

**THE LANGUAGE OF DIGITAL LEARNING:
DEVELOPING AN E-LEARNING APPROACH
FOR THE ELDERLY**

by

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April 2010

**The language of digital learning:
Developing an e-learning approach for the elderly**

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Thesis in compliance with the requirements for the Doctor's Degree in Technology: Language Practice in the Department of Media, Language and Communication, Durban University of Technology.

I declare that this thesis is my own work and has not been submitted for any other degree or examination at any other institution.

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ABSTRACT

The purpose of this study was to investigate the current learning methods that are typically used by special populations (an elderly subject group), and to explore their general level of effectiveness. The primary research questions explore how this subject group is currently learning to use the Internet and for what purposes, along with what the typical barriers are that this group experiences when seeking to use the Internet, together with factors that motivate them to participate in learning programs. This study has special relevance for elderly adults along with computer instructors who specifically train the elderly to learn to use the Internet. The findings may also be of interest to others who interact with other special populations, directly or indirectly, including web designers, healthcare professionals, librarians, and others. The project was prompted by the author's experience teaching and observing elderly adults learning to use the Internet, and his desire to develop a more effective teaching strategy for them. The thesis explores the basic principles of adult learning, including components from self-directed learning, the theory of multiple intelligences, ethnographic research and other theories and approaches that have the potential of contributing to teaching this subject group, including the use of language in describing their learning successes and failures.

Data analysis consisted of observing over 200 older adults learning to use the Internet over a two-year period. The evaluation of participants was based on empirical (defined in the glossary) and subjective analysis of levels of participation, progress and other factors. To supplement the large-scale results with rich data, the author of this study also performed detailed interviews with 14 elderly Internet users along with five teachers of the elderly. Additional material was gathered from academic journal articles, online databases and other related sources. The author tested and applied several research methods to achieve the most effective outcome. This

included participant observation from ethnographic research, along with empirical and basic quantitative research. The author also uses auto-ethnography in his research approach, an emerging qualitative research method that allows the researcher to write in a highly personalized style, drawing on his or her experience, as kind of a autobiographical personal narrative. The intent of auto-ethnography is to acknowledge the link between the personal and the cultural and to make room for non-traditional forms of inquiry and expression. In embracing personal thoughts, feelings, stories, and observations as a way of understanding the social context they are studying, these researchers are also shedding light on their total interaction with that setting by making their every emotion and thought visible to the reader. Auto-ethnography also gives researchers an opportunity to do primary research and draw data from their observations. An identifiable pattern that is reviewed in more detail in the Results section emerged from these different findings.

The primary outcome that emerged is that there are many approaches to learning, and these methods need to be examined, tested and selectively adapted for each individual to achieve the maximum benefit. The widespread demand for Internet training has resulted in fragmented and inconsistent training schemes that are generally focused on classroom-based instruction. The author encourages a systematic self-testing by the subject group member (and their teachers) to explore currently available training methods and combine the elements that they find most effective towards a personalized approach to learning based on individual interests, aptitudes, and the availability of the local training resources. The percentage of the elderly using the Internet is rising rapidly, and the current training options are limited in some areas in the United States. Based on the author's empirical observations, the self-directed approach to learning appears to show the most promise for this elderly subject group, in the sense that they generate their own "best learning" schematics, while their instructor guides and facilitates the process.

This thesis has made a primary contribution to the research in several ways. First of all, the author made a synthesis that has not been made previously. He combined the concept of self-directed learning with several methods of learning improvement, such as the use of assistive technology for the disabled, memory skill-building, and the application of symbols and metaphors to increase the ability of this subject group to comprehend the learning materials. This is arguably the best approach for adapting to this rapidly evolving subject group population. Additionally, he applied the concept of kaizen, a Japanese term from their manufacturing sector that represents continuous, ongoing improvement, to teach to members of this group the concept of self-monitoring and improvement. Additionally, the research was cross-disciplinary and used different methodologies, including ethnography, empirical and basic quantitative research. Several additional contributions and innovations are described later in the thesis.

PREFACE

This research represents original work by the author, its only prior publication (by the same author) being in peer-refereed conference and journal papers. Where use was made of the work of others it has been duly acknowledged in the text.

Prior publications related to the contents of this thesis include the following:

Sheridan, R.D. 2010. Strategies for motivating students, an approach to adult learning. Wilberforce, USA: *Wilberforce University Journal*. Spring, 2010. (Vol 4, Issue 1).

Sheridan, R.D. 2009. Hybrid and blended learning approaches for Internet-based online education. Wilberforce, USA: *Wilberforce University Journal*. Spring, 2009. (Vol 2, Issue 2).

Sheridan, R.D. 2009. Twenty-six styles help your students learn about thinking. March 2009. Lake Tahoe, USA: *Teaching for Success Journal* (Vol 20, No.1).

Sheridan, R.D. 2008. Memory techniques for learning retention. December 2008. Lake Tahoe, USA: *Teaching for Success Journal*. (Vol 19, No 4).

Sheridan, R.D. 2008. Self-directed learning, an overlooked approach. Wilberforce, USA: *Wilberforce University Journal*. Fall, 2008. (Vol 3, Issue 1).

Sheridan, R.D. 2006. Reducing the online instructor's workload. Boulder, USA.: *Educause Quarterly*. August, 2006.

Sheridan, R.D. 2005, Reading and writing across the curriculum conference. California State University, Sacramento. February 2005 (presenter).

Sheridan, R.D. 2001. Accelerated learning methods for computer students. Los Angeles, USA: *Academic Exchange Quarterly Journal*. December, 2001.

ACKNOWLEDGMENTS

Heartfelt thanks to my Promoters, Dr Dee Pratt and Professor Ramu Naidoo, for “being there” for me even though operating from a different continent and having to work completely online.

Thank you to the Faculty Officer, Pragasen Reddy, for helping me to feel part of the “DUT community” and for expediting all of the administration.

Thank you to my mother and sister for all of their support.

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CHAPTER 1: INTRODUCTION

1.1 Introduction

This chapter first looks at the use of the Internet as an aid to mental and neural health, in acting as a stimulant to the brain activity of the elderly. Recent studies suggest that using the Internet enhances the brain's capacity to be stimulated, and that reading on the Internet activates more brain regions than printed words. As with muscles, the more brains are exercised the healthier they become, and therefore activities such as the Internet can slow or even reverse the normal declines caused by ageing. Next, the social uses of the Internet are touched on, accounting for the fact that there is a large and growing population of elderly Internet users in the United States. After a consideration of the demographics of this subject group, and statistics related to this, the chapter concludes by summing up the scope and purpose of the study, namely, by reflecting on the author's pedagogical practice and using the empirical work to explore key issues, to determine the current learning theories most relevant to Internet instruction for the elderly, and to suggest how innovative combinations of learning theories and resources might be adapted most effectively to facilitate learning for this subject group. The hypothesis of this thesis is that a majority of elderly students will use at least one of the many forms of self-directed learning during the course of their e-learning process. To support this basic hypothesis, the author argues that a hybrid or flexible combination method of teaching should be employed for the greatest effectiveness ("hybrid method"). The final result of this hybrid method is that the elderly subject group will have a greater understanding of all of the learning options available to them and be able to apply those methods that are most appropriate to them, primarily with a self-directed style of learning. The

primary forms of self-directed learning include the use of a textbook, instructional DVD, online or computer-based learning, and it can even include classroom-based learning, as long as the learner helps to determine the outcomes. This applies directly to the first research question in the thesis (What existing methods and materials are employed to teach the elderly to use the Internet?). All self-directed learning can be supplemented with other tools such as memory skills, use of metaphors, aptitude testing and other factors covered in more detail in this thesis. This (hybrid method) combination will vary according to many factors, such as personal interests, current aptitudes and comfort with technology, and availability of resources. For best results, the author recommends that the subject group keep a journal and record their successes and failures, along with any questions they have. Additional methods of testing the individual efficiency of the recommended learning methods are examined, both for the student their teachers, and future researchers. The hybrid approach itself becomes a research tool to consolidate findings and make further discoveries.

The widespread demand for Internet training has resulted in fragmented and inconsistent training schemes that are generally focused on classroom-based instruction. As described in more detail later, the author will propose a hybrid teaching and learning method that will vary according to many factors, such as personal interests, existing aptitudes, comfort with technology, and availability of resources. The author believes that a flexible model of both established and innovative teaching and learning methods will prove to be the most effective teaching tool. Since most methods show both promise and limitation, and each individual member of the subject group arrives at the learning experience with different skill levels, aptitudes and expectations, the author focuses the majority of this thesis on developing a responsive means to classify and apply the combination of approaches. This thesis demonstrates several innovative ways for the subject group to try out the teaching options to find the most effective techniques for their own

individual circumstances. The findings have been tested through qualitative research using detailed interviews and participant observation, described in more detail in the background and methodology sections.

There is a growing population of elderly adults in the United States who want to learn how to use the Internet. Most of the current training methods show both promise and limitation, and each individual member of the elderly subject group arrives at the learning experience with different skill levels, aptitudes and expectations. For teachers of the elderly, the choice of a given technique depends on their instructional philosophy, prior experiences or training, and their goals and objectives. The best instruction results from the use of a combination of techniques, selected after the evaluation of the individuals with whom you are working (Hiemstra, 1990). The author's experience has been that each individual subject group member's needs and expectations are different, and a combination, ('hybrid approach') appears to be the most effective.

The author will later propose a hybrid method that encourages subject group members to explore numerous learning tools and approaches, along with adjunct tools such as assistive learning options, as long as they are locally available and compatible with that person's interests and learning abilities. This is supported by Oblinger and Maruyama (1996) who believe that a hybrid teaching structure can address issues of education since students have different learning styles, needs, and preferences. According to Draves (1984), most educational methods show both promise and limitation, and each individual member of the subject group arrives at the learning experience with different skill levels, aptitudes and expectations. Adults bring to the learning situation a combined set of emotional, physical, mental and social characteristics particular to their age group and so make each one of them unique. This study also found that technology impacts the lives of the elderly in important ways such as increased access to information and a

sense of self-reliance. In terms of social policy, it may be important for elderly learning centers to adopt programs to educate the elderly in ways of mastering new skills that can help them stay connected to society in ways that they determine are most important.

1.2 Internet use as an aid to mental and neural health

Research indicates that mentally stimulating tasks may improve brain health and cognitive abilities (Hotz, 2005). Computer search engines are used daily on the Internet by people of any age, including older adults. To explore the possible influence of Internet experience, Small (2009) reported back in the *American Journal of Geriatric Psychiatry* in a study entitled “Patterns of cerebral activation during Internet searching.” Small, Professor of Psychiatry at the Semel Institute for Neuroscience and Human Behavior at UCLA, indicated in this study that Internet use could boost the brain activity of the elderly. Online search may in fact improve cognition in older people, as web surfing boosts the brain function of middle-aged and senior users with little Internet experience.

To see how the Internet might be “rewiring” the elderly, Small and colleagues monitored the brains of 24 adults as they performed a simulated Web search, and again as they read a page of text. He monitored the brains of 24 adults aged between 55-76 years who were neurologically normal as they performed a simulated Web search, and again as they read a page of text. Twelve had minimal Internet search engine experience and twelve had more extensive experience. The mean age and level of education were similar in both groups. Measurements of patterns of brain functions were performed during functional MRI scanning.

During the Web search, those who reported using the Internet regularly in their everyday lives showed twice as much signaling in brain regions

responsible for decision-making and complex reasoning, compared with those who had limited Internet exposure. After Internet training, participants with minimal online experience displayed brain activation patterns very similar to those seen in the group of experienced Internet users after just a short period of time. Although both groups activated brain regions controlling language, reading, memory, visual abilities, left inferior frontal, temporal, posterior cingulate, parietal and occipital regions, the regular Internet users demonstrated significant signal intensity in additional regions controlling decision-making, complex reasoning, vision, frontal pole, anterior temporal region, anterior and posterior cingulate and hippocampus. The Internet search indicated twofold increases of activation in major regional clusters.

The findings suggest that Internet use enhances the brain's capacity to be stimulated, and that Internet reading activates more brain regions than printed words. The research adds to previous studies that have shown that the "tech-savvy" among us possess greater working memory (meaning that they can store and retrieve more bits of information in the short term), are more adept at perceptual learning (that is, adjusting their perception of the world in response to changing information), and have better motor skills. The findings also suggest that Internet use enhances the brain's capacity to be stimulated, and that Internet reading activates more brain regions than printed words.

