#4 lines 698 - 699.

Em was successful in creating a unique process to aid her in learning the Internet and email. She prepared, played and explored, selected her topics to learn, and set goals successfully. Next, she used luck and success in the doing phase. Finally, she realized how to successfully practice and use repetition. However, she did not have the time or discipline to continue this phase based on priorities in her life. She made this conscious choice so as not to upset the balance in her household and to continue to take care of her family, the main priority in her life.

Conclusion

This chapter described the two participants, RJ and Em, and the findings concerning their process and experiences, challenges and successes. A chart was presented which illustrated participants' progression on their journey to learning online technologies. The chart was created using grounded theory coding techniques and by reading each transcription to gain a sequence. Themes were extracted from the narratives to further describe each participant's experiences. Chapter Five will present summaries and discussions of the findings of this research.

Chapter Five: Summary and Discussion

" The time at which people learn things depends in large part upon when they wish to learn them, or when they are urged to learn them, or when they have the opportunity to learn them. "

Edward L. Thorndike (1928, p. 124)

Introduction

The findings presented in Chapter Four used a narrative format, which followed each woman's process and experiences as she learned online technologies. This chapter includes a summary of the design and population of this study. This final chapter restates the research questions, briefly reviews the methodology, discusses related literature as it applies to the findings, and considers the applications, concerns and directions for future research.

Restatement of the research questions:

This study focused on how an older adult experiences online technologies. The researcher explored the following questions.

- What is the process of going from non-literate to literate in online technologies?
- What is the experience that an older adult has when learning online technologies?
- What are responses to challenges and successes?

Review of the methodology

Design Summary

Two participants were interviewed as a case study. The first interview schedule took six weeks. After the first participant had been interviewed the next participant was chosen. This interview timetable lasted for eight weeks because of interruption to participant's schedule. Each participant was interviewed and audio taped eight times and videotaped learning how to use the computer three times during this timetable. The first interview lasted for at least one hour and gathered information before the participant had used the computer for e-mail or Internet. The second set of interviews happened after the participant had used either e-mail or the Internet for the first time. She was interviewed for one hour, then videotaped while working on her computer for at least 30 minutes, then we discussed that experience in a 30 minute follow up

interview. The third set of interviews took place after the participant had gone online approximately 10 times, usually two weeks later. This consisted of an hour interview, 30 minute videotape, and 30 minute follow up interview. The fourth set of interviews took place approximately two weeks later or after the participant had been online another 10 times. These consisted of an hour interview, 30 minute videotape and 30 minute follow up interview. The final interview took place approximately two weeks after, and lasted at least one hour. (For a visual representation of this interview process refer to Table 2).

Population Summary

The population consisted of retired adults over 65 years old who had never used e-mail or the Internet, but had an interest in learning at this time. This subject of online technologies had to be relevant to the individual in order for learning to continue for the 6 to 8 weeks; however, not so relevant that the participant learned for a work related reason. It was difficult to find these volunteers. The researcher interviewed three other participants. Two dropped out because of lack of computer access at this time. One was too far advanced and skilled in computer use to meet the criteria for this study. The two case study volunteers met the criteria and completed all of the interviews.

Relating findings to the Literature

Motivation

Both women started this process for social reasons. Family and friends encouraged and supported their efforts, and they wanted to stay connected to their loved ones. The ladies were sure that they really did not need this technology. They had lived for ten years without e-mail or the Internet and they could survive for the next ten years. Learning this technology was not a relevant task in their life plans; however, society said that it should be relevant. They had other

priorities and other ways to communicate; however, they wanted to learn for the sake of learning something new, something that could be useful.

These findings are similar to those detailing that older adults need to be meaningfully connected to others (Wolf, 1996). Also, some older adults are motivated to use online technologies because of the need for social support and communication with friends (Cody, et al., 1999; Lawhon et al., 1996; Opalinski , 2000; White & Weatherall, 2000).

Phases of the Process

To better aid in analyzing how these women learned to use online technologies, I used the metaphor of building a house. Each phase of their process was associated with a stage of house construction. The transitions will be described at the end of each phase.