The implications of this research are that, for older people with minimal experience, performing Internet searches for even a relatively short period of time can change brain activity patterns and enhance function. Internet searches may in fact challenge the brain more than reading, because several tasks are done at once, such as memorizing and accessing information simultaneously. Small agrees that brains are similar to muscles in that the more they are exercised the healthier they become. Hence

activities such as the Internet can slow or reverse normal age-related declines. Small represents his findings as indicating that Internet searching appears to engage a neural circuitry to a greater extent than that activated in hard print reading.

1.3 Social functions fulfilled by Internet use

Apart from the possible mental and neural health benefits, Internet use for the elderly fulfils a number of social functions, such as processing information on physical health care, providing cheap and accessible entertainment and recreation, and conducting financial and other functions (e.g. relating to income and investments). Thus important motivation exists for effective training of this target group of “senior citizen” learners, who already tend to feel marginalized by the predominant focus on the “youth market.” The reality is that there is a large and growing population of elderly Internet users in the United States. Personal observation suggests that the elderly rely on several distinct informal training methods to learn the Internet, including studying a book on the Internet, attending a computer training course offered through a local organization, or asking a friend or neighbor for assistance. However, it is important that this subject group gain access to credible and effective training techniques so they can effectively navigate the Internet. There are many reasons why it is vital for this subject group to learn how to navigate the Internet, both for their own safety and their own personal satisfaction. For example, there are unscrupulous Internet financial scams, identity theft concerns, bad online medical advice and other schemes that make the elderly targets for those who prey on the unsuspecting. In addition, the elderly should have access to the same information sources as the general populace. To sum up, Internet learning is not only desirable in terms of maintaining a healthy and active neural system, which can improve mental wellness and quality of life, but also in terms of its many practical and recreational applications.

1.4 Learning theories geared to the elderly

According to Quarles (1998), learning theories are mostly applied to the population under fifty, therefore there is a need to test current theory and develop new ideas with the ultimate goal of improved teaching, along with maintaining the older individual's performance, productivity and effectiveness. The practical application of learning strategies theory needs to be connected to all types of computer training for the elderly, including basic Internet skills. Muller (1995) reports that research on ageing and the aged in the U.S. is one area that has seen a gradual increase in the number of studies that have employed participant observation methods. During the two years that the author spent teaching computer and Internet-related courses for the elderly, he discovered that many of them were unable to perform basic computer functions, although they were generally very enthusiastic about learning these skills. He also began to notice the effectiveness, or lack thereof, of various teaching strategies and materials. This current study has given him the opportunity to explore the relationships between the elderly, education and technology. During his period of working on this thesis, the author explored many related areas, such as the appropriate use of design and language; evaluation of Internet sites for credibility, aptitude and skills testing; the design of effective learning materials; the use of assistive technology for those with physical limitations; and the combination of online learning with traditional in-class learning. Whitehead (2008) believes that creating a unique way through research may be as important as a previously self-chosen method.

1.5 Group demographics relevant to the study

There are many sets of statistics related to the demographics of this subject group that are relevant to this study, sometimes with overlapping results. For

example, according to The Nielsen Company (2009), the world's leading media information company, in the last five years the number of seniors actively using the Internet in the US has increased by more than 55 percent, from 11.3 million active users in November 2004 to 17.5 million in November 2009. Not only are more people 65 and older going online, but they are also spending more time on the Web. Time spent on the Internet by seniors increased 11% in the last five years, from approximately 52 hours per month in November 2004 to just over 58 hours in 2009. Online visitors 65 and older engage in a variety of activities, from e-mail to investment research. Almost 90% percent of seniors check personal e-mail, the number one online activity performed in the last 30 days. Viewing or printing online maps and checking the weather online were the second and third most popular online activities, with 68.6 and 60.1 percent, respectively.

1.6 The top 10 online activities performed in the last 30 days by people in the U.S. age 65+

1. Personal E-mail 88.6
2. Viewed or Printed Maps Online 68.6
3. Checked Weather Online 60.1
4. Paid/Viewed Bills Online 51.2
5. View/Posted Photos Online 50.1
6. Read General/Political News 49.2
7. Checked Personal Health Care Info 47.3
8. Planned Leisure Travel Trip Online 39
9. Searched Recipes/M meal Planning Suggestions 38.4
10. Read Business/Finance News 37.8

Source: The Nielsen Company, Fall 2009 Release.

The number one online destination for people over 65 in November 2009 was Google Search, with 10.3 million unique visitors. Windows Media Player

and Facebook (social networking site) were No. 2 and No. 3, with 8.2 million and 7.9 million visitors, respectively.

According to a Harris Poll (cited in Senior Journal, 2008), although senior citizens age 65 and older still are behind, they are catching up in their use of the Internet. Seniors, make up 16 percent of the US population but only 10 percent of the online users. The Harris analysis of the poll says that the difference between seniors using the Internet versus other demographic groups is close, considering that there are millions among those over age 65 that are too poor to have access or are unable to use the technology due to mental or physical problems associated with old age. In the early days of the Internet revolution, most of those online were young and well-educated. As the online population has grown it has come to look more and more like the population of the country. Internet penetration is still somewhat lower among people over 65, people who never went to college and people with household incomes of less than \$25,000, but large majorities of all of these demographic groups are now online. These are some of the results of The Harris Poll, a new nationwide survey of 2,020 U.S. adults surveyed by telephone between October 16 and 20, 2008 and October 30 and November 2, 2008 by Harris Interactive.

In California, the state where most of this research was conducted, the elderly population is expected to grow more than twice as fast as the total population. According to the California Department of Ageing (2008), the elderly age group will have an overall increase of 112 % from 1990 to 2020. Statistics also indicate that computer ownership along with Internet use among the over 65 age group is also increasing. In January 2006, the Pew Internet and American Life Project found that 34% of Americans aged 65 and older go online, up from 29% in January 2005. Additionally, forty percent of those 65 and older have a computer at home. According to Hunt (2006) adult participation rates in formal lifelong learning activities indicates that the

general population has accepted and embraced lifelong learning. U.S. data for 1998–1999 show an estimated 90 million persons, 46 percent of adults, enrolled in a course during the preceding 12 months — an increase from 32 percent in 1991. This older population will become more diverse because of increases in older ethnic populations and the number of women that continue to outlive men. All of these factors indicate a need to improve both the quality and quantity of training for this subject group population.

Most of these statistics are changing rapidly as the Internet increases in popularity, and the author predicts a much higher percentage of the elderly using the Internet, partly because of a higher level of affluence and flexible time schedules. This thesis includes several sets of statistics to lend credibility to the study and to indicate the general trends toward more Internet participation among this elderly subject group, while at the same time maintaining a primarily qualitative approach to the research methodology. Variability in the onset of ageing and the degree of the associated characteristics has not been fully explored, but several competing ideas exist to explain these occurrences. According to Shephard (1987), ageing and death are a characteristic of living organisms and various biological functions will show a progressive, age-related deterioration. A brief review of several ageing theories is included in the Literature Review.

There were several Internet-related topics that many of the subject group expressed interest in pursuing. These topics included such things as genealogy, use of e-mail, and health research. The preparation of this thesis, therefore, included a practice-based project website that allowed the author to observe how the typical subject group member tests and applies his/her Internet-related skills. Health research was chosen as the theme for this practice-based site. It is located at: <http://RickSheridan.com> (or on the attached CD).

While attempting to teach the elderly students how to use the Internet, the author observed that this subject group had a variety of difficulties using the computers. This included physical, emotional and/or cognitive limitations. In the physical category, some could not coordinate the movement of the mouse correctly (i.e. the psychomotor domain is involved). In terms of emotional factors (i.e. the affective domain), many were afraid of using the keyboard and other parts of the computer because they had fears of deleting things or permanently damaging the equipment. Technology often has a daunting effect, particularly on older users, who often experience anxiety when confronted with unfamiliar systems (Dickinson, Eisma, Gregor, Syme & Milne, 2005). Cognitive difficulties included a slow reaction time to the materials presented and the need for the instructor to repeat the materials several times for them to comprehend these. Training itself is difficult in part because of the tremendous complexity of the current computer systems.

While all novices experience some level of anxiety when introduced to unfamiliar technology, the elderly can suffer from acute anxiety and confusion (Dickinson *et al.*, 2005). Older novice computer users often complain that they “lose” the screen they are working on, or that everything suddenly vanishes when they are working with it. There is also a problem of the system behaving in unexpected ways, for example, displaying a strange menu when the user has done nothing to cause a menu to appear (often a result of accidentally right-clicking with the mouse). Complicated, cluttered screens with small targets can make using the mouse time-consuming and frustrating, as is discussed elsewhere in this thesis. Problems can also be caused by multiple windows being open at the same time, and users rarely realize that opening a “new” document will cause the old document to vanish. The apparently random behavior of computer systems, coupled with the insecurity that novices of any age may feel about losing their work, contributes to the difficulty that people encounter in learning to use computer systems (Dickinson *et al.*, 2005).

Adults are often dealing with significant life changes such as retirement, declining health, the death of a spouse, and decreased mobility. Planned and unplanned events, such as retirement or financial problems, can result in significant lifestyle adjustments. Older adults also deal with significant changes, biological, social and technological: in other words, they need not only adapt to their own changing personal and social circumstances, but also to bewildering and rapid changes in technology, including the Internet technology which would assist them to adapt to the other changes. The elderly participate in educational programs at a much lower rate than the adult population in general, and are not always prepared for the transition back to a learning environment (U.S. Department of Health and Human Services, 2001). Despite the difficulties faced by many of the elderly in the author's course, this subject group expressed a strong desire to learn, and the individuals often had compelling reasons, such as personal health research, financial management, and communications with friends and relatives, to wish to continue learning.

A large part of the existing research concerning older adults using computers and other technologies has focused on issues relating to age, such as physical and operational skills, cognitive difficulties, health-related information needs, training difficulties, and social interaction needs met by computer use. These studies help to produce an understanding of how this population learns, their unique physical and cognitive difficulties, and what their research interests are (Revercomb, 2005).

1.7 Conclusion

This study, both reflecting on the author's pedagogical practice and using the empirical work to explore key issues, investigated current methods used by the participant group of elderly adults currently learning to use the

Internet, and sought to identify any typical barriers this group experienced when seeking to use the Internet, and how these barriers might be overcome. It explored the motivations that prompt older adults to participate in learning experiences related to computers and the Internet. It attempted to determine the current learning theories most relevant to Internet instruction for the elderly and to suggest what new and innovative combinations of learning theories and materials might be adapted most effectively for this subject group. This study is considered to make an original contribution to the body of knowledge in the teaching and learning of Information and Communication Technology (ICT) because it compares competing theories of learning to establish which one (or combination) is most effective, it applies techniques developed in one area in a different context, it is cross-disciplinary, and it arrives at an original synthesis (Phillips & Pugh, 1994). Finally, this interrogates and reflects on best teaching and learning practices (Pithouse, 2007; Whitehead, 2004).

CHAPTER 2: RESEARCH QUESTIONS

2.1 Introduction

This section establishes the importance of the research questions to the scope of the overall study and will set out the nature of the specific issues to be addressed. Two related considerations will also be included: the definition of learning styles and a definition of the use of the Internet in order to provide background information and clarification to the study. Exploring how this subject group is currently learning to use the Internet, combined with what new and innovative combinations of learning theories and materials can be used to teach this group more effectively, provides the main focus of the research questions. Additional details are provided by examining the barriers to learning that this group experiences and ways in which these obstacles can be overcome. In many cases, the inner motivation of the individual appears to play a large role in overcoming these barriers. The primary focus of this section is to determine the relevance of the research questions.

The author wished to test out which learning strategies appeared to be effective for this population group, and how these strategies could best be communicated to the learner. Therefore, a hybrid method was proposed where the elderly systematically tested out the various learning strategies and applied what was appropriate in their situation. The ultimate outcome of this process, it was hoped, would provide a more appropriate approach to learning for any particular individual.

2.2 Research questions

The following research questions were used to guide this study:

1. What existing methods and materials are employed to teach the elderly to use the Internet?
2. What procedural and conceptual difficulties, if any, are experienced by the subject group?
3. What methods and materials do members of the group identify as being appropriate to their learning needs?
4. What model/s of e-learning could be seen as appropriate for this group, in view of the answers to the above?