Phase I ~ Preparation

In order to assemble an exceptional house, one must start by building a solid foundation. Both participants started with a preparation phase by taking control of their learning process. They developed their own unique method of preparing for their journey into the online world. They anticipated what they needed by setting expectations and attitudes (either greatly positive or realistic). They developed a support system consisting of their spouses, families and, in Em's case, instructors. They both got a basic understanding of their future task: learning online technologies. It was important to each woman that she be in control of her own learning process because she knew herself better than anyone else. She knew what had worked to aid her learning process and what had not worked in the past.

There is much written in the literature about older adult learning which focuses on autonomy, locus of control, and feelings of control. Also, there have been computer studies which focused on how computers and the Internet affect seniors' sense of personal control. It is

important for seniors to have a feeling of control especially in their leisure activities (Neugarten & Maddox, 1978). McClusky's (1974) Theory of Margin for the older adult is centered on building a large amount of energy and power for autonomy. Wolf (1996) states that older adults' locus of control is a "central issue" for their entire life (p. 13). When the older adult uses computers for word processing or online applications, a feeling of being in control of her process is paramount (McConatha et al, 1995; McMellon, 1997; Opalinski, 2000). Brandes & Green (1999) discovered that elders have life experience, are self-directed, and need to participate in their own learning. Also, more internal control beliefs encouraged seniors to continue their interest in computers (Jay, 1989). So, literature on older adults and recent computer studies support the fact that the participants intended to take control of their own learning process.

Rich (1993) found that older adults in a word processing class would rather have an instructor "teach" them until they more fully understand. Once they gained an understanding, they tended to want to learn on their own. Here too they defined how they wanted to learn: "First, teach me a few things, then leave me alone to learn."

Expectancy of success was related to outcomes of computer learning, whereas a positive expectancy showed proficient computer training performance and vice versa (Ralls, 1997). In my study, Em demonstrated the most positive expectations and RJ was more reserved and realistic.

Phase II ~ Play and Explore

The participants used this stage to explore the surrounding area — surveying the ground around their house, as it were. It would seem that the ground and neighboring territory have no bearing on the house itself. In fact, RJ reported that this phase was a waste of time because it did not accomplish her goals. However, if the ground around the house is not well

surveyed, the foundation could collapse and the house would cave in. So, this phase was very important in the fact that the participants learned their way around the computer, including practicing the basics such as using the mouse and keyboard. They wanted to learn about the area around their main focus, more of the whys, what else is there, the background. They did not want to take what they learned out of context. Learning about the "surrounding areas" brought the Internet and e-mail into a context. They now saw their learning topics in the bigger picture, and not as abstract subjects to be learned. Rich (1993) noticed that her senior participants had a desire to know why they needed to know something about word processing and how various pieces of the puzzle fit together. The participants in this study would say, "Here is how I want to learn: teach me enough so I can see the big picture, then I want to play around on my own to see how it works, but don't go too far away in case I need some help."

Wolf's (1991) process, learning and the shadow self, details moving into new roles and experimenting with different parts of their personalities. At this point older adults try new experiences. Echt et al. (1998) realized that motor control problems such as using a mouse may be resolved with practice. If older adults are in a class they do not "play" because they do not want to get lost while following the instructor's directions (Rich, 1993). They felt more comfortable "playing and experimenting" at home. She recommends a "controlled experimentation time" in the classroom environment (p. 239). It would also be helpful to have each learner define how long she wanted to stay in the classroom.

Another important aspect of this stage is the ability for the participants in my study to tolerate ambiguity. This coincides with past research on older adults as flexible in their learning (Wolf, 1993). Also, Lawson (1997) reported that older adults can accept technical complexity as

they learn how to use computers. They can accept the unknowns and not want to know all the details of computer technology.

Phase III ~ Selecting

This phase is reminiscent of the blueprint plans of the house and gathering the materials. The participants knew that they wanted to build this house; however, they required that the design be based upon their unique needs. For example, my house should have a huge kitchen because I love to cook. They decided that their unique needs were based upon their interests, purpose of use, and value.

The older adult learning literature is consistent in the belief that learning is tied to the interests of the learners (Thorndike, 1928). Many studies discovered that computer technology was connected to specific topics, hobbies, and interests of each individual older adult (Finn, 1997; Friend, 2001; Morrell et al., 2000; Timmermann, 1998; White & Weatherall, 2000). Piaget's formal operations thinking is applied when individuals are strongly interested in a subject (Crain, 2000). Possibly, older adults must choose a topic of interest in order to apply formal operations thinking to Internet learning.

Phase IV ~ Goal Setting

This section builds the framework of the house. The beams go up to reveal the skeleton of the house. They start with overall goals to accomplish. The goals are practical and based upon unique interests from the selection phase. RJ chooses goals such as weather, phone directories, and retirement villages. Em decided that these meaningful, practical tasks that she gave herself should be labeled "missions" and her overall desire is the "goal" to learn online technology. After completing a goal/mission, these participants seemed to develop a growth in confidence, which led to increased motivation to continue learning.

Wolf (1993; 1996) found that older adults want to construct their future and make their own decisions. In Ralls' (1997) study older adults created general and specific goals while learning computer applications, similar to Em's goals and missions definitions. He found that participants who set specific goals practiced just slightly and not significantly more than participants who had general goals. Hollis-Sawyer & Sterns (1999) found that older adults who set goals show a higher performance. Rich (1993) found that older adults describe specific life related goals when asked why they would like to learn word processing/computers, but did not wish to help their instructor plan their computer training.

Phase V ~ Doing - Strategies and Methods

At this point the house is being built. The walls are constructed, drywalled, and painted. The rooms are completed. This is where the real work is applied. When a problem occurred, they tried one method and if that did not work, fell back upon another method. For example, if one tool did not work, they would try another type of tool or strategy. There are many, many ways to build a house and many ways to learn online technologies.

Literature has shown that older adults, compared to younger adults, take more time, make more errors and require more support while learning how to use computers (Echt, et al. 1998; Kelley & Charness, 1995; Mead et al, 1999; Moore & Zabrucky, 1995; Ralls, 1997; Valasek, 1989; Zandri & Charness, 1989). Rich (1993) found that older adults' learning strategies included using repetition, reading directions, previewing or reviewing training material, using written or spoken instructions, peer coaching, following the teacher's directions, experimenting, or using practice time. All of these studies were based upon older adults in training classes, not working on their own. Methods and strategies of learning are suggested, prompted or required by the instructors in the classes. There is usually no class time scheduled for trial and error or

researching (on their own) to find an answer to a problem. The learners in this study used other strategies and methods including (in this order):

- Work on own ~ discovery method
- Trial and error
- Ask support group
- Watch others
- Use the manual or class notes
- Try again at another time

Both participants in this study preferred to work on their own without help, unless needed. They wanted to build their own house! If they had a problem, they would use one of *their* other methods for support. One technique might be more effective than another, but the choice and variety to use any of the methods, at their own choosing, was important. The findings in this research show that none of the learning strategies used in a classroom situation were applied by the participants in this study.

Rich (1993) found that the older adults learning word processing in her classroom studies preferred written instructions. This is the opposite of the findings in this study. The participants did not want any written instructions, they would rather learn and understand the theory of why they perform that task, (not memorize), than read from a paper (however, they did look up information in a book or notes if other methods did not solve the problem).

Many strategies and methods have been examined to teach older adults how to use computer technology. This study found that it was important to these particular participants that they felt comfortable using their selected method at the appropriate time of their choosing. These findings did not mirror the literature because the method of past research was different

than in this study. Most past research did not have older adults work on their own; they were in a controlled experiment or classroom situation.

Phase VI ~ Practice to Remember

At this time of building the house, the inside fine points are being completed. Fit and finish, and minor details are being refined. In this stage, the women did not learn any new material. The goal was to review what they had learned in order to remember how to complete a particular task. At this point there was a pause, in order to reflect and assimilate the newly learned knowledge and skills.