The rationale for these questions is discussed below, as well as the directions explored in answering them.

2.2.1 What existing methods and materials are employed to teach the elderly to use the Internet?

Exploring this area provided a wealth of background information for understanding the motivations of this group and the difficulties they faced. The continually changing demographics might prompt future researchers to keep abreast of the reasons how and why this subject group is learning to use the Internet. The widespread use of self-directed learning, both in the classroom and individually, was part of the exploration process. An important issue in investigating existing methods and materials is motivation; that is what motivates older adults to participate in learning experiences, especially related to computers and the Internet. There appear to be many factors that motivate older adults to participate in learning, especially related to learning the Internet. Many adults have their own self-directed projects, such as learning how to invest their savings or send photographs to their friends, and will find this to be an ongoing source of motivation. A thorough study of this area is important to fully grasp the overall situation. This thesis uses the findings from the author's detailed interviews along with additional research from other sources, such as referenced articles and online databases, to

uncover additional motivational techniques used by other teachers and how they might apply.

2.2.2 What procedural and conceptual difficulties, if any, are experienced by the subject group?

To the researcher, there are some obvious, along with more subtle, reasons why this population group faces difficulties in learning to use the Internet. This question is not meant to explore the vast social, economic, cultural, and political reasons that could contribute to preventing this group from learning the Internet; rather the emphasis is on more localized problems such as an individual's lack of access to training or equipment or a physical or cognitive challenge that person may have. Reducing these barriers should be one approach to improved learning and could be referenced by another researcher later who may want to pursue the more macro-level considerations.

2.2.3 What methods and materials do members of the group identify as being appropriate to their learning needs?

There are many approaches to learning, and these methods need to be examined, tested and selectively adapted for each individual to achieve the maximum benefit. Typically the elderly subject group member that was observed for this study would rely on a mass market book on computer use, advice from a friend, and/or enroll in an entry-level course on computer and Internet use. These methods were not always to most effective for that individual. The widespread demand for Internet training has resulted in fragmented and inconsistent training schemes that are generally focused on classroom-based instruction (see Gaumer Erickson & Noonan 2010). The author encourages a systematic self-testing by the subject group member

(and their teachers) to explore currently available training methods and combine the elements that they find most effective towards a personalized approach to learning based on individual interests, aptitudes, and the availability of the local training resources. Based on the author's empirical observations, the self-directed approach to learning appears to show the most promise for this elderly subject group, in the sense that they generate their own "best learning" schematics, while their instructor guides and facilitates the process.

2.2.4 What model/s of e-learning could be seen as appropriate for this group, in view of the answers to the above?

In view of my experiences in testing out different approaches in the classroom, and the results of the empirical work, this question further explored the current learning theories which might best be suited for those people over 65 who wished to use the Internet. With several learning theories showing potential for assisting this group (and their teachers) in their objectives, an understanding of some of the background details of individual theories is pertinent. The potential to combine two or more of these theories will be considered. As stated in the abstract, I had evidence to suggest that the self-directed approach showed the greatest promise.

Answering this question also included a consideration of what new and innovative combinations of learning theories and materials could be adapted most effectively for this subject group. Since many of the author's experiments with educational methods in the classroom showed both promise and limitation, he determined that this should be explored further as part of this thesis. Combining the learning theories with tools such as assistive technology (e.g. adaptive mouse, screen enlarger) showed a strong promise for teaching this subject group.

2.3 Learning styles definition

The concept of learning styles is often used loosely and interchangeably with terms such as “thinking styles”, “cognitive styles”, and “learning modalities” and needs to be understood. Learning style theorists draw on the fields of pedagogy, psychology and neuroscience. This has led to a confusing array of models and terminology and a body of research that is characterized by conflicting findings and weaknesses (CIPD, 2007).

According to Keefe (1982:44), learning styles are “cognitive, affective, and physiological traits that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment”.

Below are three interrelated elements that often apply to learning styles:

- Information processing – habitual modes of perceiving, storing and organizing information. This could include ways of learning pictorially or verbally.
- Instructional preferences – preferences or predispositions towards learning in a certain way, such as collaboratively or independently, or in a preferred time or location.
- Learning strategies – adaptive responses to learning specific subject matter in a particular context, often based on the individual’s cognitive style, along with their intelligence, personality and past experiences. Learning strategies are the techniques and skills that individuals use to accomplish a specific learning task. They are often a matter of individual preference and they are developed throughout life but vary by task (Quarles, 1998).

Encouraging self-awareness or metacognition (awareness of one's own thought and learning processes) is widely accepted among many teachers as a step towards better learning capability. It might also be possible that knowledge of learning styles makes learners better able to adapt to different situations. Similarly, learners who are aware of a range of learning strategies are more likely to select the correct one for a particular task (CIPD, 2007).

There is some overlap in the theories and methods described in this thesis. Several, such as cognitive or behaviorist, are considered to be more entrenched as learning theories. Others, such as Gardner's theory of multiple intelligence or Bandler's Neuro-Linguistic Programming, are less established and often relegated to a lower status as a learning style. The author believes in the use of caution in adopting any particular learning style or approach, while also being willing to explore new and uncharted areas in the pursuit of improved teaching approaches.

2.4 Definition of “using the Internet”

The Internet itself is a worldwide system of computer networks where users at any one computer can get information from any other computer. The Internet is a public, cooperative, and self-sustaining facility accessible to hundreds of millions of people worldwide (Institute of Education, 2007).

The concept of using the Internet can be better understood through the Taxonomy of Educational Objectives, also known as Bloom's *Taxonomy* (Bloom, 1956), which provides a basic guide to the process of learning. For example, Bloom views knowledge as the observation and recall of information, knowledge of dates, events, places, and major ideas, and mastery of subject matter. Comprehension is the understanding of information, translating knowledge into new contexts, interpreting facts, and comparing or contrasting. Application is the use of this information, applying

concepts and theories to new situations, and solving problems using acquired skills or knowledge. Many of Bloom's ideas could be applied to the elderly subject group learning to use the Internet, and could also serve as a guide for teachers of elderly students.

2.5 Summary of research relating to the research questions

Below is a summary of the research questions and the findings generated by this thesis:

1. What existing methods and materials are employed to teach the elderly to use the Internet?

The author discovered that the typical models for learning the Internet in this age group include classroom-based learning, online courses, one-on-one tutoring, along with additional videos/DVD's and/or textbooks. Individuals who were interviewed all had their own opinion on what was the best suited model. This appeared to vary according to the person's current ability and attitude, availability of resources and other issues considered in this thesis. Each year there are new devices to either help teach the elderly subject group, or to make it easy for them to teach themselves. An example from 2010 is the SimpliciTy computer that helps people over the age of 60 who have never used PCs or the Internet to quickly learn Internet research, chatting, social networking, online shopping and other applications. The simplified desktop opens to a bare bone screen called Square One that is designed not to overwhelm. It displays only six clickable buttons that will direct users to basic tasks such as e-mail, chat, browse the web, store photos and write short documents. Each machine is pre-loaded with 17 video tutorials. If the elderly person has a problem, she or he can just go 'back to Square One' and start all over again. The made-to-order computer takes two weeks from request to delivery (SimpliciTy website, 2010). The

author had previously developed a similar model for an all-purpose Internet combination interface that would provide the elderly with information and entertainment (see Figure 4.4).

2. What procedural and conceptual difficulties, if any, are experienced by the subject group?

This involved a consideration of the typical barriers this age group experienced when seeking to use the Internet. The typical barriers to learning, based on the peer-reviewed journals and other research include the following: inconsistent training options, lack of access to current equipment, slow Internet connections, a fear of technology, individual health problems and other related issues (Morris, 2009).

3. What methods and materials do members of the group identify as being appropriate to their learning needs?

The evidence gathered in this thesis indicates that the barriers that prevent members of this age group from learning how to use the Internet can be overcome by effective teaching methods based on the established learning theories, use of the motivational and assistive devices, and adapting the learning to the individual's aptitude or other circumstances. Some of the specialized health disabilities and other physical or cognitive limitations are beyond the scope of this study. This question is not meant to explore the entire social, economic and political reasons preventing this group from learning the Internet, rather the emphasis is on more localized problems, such as an individual's lack of access to training or equipment. Motivation is also considered an important factor in driving learning. A data search revealed that people over the age of 65 use the Internet most often for e-mail, health research, online banking and other transactional uses. Often

they are motivated by the influence of friends and family who have previously discovered the Internet and bring it up in conversation.

4. What model/s of e-learning could be seen as appropriate for this group, in view of the answers to the above?

This included a consideration of the current learning theories that were best suited for those people over 65 who wish to use the Internet. Based on the research, self-directed learning is a method well-suited to this population because it encourages personal initiative, helps one to combine the most useful components from multiple learning methods, and fits well into the comfort zone of a large proportion of the study population, as evidenced by its wide adoption. When looking for new and innovative combinations which could be adapted most effectively for this subject group, this thesis explored a flexible combination of teaching theories and methods that appeared to be the most effective for this population. The proposed “hybrid approach” will examine a variety of established teaching theories and learning approaches that appear to be have the most potential for this subject group population.

2.6 Conclusion

This chapter began by explaining the importance of each research question in the context of this overall study, and some additional rationale is provided. The selective combination of divergent theories and methodology has the potential of opening up a new understanding of adult education. Although not all individuals will have access to the same resources, they can make the most out of what is available to them through a willingness to explore fully and to experiment. This section continued with a definition of *learning styles*. Additionally, a section defining the concept of *using the Internet* was included for general clarification. The chapter ended by summing up what could be found in the literature to suggest tentative answers to the research

questions. Although this chapter was brief, it has provided a foundation for further pursuing the research questions.

CHAPTER 3: LITERATURE REVIEW

3.1 Introduction

The literature review will explore several topics closely related to teaching Internet skills to the elderly. This will include an overview of the current learning theories and teaching methods related to this topic, motivations to learning, along with an analysis of potential innovations in this field. A review of the literature in the field of ethnographic research and self-directed learning will take up a large part of this chapter, since they represent a major component of the approach used in this study. Other related topics, such as the use of assistive technology to help students with a physical or cognitive disability adapt to the use of the Internet, will also be considered. Several of these subjects, such as Humanistic Theory and Experience Sampling Method are provided only for general context to help place the entire study into perspective.

Related literature on learning in older adulthood was identified through a review of journals, books, thesis abstracts and other research databases. Since the understanding of how adults develop and change as they age is important for designing effective learning strategies, this literature will also be explored. The primary gaps in the literature that the author discovered are related to several aspects of the study of older adults using technology. There is little information concerning the most effective approaches for teaching older adults how to use Internet technologies, despite the abundance of general books on computer instruction. Additionally, there is a lack of current literature about the application of common learning theories and methods for older adults learning to use computers and the Internet (Snyder, 2009). The books and articles on these individual learning theories

rarely compare and test their ideas against the other competing learning theories in a systematic and coherent way that could produce a combination, or hybrid approach, that would have the potential to provide a better overall learning strategy for the elderly subject group. Cook (2003) wrote that researchers with expertise in education or communications have not applied their findings to the ageing field. She believes that this has resulted, with limited effectiveness, in vocational teaching methods being used to teach the elderly. She also believes that as computers and related technologies become more important and relevant, adult educators need to develop new models, strategies and understandings of computer-mediated learning systems, something currently missing from the research and discussion in this field. Additionally, according to Quarles (1998), learning theories are mostly applied to the population under fifty. There is a need to test current theory and develop new ideas with the ultimate goal of improved teaching along with maintaining the older individual's performance, productivity and effectiveness. The practical application of learning strategies theory needs to be connected to all types of training the elderly, including basic Internet skills.

3.2 Learning theories and approaches

This section will include details on several of the most important learning theories related to the author's proposed hybrid method for teaching and learning. This section is not meant to be a detailed study of all of the existing learning theories, but rather a review of several theories and ideas that could be used by teachers of the elderly, and, in some cases, could be tested out by individual learners and applied to their personal circumstances.