There is much literature about how adults reflect and try to make meaning of experiences in their lives (Brookfield, 1986; Wolf, 1994). In fact, the more time older adults spend practicing, the more interested and skilled they become (Thorndike, 1935). This especially applies to practicing on a computer (Jay, 1989; Ralls, 1997; Valasek, 1989). Also, practice using the mouse may diminish motor control problems for older adults (Echt et al., 1998). It is important to note that older adults using computers take more time than anticipated, make more errors, forget over time, ask more questions, become more interested and skilled as they learn and practice (Baldi, 1997; Moore & Zabrucky, 1995; Valasek, 1989; Westerman, & Davies, 2000). Older adults also become more confident as they practice (Baldi, 1997). Computer researchers realize this need for older adults to practice and schedule individual practice time in the design of their studies (Jay, 1989; Kelley et al., 1999).

At one point in the study Em discussed becoming a computer addict like her husband and a woman in her class. She did not want to sit alone in front of the computer all day long and get fat. This meshes with literature revealing that other seniors were concerned about becoming

computer junkies being secluded in front of their computers (Finn, 1997; McMellon, 1997; White et al., 1999).

So, there is a great need to schedule individual practice time while learning online technologies. This time is beneficial for reflection, skill improvement, and developing an interest in order to stay motivated. However, this practice time must be in moderation because of perceptions of addiction to the computer, especially the Internet.

Ralls (1997) suggested that it is important for the older adult to learn and practice on the same type of computer hardware and software that she will be using at home. This was a key factor in Em's ability to learn since she had to switch between the PC and the iMac®.

Phase VII ~ Liberation

Finally, the house is complete. It is time to move in! RJ moved in immediately and realized a feeling of liberation. She had built this house on her own, with help from her family (only when *she* asked for help), and decorated it *her* way and now was living with this new image of herself. Em decided that this house was not for her. She had built the house; however, she was more comfortable in her own surroundings and not ready to move on to this next phase. Em decided not to tackle the final obstacles that would give her mastery and the ability to rescue herself from those computer errors. She decided that it was easier not to upset the apple cart, to let Jm use the computer, and to continue nurturing her family -- the main priority in her life.

Piaget's (Crain, 2000) formal operations thinking is applied at this stage. At this level, the seniors can solve the problems one at a time, by using an organized structure to acquire all possibilities of answers. Mary Alice Wolf (1991) describes a process of how older adults learn as "cognitive reordering." During this procedure the older adult experiences a "a creative tension" to produce a change to become a more active self (p. 17). Wisdom is gained in this

process and the senior encounters a change in thinking. This appears to be what has happened in this study. The participants created a new "more active self" (Wolf, 1991, p. 17) as they stepped through the stages in the phases of their processes.

Liberation into selfhood

This last transition into the phase of liberation is more of a transformation. After this transformation each would experience the world differently. It would change the way they

- relate to others
- communicate with family
- see themselves
- think

The individual would become a higher order of herself if she crossed over the threshold. A new being emerges — one who understands and uses online technologies. This concept of selfhood describes the final step in the process. The question remains…when is one *ready* for a change in selfhood?

Challenges

The two participants in this study had different experiences with challenges; however, they defined them the same way. Challenges were not difficult steps to complete a task. A challenge was defined as an obstacle standing in the way of the overall goal. RJ reported that she had no challenges. Em however had plenty. These challenges were not related to small tasks, but related to impeding the learning process. Specifically Em's challenges were:

- Physical limitations
- Converting information from PC windows to iMac® system 10®
- Competing for computer time with her husband

- Time in her busy schedule
- Priorities which were more important

Successes

Literature has shown that success is brought about by acknowledging progresses in learning (Lorge, 1963). In this study, successes were defined as doing something correctly without luck. Most often the participants would experience success after completing a mission. The success cycle (see Figure 8) is a model designed to best illustrate the participant's experiences with success in this study. Each piece of the cycle is defined below.

Sense of Self - My reality. Knowing myself and who I am at this point in time. Knowing what I want.

Mission Creation - Development of a task or project.

Good Resources/Support - having good resources and knowing which resource to use.

Mission completion - finishing the project.
Fun - Enjoyment

Confidence - The realization that I can learn. I can do it!

Motivation - to provide with incentive, to move to action.

Assimilation - Putting it all together to create a new sense of self.

Figure 8: Stages in the Success Cycle.

This model begins with a sense of self and continues around clockwise in a cycle. This model also ends with sense of self; however, this is the newly defined, more technological, self. Each time a mission was completed it gave the participants a feeling of success. The success

built confidence, which led to motivation. This motivation would cause them to want to continue to succeed. Thus, each round of the success cycle brought them closer to completing their overall goal, to learn how to use online technologies.