3.2.1 Self-directed learning

According to Hiemstra (1994), self-directed learning is considered to be any

method of studying in which individuals have primary responsibility for planning, implementing, and even evaluating the learning effort. Self-directed learning is a method well suited to this population because it encourages personal initiative, helps one to combine the most helpful components from multiple learning methods, and fits well into the comfort zone of a large proportion of the study population, as evidenced by its wide adoption. Hiemstra (1994), also identifies several other components of self-directed learning: (a) individual learners can become empowered to take increasingly more responsibility for various decisions associated with the learning endeavor; (b) self-direction can be seen as a characteristic that exists to some degree in every person and learning situation; (c) self-direction does not necessarily mean all learning will take place in isolation from others; (d) self-directed learners appear able to transfer learning, in terms of both knowledge and study skill, from one situation to another; (e) self-directed study can involve various activities and resources, such as self-guided reading, participation in study groups, internships, electronic dialogues, and reflective writing activities; (f) some educational institutions are finding ways to support self-directed study through open-learning programs, individualized study options, non-traditional course offerings, and other innovative programs, (Self-Directed Learning site, 2006).

Self-directed learning has many existing and potential applications for this subject group. Many of the subject group members had already successfully experimented with self-directed learning while teaching themselves computer and Internet skills. Figure 3.1 shows some of the specific self-directed skills that the author recommends that Internet learners experiment with, for example, trial and error, keeping a journal, Kaizen (continual improvement, modelling behavior on that of successful users, and so on.

Here are several experimental methods for the elderly
(and their teachers) to try in order to improve their
e-learning skills and abilities.



Figure 3.1: Self-directed learning methods prompt

The field of adult learning was largely pioneered by Malcolm Knowles, a former student of Cyril Houle at the University of Chicago. Knowles (1975) identified several of the characteristics of adult learners, (this includes the elderly subject group along with any others over the age of 18). He found that adults are often independent and self-directed. Whoever teaches them must actively involve them in the learning process and serve as facilitators and mentors instead of just as a lecturer. Adults already have many life experiences and knowledge that includes work, family, and previous education. They need to tie-in this new learning to their existing knowledge and experience base. Adults are often goal-oriented, and upon enrolling in a course, they usually know what goal they want to attain. Adults are also

often relevancy-oriented; they must see a reason for learning something. Learning has to be applicable to their work or other responsibilities to be of value to them. Adults are also practical, and are most interested in the parts of the lesson they perceive to be useful to them in their work. They may not be interested in knowledge for its own sake. Many of the well-known SDL researchers are still active and participate in an annual symposium presented by the International Society for Self-Directed Learning (ISSDL, 2010)

Knowles' definition of self-directed learning states:

In its broadest meaning, "self-directed learning" describes a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes (1975:18).

According to Kearsley (2006), another contribution from Knowles was his attempt to put together theoretical support for his theories from several disciplines, primarily sociology, education, developmental psychology, and humanistic psychology and to popularize the concept.

Andragogy is a system of ideas, concepts, and approaches to adult learning, and is largely based on self-directed learning. This has become part of the foundation of adult education and has significantly contributed to the growth of the field during the past two decades. Malcolm Knowles brought popularity to the andragogical approach and he describes four key concepts: 1. Adult learners are self-directed -- they want their education to be relevant to their jobs and lives. 2. Adult learners draw on life experiences in their learning activities. 3. The learning focuses on problem-solving. 4. Adults in a classroom setting want to be involved in their educational planning, (Knowles, 1970). There is debate about whether andragogy should be

considered a theory, method, technique, or only as a set of characteristics. Regardless, andragogy is now an important part of adult education.

Tough (1979), another well-known self-directed learning researcher and former student of Houle at the University of Chicago, used a detailed interview technique. He determined that most adults spend an average of 700-800 hours in deliberate learning projects each year. These included such things as researching local history, learning a specific home repair method, computer skill or other task. Nearly two-thirds of his original sample reported that these projects were self-planned. According to Hiemstra (Website), a survey with various groups in ten different countries has confirmed that approximately 90% of adults develop at least one intentional learning project annually. According to the survey findings, a typical adult spends about 500 hours a year in such learning with approximately 70% planned by the learner. Approximately 90% of all adults develop at least one large learning project each year; the average is five separate projects per year, with about 100 hours on each project. (Self-Directed Adult Learning: Some Implications for Facilitators, 2006).

Another related project was Guglielmino's (1977) thesis. She developed the Self-directed Learning Readiness Scale (SDLRS) that is used to compare different self-directed learning components and characteristics. In 1987, the International Symposium on Self-directed learning was set up, which has subsequently resulted in many publications, research projects, and other efforts by researchers internationally.

Candy, an adult learning theorist, suggests that continuous learning is an important process that helps adult learners to keep up with changes in society. Candy (1991) also supports the idea of a flexible, self-directed learning style. Candy believes that those people who fail to keep up with developments are likely to fall progressively further and further behind, and

to become less employable and less competitive. As a result, there is a relentless pressure for increased learning across the lifespan, which may be met in a variety of ways. To cope with the diverse learning challenges, Candy believes that the answer is different for each individual, and likewise the skills that are required of the successful learner are not exactly the same (Candy, 1991). This directly supports the hypothesis of this study in recommending a flexible approach to teaching Internet skills to the subject group because of the differences in requirements for each individual to learn successfully the desired Internet skills.

The idea of self-directed learning has reached many nations, along with segments of government and private industry. Brookfield (1986) writes about various efforts where individualized, self-directed learning opportunities exist, in countries such as Germany, Denmark, and others in Eastern Europe. Brockett and Hiemstra (1991) also list several self-directed efforts in China, Indonesia, Japan, Norway, Russia, Saudi Arabia, Sweden, and Tanzania. Knowles (1984) describes various self-directed learning efforts in various government, industry, health, religion, and military settings. Besides the Open University in England, there are several other institutions that have emphasized self-directed learning. These include: St. Francis Xavier University (Nova Scotia, Canada), Columbia University's Teacher College (New York, USA) and Syracuse University's Adult Education Program (New York, USA). The Ontario Institute for Studies in Education (Toronto, Canada) has incorporated self-directed learning principles into various of its adult education efforts (Self Directed Learning site, 2006).

Self-directed learning appeared in the adult education literature as early as the 1920's (Lindeman, 1926). This history of self-directed learning could be argued to actually be much older. For example, self-study played an important part in the lives of such Greek philosophers as Socrates, Plato, and Aristotle. Other historical examples of self-directed learning that

Hiemstra (2006) cites include Alexander the Great, Caesar, Erasmus, Descartes. The social conditions in the early European settlements in America, 1750-1850, with their lack of formal educational institutions, required that many people learn on their own.

A supporting theory to self-directed learning, especially related to computer learning is the Minimalist Theory. This is based upon studies of people learning to use a wide range of computer applications including word processing, databases, and programming. Carroll (1990) believes that adult learners are not 'blank slates' and that they are usually learning new things based on personal goals and expectations. One of the main ideas of minimalist theory is to minimize the extent to which instructional materials impede learning and focus efforts on activities that support student accomplishment. It has been extensively applied to the design of computer documentation (Kearsley, 2006).

Closely related to self-directed learning is Discovery Learning. According to Ormrod (1995) discovery learning is "an approach to instruction through which students interact with their environment by exploring and manipulating objects, wrestling with questions and controversies, or performing experiments." In other words, students are encouraged to learn through trial-and-error. Teachers have found that discovery learning is most successful when students have prerequisite knowledge and undergo some structured experiences (Roblyer, Edwards & Havriluk, 1997). The concept of discovery learning has appeared numerous times throughout history as a part of the educational philosophy of many well-known philosophers such as Rousseau, Pestalozzi and Dewey. Discovery learning often takes place in problem solving situations where the learner draws on his own experience and prior knowledge to discover the truths that are to be learned (Bruner 1966). Subject group members in this study typically will learn to use the computer

through the process of trial-and-error, metaphors (for example comparison with a manual typewriter), and other discovery-based learning methods.

Yet another related concept is individualized instruction. This is where the instructor designs the learning materials for each student individually, as much as possible. With individualized instruction, learners are encouraged to seek ways of coordinating their learning activities to the practical realities of their job, home, and other daily situations. Learners have the freedom to select various written or other resources to enhance their understanding of the subject matter. According to Hiemstra (1994), individualizing the instructional process does not work equally well in all situations. Instructors have to decide how to adapt the process to the particular setting, whether to emphasize certain elements, and whether to use only portions of the material with certain audiences.

Finally, problems with the idea of self-directed learning do exist. Candy (1991) writes that research on self-directed learning has been stalled in recent years because of the lack of a uniform theoretical base, ongoing confusion over what exactly the term means, and other issues. Despite these criticisms, the author of this thesis believes that self-directed learning has proven to be effective, especially in the field of adult education. At a minimum, self-directed learning should receive further evaluation by the elderly subject group population interested in continuing their education, along with those who teach them.

The problem arises because current software producers and manual writers are basically computer engineers who understand how the machine works but have no idea about how adults learn (Gibbons, 2003:28). 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 (Knowles, 1990:163-164).

To summarize, there are four characteristics of self-directed learning:

1. Adults prefer self-directed learning.
2. Adults bring a wealth of experience to the learning situation and they learn most effectively through experiential techniques.
3. Adults are often aware of specific learning needs evoked by real-life events.
4. Adults are competency-based learners; they desire to acquire knowledge or skills that they can use for practical application (Knowles, 1990).

3.2.2 Theory of multiple intelligences

The theory of multiple intelligences (MI) suggests that there are several distinct forms of intelligence, and that each person possesses all of them in different degrees. Gardner (1983) originally identified seven main forms: linguistic, musical, logical-mathematical, spatial, body-kinesthetic, intrapersonal and interpersonal (he has since added naturalistic intelligence). Gardner believes that teaching and learning should focus on the particular intelligences of each person, and the instructional activities should appeal to different forms of intelligence. MI researchers have surveyed a wide variety of independent research traditions, such as neurology, psychometrics, anthropology, and the study of special populations, to help formulate their theory (Gardner 1993).

Although Gardner believes that everyone has characteristics of all seven intelligences, he also thinks that people can be highly developed in some areas and relatively undeveloped in others. He believes that virtually everyone has the capacity to develop all seven intelligences to a reasonably high level of performance if given the appropriate encouragement,

enrichment, and instruction. Gardner proposes that a person's learning style will reflect the kind of "intelligences" the individual applies. (Gardner 1983) Other academic theories demonstrate between one and 150 different intelligences. What makes Gardner's unique is that these forms of intelligence must meet specific requirements- capable of being symbolized, having its own developmental history, and being vulnerable to specific brain injury. Gardner's MI theory has been widely accepted in the United States, and he has received endorsements from large organizations such as the Rockefeller Foundation, American Psychological Association, along with several major universities, including Harvard, where he currently teaches. In the Methods section, the author has included a model for applying Gardner's intelligences to the subject group, and he believes that this approach has good potential for increasing the learning capacity for this group.

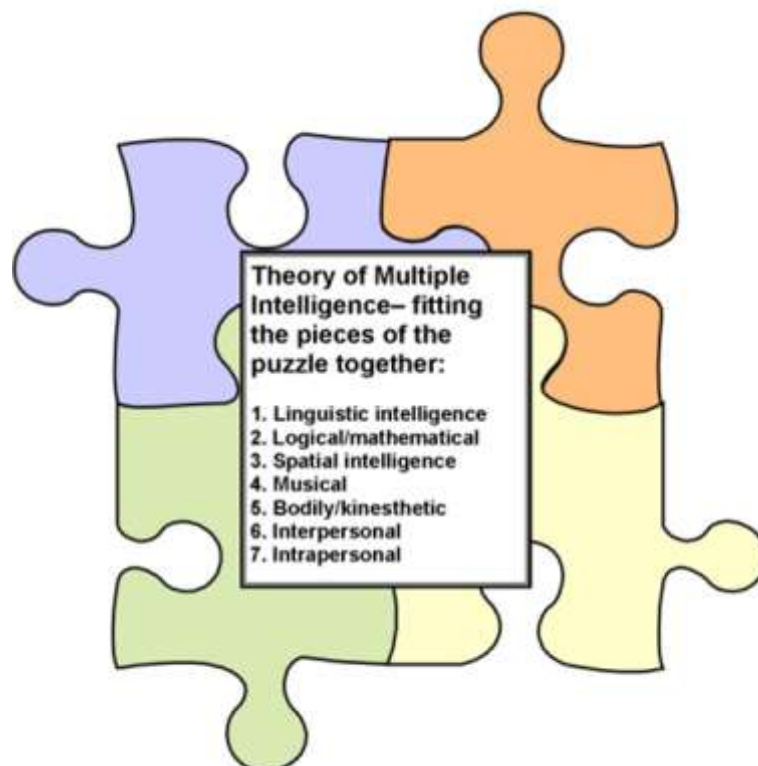


Figure 3.2: The Multiple Intelligence Puzzle

Below is a brief summary of the original intelligences Gardner (1983) has identified (shown in Figure 3.2):

1. Linguistic intelligence - the capacity to use words effectively. Traits include the ability to argue, persuade, entertain, and instruct effectively through the spoken word. People who are strong in this category often enjoy word games, and they enjoy reading. IQ tests in the United States are primarily based on linguistic and mathematics ability.

2. Logical/mathematical - comprehension of and ability with numbers and logic. Professionals with this aptitude often include the scientist, accountant and computer programmer. Traits include the ability to reason, sequence, create hypotheses, understand cause-and-effect, find numerical patterns, and have a generally rational outlook on life.

3. Spatial intelligence - the ability to think in pictures and images and the ability to perceive, transform and re-create different aspects of the visual-spatial world. The professionals with this aptitude often include architects, photographers, artists and pilots. Other traits include the ability to visualize effectively and to draw or sketch ideas graphically and in 3D space.

4. Musical - the capacity to perceive, appreciate and produce musical rhythms and melodies. People who are strong in this category can often keep time to music and understand the different types of music. The biographies of famous musicians, like those of mathematicians, contain many stories of the emergence of extraordinary talent at an early age, even before having received musical training.

5. Bodily/kinesthetic - a talent for controlling body movements and handling objects skillfully. The professionals with this aptitude often include athletes, dancers, craftspeople, mechanics and surgeons. Components often include

strength, endurance, flexibility, balance, dexterity, coordination, poise, grace, and good reflexes.

6. Interpersonal - the ability to understand and work with other people. This includes the ability to perceive and be responsive to moods, intentions and desires of others, and see the world from their perspective. People with this ability are often excellent negotiators, teachers or business leaders.

7. Intrapersonal - intelligence in this category includes the ability for a person to easily access their own feelings. The professionals with this aptitude often include counsellors and theologians. Components include a capacity to experience a wide range of feelings, to develop excitement and spontaneity, capacity for assertion, and the ability to soothe painful feelings in oneself (Gardner 1983).

For the subject group members studied here, an awareness of the multiple intelligences has the potential for the teacher to adapt to the individual needs of students and also to help them develop an effective learning plan. For example, a computer-related lesson plan could include a project incorporating word text (linguistic), illustrations (spatial), sound score (musical or linguistic), and hands-on projects (bodily-kinesthetic, interpersonal and so on).

A similar theory to MI is known as Aptitude-Treatment Interaction (ATI). This is the idea that some teaching strategies are more or less effective for particular individuals depending upon their specific abilities. ATI suggests that the best learning happens when the instruction matches the student's aptitudes. ATI suggests a multidimensional view of ability. According to Snow (1989), the aim of ATI research is to predict student outcomes from combinations of aptitudes and approaches to teaching.

Aptitude testing is another related field. Aptitudes are special abilities for learning to do certain kinds of things easily and quickly. Some examples of aptitudes are tweezers (finger) dexterity, musical ability, color perception, visualization skills, inductive reasoning and memory of numbers. These measured traits are highly stable over long periods of time, and can benefit the learning process by directing students towards those areas where they already have existing aptitudes (or compensate for undeveloped aptitudes). Aptitudes often overlap with Gardner's multiple intelligences, such as in the musical category, and they would be recommended to the subject group as a way of discovering skills that are easy for them to learn (in the United States, the Johnson O'Connor Foundation (2006), a non-profit organization that administers aptitude testing).

The theory of multiple intelligences ties in directly with the focus of this thesis in that individual students have a variety of aptitudes and intelligences and require a flexible combination of approaches to meet their educational needs. One of the difficulties with the MI theory is that it has been popularized and applied by others, often with a somewhat different emphasis on the categories of intelligence, and often with much less rigor in their research. Regardless, MI is a widely accepted theory and will play a role in this thesis by being synthesized with several other learning theories and teaching methods to produce the most effective learning option for the individual subject group member.

3.2.3 Behaviorist theory

Supporters of the behaviorist theory, one of the most well-established education theories in the United States, believe that learning happens as a result of students forming associations between stimuli and responses. Behaviorism focuses on objectively observing changes in behavior and largely comes from the work of Skinner (1956) and the concept of operant

conditioning. According to Kearsley (2006), Skinner and other behavioral theorists were concerned mainly with observable characteristics of learning and what those observations could represent for teaching. According to Roblyer, Edwards and Havriluk (1997), Skinner and others viewed the teacher's job as one that modifies students' behavior by setting up situations to reinforce students when they appear to be learning effectively. They reasoned that teachers could link together responses involving lower-level skills and create a learning 'chain' to teach higher-level skills. The teacher would determine all of the skills needed to lead up to the desired behavior and make sure students learned them all in a step-by-step manner. Behavioral theory defines learning as a change in behavior, with the goal of teaching to produce that change (Schunk, 1996). Even though behavioral theory has had some success in the educational field and is the foundation for much content-based instruction used today, behavioral theory ignores cognitive principles that are probably necessary in explaining complex learning and problem-solving processes.

Robert Gagne (1965) and his followers are part of the behaviorist group, and their focus is on the outcomes, or behaviors, that result from training. Gagne's book, *The conditions of learning*, identified the mental events that occur when adults are presented with various stimuli. Gagne developed a nine-step process called the "events of instruction" to help address the conditions of learning. The nine steps include the following:

1. Gain attention.
2. Inform learners of objectives.
3. Stimulate recall of prior learning.
4. Present the content.
5. Provide learning guidance.
6. Elicit performance (practice).
7. Provide feedback.

8. Assess performance.
9. Enhance retention and transfer of skills.

Gagne sees his conditions of learning as being based on internal and external conditions. Internal skills are skills that the learner has already internalized and are there to apply to the learning task. The external conditions for acquiring the new skill could begin with the realization that the internal skills will need to be recalled. Another external condition is to “put things together” by combining subordinate skills to make the new one (Gagne, 1985).

The author of this study attempted to use basic behaviorist theory several times with the subject group while teaching the *Internet for Seniors* course by trying to modify the behavior of the group through positive feedback and peer recognition. He also followed Gagne’s events of instruction as part of his classroom presentations to the subject group.

3.2.4 Cognitive theory

Cognitive theory is another well-established and well-known learning theory. According to Bruner (1966), cognitive theorists try to expand beyond simply observing the student to focus on the complex mental processes involved in learning and understanding. Cognitive theories seem to offer a much larger view of human potential than do behavioral theories.

Bandura (1991) developed an elaborate theory of observational learning that emphasizes the idea that people learn from their social environment. Students who watch others learn how to acquire knowledge and skills often develop their own personal strategies, beliefs and attitudes. People also learn about the usefulness and appropriateness of behaviors by observing the results of others’ behaviors. Therefore, behaviors that result in

successful consequences are retained; and those that create problems are discarded (Barclay, 2001). This is especially true in computer and Internet learning where learners watch each other. The author continually advised students to observe others and to attempt to teach their new Internet skills to family and friends after the course had ended.

Cognitive Theory represents an expansion of some of the earlier theories and could help to fill in many gaps in the analysis of adult learning. The author of this study found that many of the elderly subject members he taught often relied on feedback and advice from their peers in learning how to use the Internet. The cognitive approach should be included with any research or teaching strategy in this area.

3.2.5 Constructivism

Constructivist learning theorists believe that learning occurs when the student constructs his or her own knowledge from their current and/or past knowledge. This is different from behaviorist theory, which tries to reason that knowledge is gathered through observation of another person. Constructivism is based partly on the idea of discovery learning, where the instructor functions as a guide or coach to facilitate exploration (Kearsley, 2006). Constructivism has been influenced by Lev Vygotsky, a well-known educational theorist, who believed that humans have an ability to change the environment for their own purposes and that social interaction plays a fundamental role in the development of cognition (Schunk, 1996). Vygotsky's (1934) sociocultural theory emphasizes a zone of proximal development. This represents the highest amount of learning possible with the right instructional conditions. Bruner (1966) writes that the learner selects and transforms information, develops hypotheses, and makes decisions. He believes that learning is an ongoing process where learners construct new ideas or concepts based upon their current or past

knowledge. Candy (1991) views constructivism as an individual's attempt to impose meaning and significance on events and ideas through the process of constructing meaning and transforming understandings. Constructivist learning appears to blend effectively with self-directed learning, especially related to computer and Internet training, and is worthy of consideration for teachers of the elderly.

3.2.6 Humanistic theory of learning

This theory is largely based on the humanistic psychology of Abraham Maslow and Carl Rogers. The humanistic theory holds that, given the right environment, people have a natural tendency to learn and to improve themselves with the use of positive role models and encouragement. This theory is the foundation of the individualization and student-centered approaches in modern education philosophy (Rogers, 1980). There is also an emphasis on modeling successful behavior as opposed to studying dysfunctional behavior. Maslow (1954) developed the hierarchy of needs theory. He theorized that humans need the basics, such as air, water, and food as well as five additional successive layers of needs: physiological needs, safety and security, love and belonging, esteem, and the need to actualize the self, in that order. Maslow believed that people would fill their needs for higher priority items such as air and water before pursuing their needs for esteem and belonging. An example from this study would be where individuals had resisted purchasing a computer until other basic needs had been filled.

There is a connection between the humanistic and self-directed learning approaches. The Personal Responsibility Orientation (PRO) model illustrates the link between humanism and self-direction in adult learning (Brockett & Hiemstra, 1991). The humanistic approach also has the potential of assisting others in the field of adult education. The author continually

emphasized the humanistic idea of modeling the effective behavior of others as an important tool for teaching. In class, he would assign some of the work in groups and encourage students to be aware of those peers who demonstrated effective mastery of computer and Internet skills. This ranged from the body language of a successful student to the learning strategies they chose to employ. Other teachers were observed paying more attention to students' errors rather than focusing on encouraging the best qualities of their learning.

3.2.7 Criterion referenced instruction

The criterion referenced instruction method is used for the evaluation of training program distribution and effectiveness. It is especially relevant to this thesis since it focuses on the design and delivery of self-paced training programs. This approach, created by Robert Mager (1975), include: identifying what needs to be learned, objectives of the learning process, and development of learning modules tied to specific objectives. Training programs developed with this method are often self-paced courses using a variety of tools (such as video, DVD, workbooks, group discussions and distance learning). Students learn at their own pace, and take tests under the direction of a course manager or administrators to make sure that they understand the material. Mager's approach is similar to that of the author of this study, with the primary exception that the criterion referenced instruction method appears to be designed for vocational skills courses rather than the general learning environment that would be more typical for the subject group in this study.

3.3 Ageing characteristics and related research

Wear and tear theory - the human body eventually exceeds the reparative capacity of the tissues. Some biologists have also argued that ageing has

been "programmed" by evolution to avoid the hazard of overpopulation (Restak, 1997).

Programmed senescence — this is the belief that ageing results from a genetically programmed set of events. Ageing is believed to be the result of the sequential switching on and off of certain genes, with senescence being defined as the time when age-associated deficits are manifested (Oracle ThinkQuest Education Foundation, 2006).

Hayflick limit theory — this theory states there is a limit to how many times the body's cells will multiply, with the limit to life based on the total number of cell divisions.

Free Radical Theory — this theory is based on the idea that unpaired electrons are unstable and will try to pair up. This causes a chain reaction in which atoms and molecules steal electrons from each other. In this theory, the maximum life span of a species is largely determined by the rate of mitochondrial damage inflicted by free radicals in the course of normal metabolism.

The stochastic theory — holds that ageing is a random event, so that its behavior may be analyzed statistically but not predicted precisely.

According to Restak (1997), lifespan has increased more in the past fifty years than in the previous two thousand years. In 1900, according to Restak, a typical person could expect to live about 47 years. This was about the same length as the ancient Greek and Roman men before 100 B.C. Currently the life expectancy is 71 years for men and 78 for women, in the United States. This thesis will include information about the characteristics of ageing as a factor in the subject group's Internet experiences.

Health-related deterioration is often more measurable as a person ages and can have a significant bearing on the learning performance of adults. With ageing there are sensory changes that result from deterioration in the central nervous system. According to Knox (1977), with advancing age there is a shift from acute illnesses (such as infections or accidents) to chronic illnesses (such as arthritis or heart problems). Any long-term disease could have an effect on learning performance and provides another explanation for the variation of learning ability over the life span. Although all people age, they do so in different ways and at different rates.