The success cycle circled through each phase in the process model (see Figure 9 or Appendix L for an animated example if online) into the next phase. For example, during the preparation phase, the participants began with a sense of self that did not understand online technologies. They created the mission to prepare to learn and set a learning process. Both participants then got the support they needed to complete the preparation mission and completed the preparation phase. They realized that learning e-mail and the Internet is not work, but fun. That realization led to an increase in confidence that they could indeed learn this technology. This confidence gave them the motivation to change their behavior. They took action to move into the next phase of the process. As they moved into the next phase, they assimilated what they had done, that reflection process led to a new definition of what they knew about online technologies. Their sense of self had changed vis-à-vis technology. They acquired knowledge and skills that were needed to continue the process of learning online technologies. They were now different than when they had started this phase in the process. The steps in this cycle continued through each phase in their process.

In conclusion, this study detailed a process in which the participants learned how to use online technologies. This process consisted of seven phases from the beginning, starting at ground zero (preparation), to realizing that they had indeed learned how to use online technologies successfully (liberation). Experiences, successes, and challenges were also detailed and examined in this chapter.

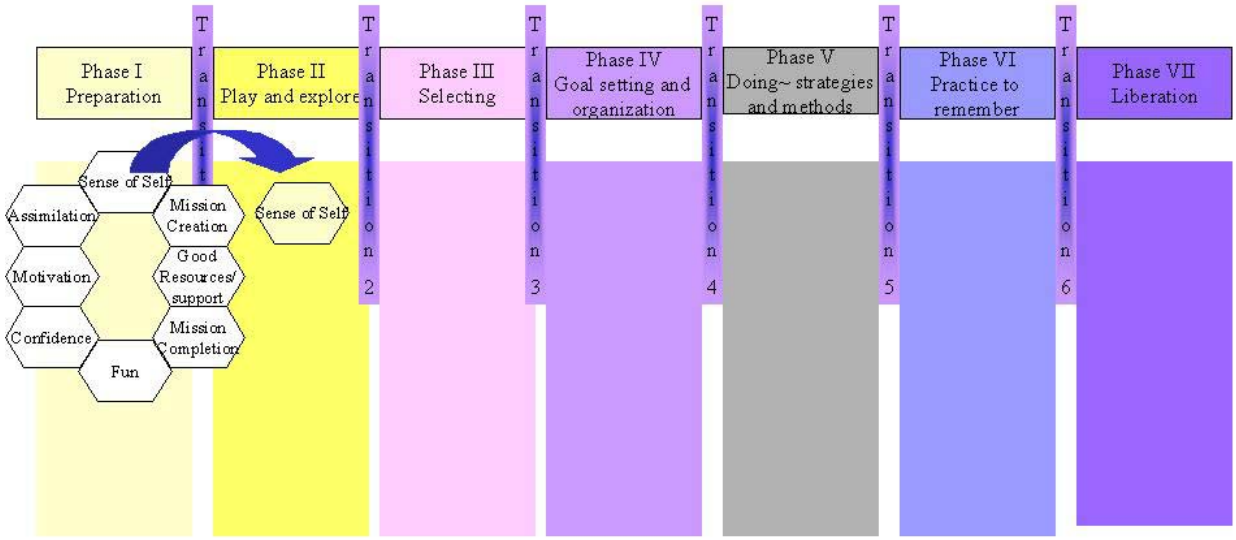

Figure 9. **Stages within the Phases of the Process**

Recommendations

These recommendations are for curriculum developers, practitioners, instructors, and teachers who assist older adults in learning online technology. Older adults are interested in learning computer online technology (Wrixon, 2000), and there will be more older adults as compared to younger adults in the near future (Hobbs & Damon, 1996). So, we must prepare to effectively assist older adults in learning online computer technology.