As adults age, they experience a deterioration of their ability to hear and see. Vision changes include a loss of close vision, visual acuity in low illumination, and an increased sensitivity to glare. Hearing changes often involve losing the ability to discriminate pitch and high frequency notes (Jones & Bayen, 1998). They suggest changing the type-size settings on the computer, customizing toolbars to include larger buttons, and adjusting the color of text and hyperlinks to increase the contrast with the background.

In a finding relating to gender differences, Fallows (2005) cites a Pew Internet survey that revealed that among those 65 and older, men were more likely (34%) than women (21%) to use the Internet. Women seem more likely than men to value the Internet for the opportunities it provides for connecting with others, including friends, family, and co-workers.

3.3.1 Similar studies of relevance

The author researched several similar qualitative studies that helped in the formation of his approach to this thesis. Namazi and McClintic (2003) examined changes in 24 older adults' (aged 68 to 95) attitudes toward, and skills in using, computers and the Internet following regular computer training sessions conducted over a fifteen-month period. Computers were made

available for use by participants throughout the course of the study. The authors noted that participants were “enthusiastic” about learning to use computers during the initial training sessions. The most commonly cited uses of the computer and Internet were for playing games, word-processing, sending and receiving mail, and surfing the web. The authors reported that the greatest obstacles for participants in using computers were age-related changes in physical, cognitive, and sensory abilities.

Based on findings from a randomized controlled study involving 100 older adults, White *et al.* (2002) concluded that older persons who use the Internet may experience a number of psychosocial benefits, such as lower rates of loneliness and depression, compared to those who do not use the Internet. Of the 45 participants in the intervention group who received training in use of the Internet, twenty-nine (approximately 60%) reported using the Internet at least once a week. Fourteen of those 29 used the Internet to e-mail family and friends. Gender differences were related to the type of activity performed on the computer: Men were more likely to use the Internet than women; women used e-mail more frequently than men. Participants who reported good health (42%) also used e-mail more regularly than those who rated their health as poor or fair (6%).

According to Maheu (2000), there are currently several promising services available that can considerably increase the ability of physicians to use the Internet to effectively monitor their patients. For example, the Medtronic site (Medtronic.com) is developing a new monitoring service that will allow heart patients to use the Internet to relay up-to-date cardiac data from their homes to physicians' offices. The electronic connection would use a home monitor to download information such as heart rate and battery status from an implanted pacemaker, defibrillator or experimental cardiac device, possibly while the patient sleeps. The data would then be automatically transmitted to a cardiologist over a secure Internet link. The physician could call the patient

in for an office visit as needed or, eventually, could reprogram the device remotely without the patient leaving home. The author is interested increasing the doctor-patient communication, both by these interactive devices along with empowering the patient to gather some basic health data for the doctor to interpret.

The use of the Internet by the elderly for health research to supplement what their doctor is able to provide them is likely to accelerate and evolve quickly because of the consumer awareness of the Internet along with the new materials being added daily. With the average doctor-patient consultation averaging twelve minutes duration in the U.S., these professionals routinely fail to address the information needs of consumers (Braddock *et al.*, 1999). Although many of the subject group are not capable of extensive online health research, it remains as a goal and motivation for study. According to Campbell (2003), a majority of U.S. patients prefer to leave their medical decisions to their physicians. However, the more a patient learns about their illness, the more likely they are to ask intelligent questions of their physician. According to Campbell, studies have shown that patients who ask questions compare treatment options, and express opinions to their physicians have better health outcomes than those who do not communicate.

According to Lang (2006), the Internet may allow ageing adults to assume a more active role in their health care (see also Campbell & Nolfi, 2005). Unfortunately, there are several limitations associated with medical information found on-line. Examples include the difficulty experienced in actually researching and using the health information, along with the variability in the quality of the information found on websites. She recommends additional research to assess variables impacting on-line searching to help develop ways that health information could be presented in a more comprehensive and accessible way. Finally, Nielsen (2005) did a quantitative study that compared the elderly (over 65), with a control group

(age 21-55) and determined that one of the primary reasons that the control group was able to use the Internet more rapidly and effectively than the elderly was because websites tend to be produced by young designers, who often assume that all users have good vision and motor control.

In a study of the use of the Internet, a randomized controlled study involving 100 older adults, White *et al.* (2002) concluded that older persons who use the Internet may experience a number of psychosocial benefits, such as lower rates of loneliness and depression, compared to those who do not use the Internet. Of the 45 participants in the intervention group who received training in use of the Internet, twenty-nine (approximately 60%) reported using the Internet at least once a week. Fourteen of those 29 used the Internet to e-mail family and friends. Gender differences were related to the type of activity performed on the computer: Men were more likely to use the Internet than women; women used e-mail more frequently than men. Participants who reported good health (42%) also used e-mail more regularly than those who rated their health as poor or fair (6%).

Another topic related to this study, especially the practice-based project, is the use of the Internet for health research among this subject group. According to Maheu (2000), there are currently several promising services available that can considerably increase the ability of physicians to use the Internet to effectively monitor their patients. For example, the Medtronic site (Medtronic.com) is developing a new monitoring service that will allow heart patients to use the Internet to relay up-to-date cardiac data from their homes to physicians' offices. The electronic connection would use a home monitor to download information such as heart rate and battery status from an implanted pacemaker, defibrillator or experimental cardiac device, possibly while the patient sleeps. The data would then be automatically transmitted to a cardiologist over a secure Internet link. The physician could call the patient in for an office visit as needed or, eventually, could reprogram the device

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3.4 Teaching approaches and tools for increased performance

This section includes a review of potential options for learning improvement. Several of these are also discussed elsewhere in this thesis and represent samples of the author's approach that will continually encourage self-directed exploration by the subject group. The author has tested most of these, either individually during the interviews or while teaching the Internet for Seniors class for two years at Butte College. These learning motivation methods can be tested and used individually by members of the subject group and adapted to their individual needs or preferences. This section is

designed to be expanded and updated as new methods are discovered, rather than as rigid criteria to be followed.

3.4.1 Common teaching methods

Below is a brief sample of several of the common approaches to teaching and learning, especially related to Internet and computing skills. These will all be part of the author's hybrid approach, and individual subject group members will be encouraged to explore these, as long as they are locally available and compatible with that person's interests and learning abilities. A diagram at the end of this section helps to clarify the interviewees approach to these teaching methods.

a. Classroom-based learning: Lecturing from a live instructor offers strong benefits and is one of the most common methods for the subject group to obtain Internet training. The author's experience has been that instructor-led training in a classroom often injects enthusiasm and assures consistency and completion of related projects. The classroom situation offers give-and-take flexibility along with the feedback and assistance of peers in the group. The lecturer can serve as a model of the desired outcome. This type of training is not available in all geographic areas, and has other limitations, such as time constraints, potential costs, and the effectiveness of the individual instructor. Since student participation is often minimal, classroom-based learning can promote passivity in students and can end up resulting in one-way communication. Other advantages and disadvantages of classroom-based learning are covered throughout this thesis. Mixed classes (old and young) have a potentially negative consequence for older learners: older people often struggle to keep up with the class, feel as if they are making many more mistakes than their classmates, and that they are demanding an excessive amount of support. It is increasingly difficult to repeatedly ask for help for what is apparently the same problem, particularly

if the learner is in a group and competing with others for the trainer's attention. This often has the effect of making the learner feel stupid, dependent on the trainer, and therefore reduces confidence (Dickinson *et al.*, 2005).

b. One-on-one tutoring: This occurs when someone who is knowledgeable about computers and the Internet is willing to teach those skills to someone who is not (often for a fee). A skilled tutor can offer problem-solving and on-the-spot training tailored to the person's needs. Learning occurs at the rate and time most suitable for the individual student, allowing the tutor to take into account the individual student differences and provide them with immediate feedback. If the tutoring is at the subject group member's home, it also offers convenience and assures that the individual will learn on the same computer that he or she will use later. The primary problem with this method is that often those who possess good computer skills are not always effective teachers. There is the issue of continuity since the tutor may move on or lose contact with the student. One-on-one tutoring can potentially be expensive if the student wishes to hire an experienced tutor. Based on the interviews the author conducted, however, this is the most desired method of learning. Comings, Soricone and Santos (2006) include tutoring as an important part of the modes of engagement in their Evidence-based Adult Education Program Model Appropriate for Research. This ties in directly with the third research question in this thesis: What methods and materials do members of the group identify as being appropriate to their learning needs?

c. The software manual and learning tutorial: The manual is the most basic form of assistance available to computer and Internet users. Unfortunately, many of these are reference-oriented and often not very exciting to read. The advantages include almost universal availability along with a consistent source of reference. The software learning tutorial is software that teaches users how to operate their program, and now accompanies many software

packages, with more elaborate versions available at an additional cost. Some of the newer programs are fully animated and help guide the user through a step-by-step process. The manual and learning tutorial are good for introductory training, but do not provide much assistance when a problem is encountered.

d. Online course and online help sites: Currently there are hundreds of online courses available in many subject areas related to computer and Internet training. These courses typically have modules, learning objectives, and a glossary. There are many advantages and disadvantages with this method of delivery. Additionally, online help sites allow users to browse through technical information about computers or look up a specific solution or a series of steps and are often available at no cost. *Ask an expert* sites are another form of online assistance where computer experts are willing to answer questions sent to them by e-mail. A more detailed section on the related topic of distance-learning follows. These resources have some benefits, along with certain limitations, and should be considered in a holistic overview of what is available to the individual subject group member. This ties in directly with the fourth research question in this thesis: What model/s of e-learning could be seen as appropriate for this group, in view of the answers to the above?

e. Video/DVD and audio tape instruction: Currently there are many computer and Internet training videos that offer an alternative approach to learning. Videos and DVD's allow the learner to control the pace and timing of learning, and sections can be repeated as needed. There is an established market for used and inexpensive video/DVDs, and they are available in many public libraries. As with several of these other methods, there is little or no feedback available. A variety of computer and Internet instructional audio tapes are also commercially available. This style of learning is good for making the best use of time while driving a car, commuting by rail or other

activity where partial concentration is possible. There are obvious limitations with no visual component.

3.4.2 Distance learning - background and evaluation

An additional section will be devoted to distance learning and how it relates to teaching. Distance learning can be defined as an educational process of formal or informal instruction using print or electronic communications media in which instructors and learners are separated by time and/or geographic location (Mclsaac & Gunawardena, 1996). Keegan (2000) writes that the essential part of distance education is the separation of the instructor from the learner and flexibility in times of delivery. The instructor and learners are brought together through the use of technology and media to deliver the course content.

Although distance learning is now associated with Internet-based learning, there is a history of alternative ways of presenting information at a distance. According to Keegan (2000), teaching at a distance began about 180 years ago in the form of printed correspondence courses and has continued to evolve into other methods of delivery. The original correspondence studies were largely due to the development of postal communications and rail transport, the technologies associated with the Industrial Revolution (Hanson, Maushak, Schlosser, Anderson, Sorensen, & Simonson, 1996). During this same period, the University of Chicago created the largest correspondence program in the United States. The program was established to offer courses to learners who could not afford to participate at full-time learning institutions (Mclsaac & Gunawardena, 1996). Distance education used various forms of media in its development, including radio during World War I and television in the 1950s (Mclsaac & Gunawardena, 1996). Distance education was further developed with the establishment of the University of South Africa in 1962 and the founding of the British Open

University in 1969 (Mclsaac & Gunawardena, 1996). In the early 1990s, the development of the World Wide Web and the availability of personal computers in homes, schools, libraries, helped develop new Internet-based online learning options.

Hanson *et al.* (1996) believe that, as technology has evolved, so has the definition of distance education. Broadband technologies and advancements in computer simulations and tutorial programs have altered the traditional definition of distance education. According to Nasseh (1996), three factors important to the development of distance learning are: 1) the need to provide easy or quick access to new information to satisfy current concerns or to solve existing problems; 2) a lack of readily accessible learning environments or instructors available on a face-to-face basis; and 3) the reduction of training expenses (Barclay, 2001).

3.4.3 Advantages and disadvantages of distance learning

To understand distance education fully, it is important to compare the relative advantages and disadvantages, especially since Internet-based distance education is one of the primary forms of computer and Internet training advocated for the subject group to explore. According to Mayadas, Bourne and Moore (2002), a study done at the State University of New York revealed several advantages of distance education. Students reported studying more for online courses than for traditional courses, and they were satisfied with the timely, constructive feedback they received. Faculty reported that online teaching improves understanding of teaching with technology, and that online teaching seemed to improve face-to-face teaching. According to Hartman, Neuwirth, Kiesler, Cochran, Palmquist, and Zubrow (1995), there are often higher participation rates with online classes since students can be anonymous. Without the potential embarrassment from making a mistake in front of peers, quiet students are often more willing

to participate in an online class. There are several disadvantages to consider. These include such things as the complexity of learning the new technology, preference not to read text from a computer screen, and the lack of consistent interaction with an instructor (Sheridan, 2006).

3.4.4 Neuro linguistic programming

Neuro Linguistic Programming (NLP) is a communications and teaching methodology developed by linguistics professor John Grinder (1981) and mathematician Richard Bandler to study how top performing people in different fields obtain their best results. NLP has been used to train Olympic athletes, educators and others to improve their performances with techniques such as modeling, reframing and the specific use of vocabulary. Much of early NLP was based on the work of Virginia Satir, a family therapist; Fritz Perls, founder of Gestalt therapy; Gregory Bateson, anthropologist; Noam Chomsky, linguist; and Milton Erickson, hypnotist. It was Erickson's work that formed the foundation of NLP and the Bandler and Grinder book *Patterns of the hypnotic techniques of Milton H. Erickson* (1996) explains this connection. NLP is especially useful in teaching since it has the potential to put students into a more resourceful learning state.

The “neuro” in NLP refers to a person’s ability to take in and store information in the form of visual, auditory, kinesthetic, olfactory (smell), and gustatory (taste) information. The “linguistic” in NLP refers to how we code information, verbally and non-verbally, to give meaning to our experiences. Generally, we code information in pictures, images, sounds, words, feelings, tastes, and smells. The “Programming” in NLP refers to how we create and run programs or strategies that we use to accomplish our specific and desired outcomes (Bandler & Grinder, 1981).

As a related concept, Naidoo’s (2004) model describes the mechanism

(Bhaskar, 1978:192) driving neural processing in teaching and learning. The mechanism comprises both formal (or theoretical) and applied (or practical) aspects, which Franck (2002) represents as theoretical and empirical models respectively: “In Franck’s modeling process the formal aspect of the mechanism lies in the system of functions, the applied aspect takes the form of an empirical model” (Pratt, 2007:707). The left hand side of Naidoo’s (2004) diagram then comprises the system of functions, or “theoretical model”, while the middle and right hand side comprise the applied aspects of the mechanism, in effect, an “empirical model”. Naidoo’s model shows how the cognitive functions involved in teaching and learning are carried out in actual neural processing.

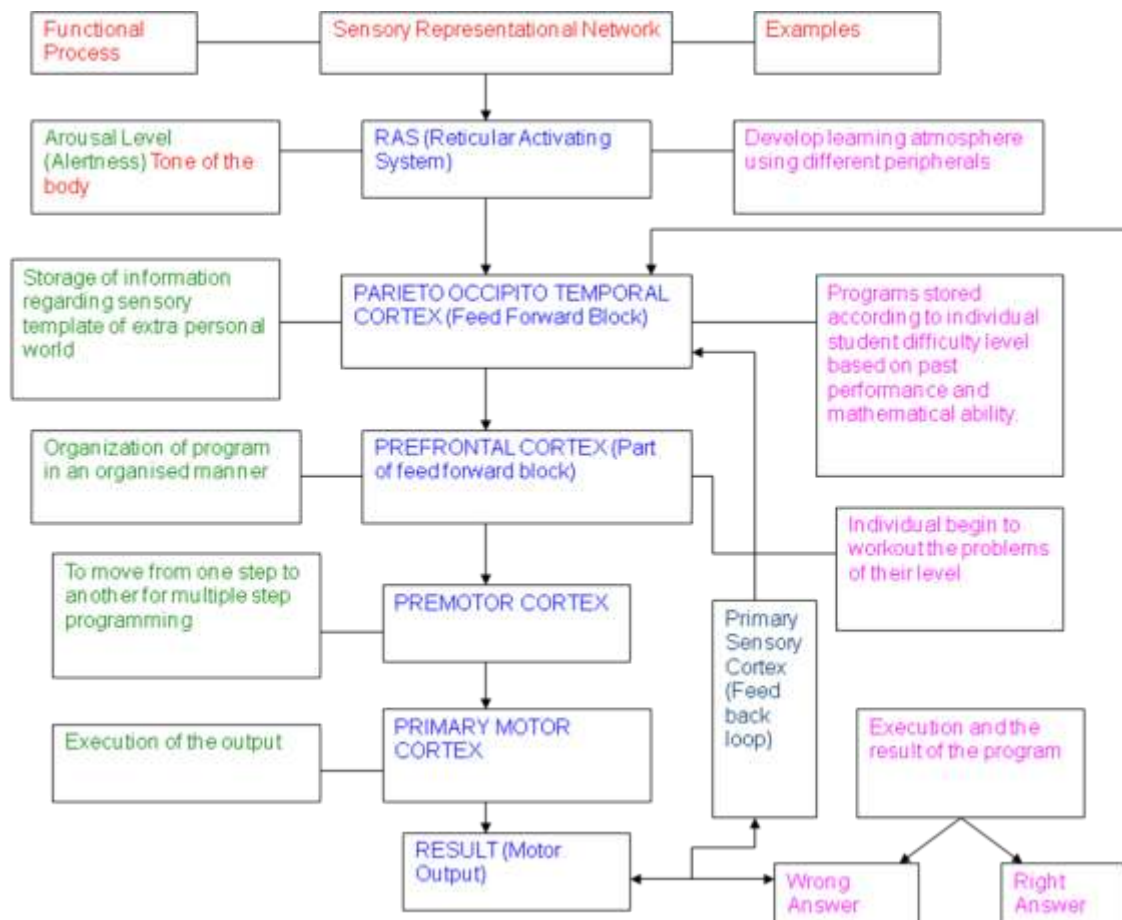


Figure 3.3: Neural teaching and learning model (in Naidoo, 2004)

Naidoo's (2004) model of neural teaching and learning illustrates how learners develop an understanding of concepts and learn to solve problems in various contexts. The model explains the neural processes involved in techniques such as modeling, reframing and re-modeling in order to grasp the reality of the situation and, in the process, be able to engage in effective problem solving. Neuro-Linguistic programming, as well as its depiction in Naidoo's model, was found to represent an important theoretical breakthrough in this study, as it explained much of the data on the responses of elderly users to the various kinds of mental processing both applied and reinforced by use of the Internet.

The concept of modeling is widely used in NLP and is supported in Bandura's (1977) social learning theory. He explores the idea of modeling of behaviours, attitudes, and emotional reactions of others. Bandura writes:

Learning would be exceedingly laborious, not to mention hazardous, if people had to rely solely on the effects of their own actions to inform them what to do. Most human behaviour is learned through modelling, by observing others one forms an idea of how new behaviours are performed, and on later occasions this coded information serves as a guide for action (1977:22).

NLP is also supported by the Dual Coding Theory developed by Paivio (1986) that gives equal significance to verbal and non-verbal processing. Paivio states:

Human cognition is unique in that it has become specialized for dealing simultaneously with language and with nonverbal objects and events. Moreover, the language system is peculiar in that it deals directly with linguistic input and output while at the same time serving a symbolic function with respect to nonverbal objects, events, and behaviors. Any representational theory must accommodate this dual functionality, (1986:53).

The author of this study has used NLP several times while teaching courses for the elderly subject group. He found that key concepts such as modeling, physiology and anchoring were especially useful for motivating students. For example, students were asked to be aware of their physiology while operating the computer, and to observe, or model, someone they considered to be an effective computer user. The author has determined, through teaching this subject group, that often tools such as NLP are useful to help these individuals understand their emotions and to provide them with specific tools for overcoming the frustration and overwhelming feelings of working with new technologies. The use of NLP in consumer product sales campaigns and its popularization by others does threaten its perceived value, but this author believes that there are many creative and practical uses for NLP in training this subject group population.

3.4.5 Concept mapping

Concept mapping is the use of a diagram or illustration to show the relationships between related ideas and concepts, with the concepts often connected with arrows, in a hierarchical structure. Concept maps are one of the tools used for encouraging subject group members to self-direct themselves through practice-based sites and other learning projects. White and Gunstone (1992) have identified several uses of concept maps. These include: to look at a limited aspect of a topic, to understand the reasons for the instruction, to make appropriate links between concepts, for a teacher to identify changes that students make in the relationships between concepts, and to promote more discussion among learners. A specific example of a concept map related to how the subject group can use this method to examine their learning approach is provided in Figure 4.8 below.

Concept maps encourage students to form their own connections between established ideas and encourage the formation of new links and

connections. Gaines and Shaw (1995) state that "Concept maps have been used in education, policy studies and the philosophy of science to provide a visual representation of knowledge structures and argument forms. They provide a complementary alternative to natural language as a means of communicating knowledge."

Zimmaro and Cawley (1998) state that concept maps are useful because they provide a way to observe and record the student's understanding of a particular topic. They also help the student to think about what knowledge and approach they need for this situation. Concept maps can also be helpful in problem solving, application, and integration of information, events, and processes. Concept mapping also helps the teacher with course development and to determine what is most important to include in the lectures.

Finally, according to Novak and Gowin (1996), there is research that knowledge stored in the brain is hierarchical, with various core building blocks. Since concept maps are constructed to reflect these hierarchical components of knowledge, they facilitate meaningful learning for the individuals who create and use concept maps. Concept maps have the potential to allow the subject group to systematically test out locally-available learning options (classroom-based, online, and others) and combine them with prompts (memory skills, aptitude testing, and others) to discover their own, most effective approach to learning Internet skills.

3.4.6 Memory theories and improvement techniques

Memory plays a vital role in the effective teaching of older adults, especially related to computers and the Internet. There are many diverse theories about memory that the author will attempt to summarize in this section.

According to Salthouse and Babcock (1991), primary memory, also known as short-term memory, refers to the ability to retain information over short intervals, based on memory span tests. Age-related differences in memory span tests can be statistically significant. Salthouse and Babcock (1991) tested a total of 460 adults between 18 and 87 years of age with the mean spans decreasing with age from 27% to 39% for the older participants, depending on the type of test administered.

According to Schultz and Salthouse (1999), successful performance in a memory task involves three stages: registration or encoding of information, retention or storage of information, and recall or retrieval of information. A substantial amount of research has been conducted to determine which of these parts are most affected by increased age. One problem with the studies has been the interdependence of the process. For example, items cannot be retrieved if they were never properly stored. Regardless, there are some steps that can be used by any age group to improve the memory process. In the encoding stage, for example, participants can find unique associations for target items. Mnemonics, according to Schultz and Salthouse (1999), usually involve procedures based on associations, rhyming, or various kinds of encoding procedures. If the goal is to remember names and faces, for one instance, a participant might be asked to try to associate something about the person they are trying to remember with someone whom they know well. In another example, someone could create a mnemonic by taking the word HOMES to help them remember the five U.S. Great Lakes (Huron, Ontario, Michigan, Erie, and Superior).

Craik and Lockhart (1972) emphasize four points in the development of their levels of processing framework. Firstly, memory is the result of a successive series of analyses, each at a deeper level than the previous one. How a word sounds, for example, would be shallow processing, while focusing on the meaning of a word would be more complex. Secondly, Craik and

Lockhart assumed that with the deeper the level of processing, the stronger the resulting memory. They believe that rehearsal can be relatively unimportant. A lot of rehearsal using a shallow level of processing will lead to worse memory than much less rehearsal using a deep level of processing.

Another common theory related to memory is the Interference Theory. According to Schultz and Salthouse's (1999) research, humans have a limited capacity for remembering. Since older adults have often remembered much more information during their lives, they are operating closer to their capacity limits, and therefore the processing of memory can be "interfered with". According to Baddeley (1992), working memory is the "mental workbench", the site of applied conscious mental effort. Information in working memory is translated into meaningful chunks. This is where work happens, problems get solved and other functions are performed.

The author found, while teaching a course for the elderly, that many of the participants could not remember many of the skills from one class to the next. Some basic memory improvement skills, such as mnemonics, have the potential to increase the learning capacity of the subject group. He experimented with the use of symbols and mnemonics as described throughout this thesis.