Curriculum developers

Curriculum developers must be more flexible creating lesson plans for older adults learning online technologies. This is very difficult, time consuming and contrary to present practice. Presently most instructional courseware lists objectives, presents conceptual information, demonstrates or shows an example, provides some exercises, and possibly a practice exercise. This is not enough for older adult learners. Some suggestions based on this research are:

- List many topics and have learners choose and create their own goals and objectives.
- Create space in the curriculum in which to write goals.
- Present many problems and have the learner choose one of interest to the unique learner.
- Suggest many methods of solving a problem. Do not just have seniors click and follow rote instructions. This way the learner has a choice and will feel in control of their learning.
- Schedule individual practice time (and I do mean time) in the lessons.

Practitioners, Instructors and Teachers

Practitioners, instructors and teachers should let older adults take control of their own learning process. It seems that older adults know what has worked for them in the past and what has not worked. Using their unique past experiences, we should rely more on input from each senior. The older adults in this study were motivated by their interests in topics of their choosing. So, not only should *they* suggest what they want to learn, but how they would like to learn. Before older adults start a learning process in a classroom or monitored, we should ask the individual questions such as.

- What are your interests?
- What are your goals?
- Which methods work best for the way you learn?

This way the learning will be customized for each unique individual. Plus, each person will feel a sense of control and autonomy due to the fact that she designed her own learning process.

Practice with online technologies should be a must in each senior's learning experience. This researcher suggests that instructors allow the seniors time in order to solve their own problems and not reply with the correct answer immediately. Instructors could use thinking questions such as, What do you think?, What would you normally do in this situation? or Where do you think you can find that answer? Also, many varied resources could be provided for the older adults, so that they might choose their method for problem solving. Instructors might keep in mind that there may be a concern about becoming addicted to the computer.

Need for Further Research

Clearly, there is a need for future research concerning the process and experiences of older adults learning online computer technologies. This research detailed two case studies in which women were participants. There is a need to replicate this study with older adults of different backgrounds, including gender.

Much previous literature documents older adults learning in a classroom or experimental environment (see Appendix B). Future research might study older adults learning in other environments such as their home or a mixture of classroom and home.

It was interesting to note the transitions between the phases in the participant's processes. Transitions in this study could further be researched in regard to the process of learning online technologies.

McClusky's theory of margin could be explored in regard to the findings in this research. For example, one might research the reasons why some people continue and others do not, in regard to McClusky's theroy.

Conclusion

This study investigated the process, experiences, and responses to challenges and successes of older adults learning online technologies. A case study, grounded theory qualitative methodology was utilized. Findings showed a detailed process that two older adults used to learn the Internet and email. The participants' experiences were described as they proceeded through their unique process. Responses to challenges and successes were documented and analyzed, thus creating new definitions of a challenge and a success cycle model.

> If you have met one older adult learner, you have met only one older learner. Do not count on a trend. (Wolf, 1992, p. 77).

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Figure Captions

[1]U.S. Bureau of the Census, Decennial Censuses for specified years and Population Projections of United States by Age, Sex, Race, and Hispanic Origin, 1993 - 2050.

[2] Original illustration, Lori Ann Roth Gibbons.

[3] McClusky, H. Y. (1974). The coming of age of lifelong learning. *Journal of Research and Development, 7*(4), 97-107.

[5] White, J., & Weatherall, A. (2000). A grounded theory analysis of older adults and information technology. *Educational Gerontology, 4*(4), p. 378. Reprinted with permission of the author.

[6] Original illustration, Lori Ann Roth Gibbons.

[7] Original illustration, Lori Ann Roth Gibbons.

[8] Original illustration, Lori Ann Roth Gibbons.

[9]Original illustration, Lori Ann Roth Gibbons.

Endnotes

1 The 2000 Census Life Expectancy at Birth by Race, Hispanic Origin, and Sex: 1995 to 2050, Table B-1, has three projections sections: low assumptions, middle assumptions, and high assumptions.

2 Some examples of Post Formal learning researchers include: Commons, Cook-Greuter, Labouvie-Vief, Perry, Rakfeldt, , Roodin, Rybash, and Sinnott.

3 Advanced Topics: Coding. A seminar instructed by Dr. M. G. Cline Spring 2000 - Spring 2003.

4 The Hawthorne effect suggested that factory workers reported they were being given much attention by the researchers. This attention was the cause of the improvements in performance for the workers in the Hawthorne factory (Mayo, 1933).

Appendices