3.4.7 Fitness and exercise

Substantial research indicates that physical fitness increases oxygen flow to the brain and has the potential to increase attention span and improve the general health of the subject group population. In a recent six-year study, researchers found that adults who were most physically fit at the start of the study maintained their mental sharpness over time and did better in tests of their mental function conducted years later than did their less fit peers. Physical activity appears to be good for the brain as well as the body. Older

adults with higher levels of cardio-respiratory fitness experience a slower rate of cognitive decline over time, wrote author Dr. Deborah E. Barnes of the Veterans Administration Medical Centre in San Francisco, California (Huggins, 2003).

According to the U.S. Government's National Institute on Ageing (NIA), older, inactive adults lose ground in four areas that are important for staying healthy and independent: endurance, strength, balance, and flexibility. Fortunately, research suggests that they can maintain, or at least partly restore, these four areas through exercise or through everyday physical activities (walking briskly or gardening, for example) that accomplish some of the same goals as exercise. What may seem like very small changes resulting from exercise and physical activity can have a big impact (NIH website, 2006).

The author of this study found that mental reaction time and concentration was one of the factors that influenced the ability for the subject group to comprehend and apply the learning materials presented in his courses. According to Singer *et al.* (1994), the main cause for good reaction time is the increased speed and effectiveness of a movement in relation to a stimulus, along with an increased awareness of the surroundings and focus on a specific stimulus in the environment. There are many factors which can slow a person's reaction time, such as whether they are expecting the stimulus or not, their previous experience in the situation, and how quickly one stimulus follows another.

Arthur Shimamura, a psychologist at the University of California, Berkeley, tested 72 university lecturers which he divided into three age groups. He also used a less educated comparison group in the three age categories. His first test measured raw reaction time. Participants sat at a computer console and watched the screen for the appearance of a specific stimulus. A certain

key was pressed when a stimulus appeared on the screen. Professor Shimamura found that older people took longer to respond than younger people, irrespective of education. Shimamura's research findings show that as the brain matures, it has a slowed reaction time and is slightly less facile in learning and associating unrelated items. He also found that the mature brain performs as well as a younger one in tasks requiring planning, organization, and the manipulation of information. With advancing years, the brain redesigns itself to compensate for decreases in reaction time. Rapid retrieval of information becomes less important than the application of the information (Metcalf & Shimamura, 1996). In another study, researchers from the University of California at Irvine found that a healthy brain continues to grow new neurons indefinitely, which can actually slow the brain's ageing process and even reverse any existing damage. A healthy brain is a product of a balanced lifestyle that includes proper nutrition, stress management, and mental and physical exercise (Ratey, 2001).

According to Restak (1997), attention is the ability to sustain attention so that new information is properly encoded and available for later recall. With age, most people are more vulnerable to distractions in their concentration from both external and internal sources. They are typically more affected during times of high arousal, such as athletic competitions. This is often attributed to subtle impairments in the brain's frontal lobes, part of the working memory. With visuo-spatial skills, the ageing brain suffers some slight decline in depth perception, spatial localization, and the rapid identification of complex geometric shapes.

The author's experience in working with elderly computer users is that many of them would benefit from regular stretching and exercise. Some of the subject group members appeared to have a very limited range of motion and also had trouble with coordination and manual dexterity along with the ability to maintain their attention on the subject being taught and a slow reaction

time compared to their younger peers. The author has experimented with simple stretching exercises in the classroom, with most participants being enthusiastic. A five-minute stretch break was used to help the class members avoid common problems associated with prolonged computer use. While still sitting, students would stretch their arms and torso. Most students participated enthusiastically.

3.4.8 Metaphors and symbols

Metaphors are ideas or concepts that are already understood and, directly or indirectly, relate to the topic being taught. The effect of the metaphor is to transfer the understanding from the better-known “source” to the lesser-known “target”. According to Shulman (1987), research shows that an important characteristic of an effective teacher is the ability to take difficult concepts and transform them in ways that students can understand through the use of metaphors, analogies, and examples. An example of a metaphor in this context would be that the Internet is viewed as being similar to “an ocean of information”.

A symbol is a design, drawing or other emblem which represents a concept generally understood by people viewing it. Humans encounter symbols constantly in their daily lives. Examples include such things as a computer icon, a logo on the Internet, or a no smoking sign. Symbols supplement language and can often be helpful learning tools for students. Mnemonics are where certain letters are used to represent whole words or concepts. According to Yildiz (2002), symbols and mnemonics have the potential to communicate beyond language and can often also communicate across cultures. The author explored several of the different symbols and mnemonics to communicate with the subject group.

The meaning of signs or symbols is dependent on social, cultural, and historical contexts. We construct meaning based on the physical appearance of the sign; our previous personal and cultural experience; time or era we live in; and context or place in which it occurs. In order to communicate with each other and leave their stories for the new generation, humans have been using the power of images and symbols since the beginning of the human history (Yildiz, 2002).

The understanding and use of signs, symbols and metaphors was emphasized in this thesis as part of a general understanding of the design and educational process. The author finds that symbols have the potential to quickly communicate an idea or concept to this specific subject group population. Metaphors and symbols form a part of the study's general context but they are not directly examined.

Metaphors can also be part of a personal growth process among this elderly subject group. They have the potential to not only increase the learning speed but also to provide them with a language to explain their success and failures. According to Robinson and Smith (2009), metaphors typically describe a metamorphosis of selfhood; a reflection that is the change in identity. The episode is experienced retrospectively as integral in the developing identities of the participants and the experiences and effects on identity were frequently recounted later using metaphor.

3.4.9 Accessible technology

Accessible, or assistive technology, is defined by the U.S. Government's Assistive Technology Act of 1998 as any item, piece of equipment, or product system, whether acquired commercially or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities or learning difficulties. These devices provide many opportunities

for individuals who have significant disabilities, to actively participate in the daily experiences that a person without disabilities can enjoy (Levin and Scherfenberg, 1990). This ties in directly with the second research question in this thesis: What procedural and conceptual difficulties, if any, are experienced by the subject group?

Unfortunately there is some resistance to using these assistive devices. According to Lubinski and Higginbotham (1997), the elderly may perceive assistive devices as stigmatizing, too complex, too expensive, too troublesome, or inappropriate for their situation. The elderly may also be suspicious of the device malfunctioning or of the sales staff not delivering customer service. Despite these problems, there are current applications of assistive technology that are making computers easier to use for the subject group.

In spite of the existence of assistive technology, as mentioned above (see p. 64), Nielsen's (2005) study highlighted the fact that websites produced by young designers regularly do not accommodate the possibility that elderly users will be experiencing age-related problems such as deteriorating vision and diminished motor control. As the data will suggest, many members of this subject group do appear to be experiencing age-related physiological changes. Typically, these impairments include diminished vision, hearing, dexterity and flexibility. Some losses are accelerated by age-related degenerative diseases and ailments, including hypertension, osteoporosis, diabetes and macular degeneration. Disabling conditions, including arthritis and orthopedic impairments resulting from sports, and vehicle and occupational injuries experienced earlier in life, can become more pronounced as the body ages.

Some individuals may not realize they have a disability, or they may be unwilling to admit its existence. Others may hide or ignore the disability from

fear of discrimination or embarrassment. In other cases, because of the gradual onset of age-related impairments, the disability may have occurred so gradually that the person has adapted to it without realizing the effect on his or her everyday activities. From the author's two years of participant observation while teaching elderly computer and Internet users, he found that the typical problems experienced by the subject group include: hand-to-eye coordination (this might require adaptive mouse and keyboard), vision problems (which might require screen magnifiers and/or screen color changes), along with general alertness and reaction time (which might require use of games or stretching exercises).

Numerous strategies for the effective use of assistive technology are available to the average consumer and web designer, often as a result of the government legislation in this area. For example, Muller (2003) recommends that designers make accessibility part of their initial application design. He argues that it is easier to design accessible operation into an application than it is to add it later. Being aware of the site download time, avoiding dark colored text on a colored background and the continual testing of the site usability are some of the main recommendations that Muller offers as part of his book on understanding the government's accessibility requirements. As mentioned elsewhere in this thesis, a new SimpliclTy computer that helps people over the age of 60 who have never used PCs or the Internet to quickly learn them. The simplified desktop displays only six buttons that will direct users to basic tasks such as e-mail, chat, browse the web, store photos and write short documents. Each machine is pre-loaded with 17 video tutorials. If the elderly person has a problem, she or he can just go 'back to Square One' and start all over again. This is a made-to-order computer that takes two weeks from request to delivery.

3.4.10 Kaizen (continuous improvement)

Kaizen is a Japanese term meaning a gradual, orderly and continuous improvement. The application of kaizen has been associated with the economic recovery of Japan immediately after World War II. With kaizen, an involved leadership guides people to continuously improve their ability to meet expectations of high quality, low cost, and on-time delivery. Teams are out on the floor trying out new techniques until they find practical and effective ways to improve performance. According to Imai (1986), some of the basic ideas of kaizen as applied to the industrial model include:

1. Discard conventional fixed ideas.
2. Think of how to do it, not why it cannot be done.
3. Do not make excuses. Start by questioning current practices.
4. Do not seek perfection. Do it right away even if for only 50% of target.
5. Correct it right away, if you make a mistake.
6. Do not spend money for kaizen. Use your wisdom.
7. Wisdom is attained by facing hardship.
8. Ask "Why?" several times and seek root causes.
9. Seek the wisdom of ten people rather than the knowledge of one.

Kaizen is part of the Japanese innovation process. According to Higgins (1995), some of the other components include:

Tansakii — the company or organization begins searching for new ideas.

Inysei — the company or organization nurtures new ideas and allows them to incubate.

Hassoo — the company or organization makes an effort to generate innovative and breakthrough ideas.

Kaizen — the company or organization refines its ideas through continuous improvement.

Saitiyo — the company or organization recycles old technologies as part of the continuous effort of innovation.

Despite the fact that kaizen is traditionally an industrial model, it could be adapted and applied effectively in teaching Internet skills to the elderly subject group. By encouraging the subject group to continually try new techniques and methods, and be aware of the process of continually improving their skills, many of the conventional and alternative learning methods could be quickly tested and adapted to their individual needs. The author discussed the idea of kaizen with his students and encouraged them to be aware of how they could continue to improve their computer and Internet skills on a consistent basis.

3.4.11 Blended learning

The blended learning method combines 'live' instructor-led training with online education and thus combines the benefits of traditional classroom training with the advantages of an online course that can be accessed anytime. According to Bershin (2004), some of the advantages of blended learning are potential cost reduction, elimination of distance barriers, time flexibility, and the adaptation of learning materials to different learning styles. Oblinger and Maruyama (1996) indicate that a combination of traditional and online instruction is the most effective approach to many situations. Students enrolled in blended learning courses are more successful compared with face-to-face courses and online-only courses. According to their article, hybrid-teaching structures can address issues and accomplish instructional results that neither a traditional nor an online course could achieve alone and that there is no single, best method of education because students have different learning styles, needs, and preferences.

Despite the benefits of online learning, there is still some controversy. Young (2002) writes that online-only courses have received a high number of complaints from students. Even with all the modern educational technology available, human interaction is still preferred by many students. This supports the author's observations in his teaching experience. Without the hour of face-to-face meeting time, many of the students' questions could not have been answered effectively. The blended learning model gives instructors more flexibility with their classes. Previously, many U.S. universities focused on developing online courses that required no face-to-face meetings. Many of these efforts have failed, and colleges have reported high dropout rates in classes that are completely online (Tyler-Smith, 2006).

Blended courses also vary in how the classroom-to-online time is distributed. In a Hybrid Course Project Study, it was shown that instructors varied their reduction in class time from 25% to 50% and also showed more flexibility in scheduling their classes. For example, some replaced one class per week with online assignments. Others met with their students in class for several weeks and then suspended class meetings for several weeks as the students worked independently or in teams on online assignments. One blended learning instructor simply replaced the last 30 minutes of a weekly night course with online work to ensure that students were prepared to participate in the in-class discussions (Aycock, Garnham & Kaleta, 2006).

Brown (2005) found that some colleges in the United States have turned failing online courses into successful blended learning courses, after deciding that some activities are better done in person. An example would be the Centre for Distributed Learning at University of Central Florida where they recommend a '90-10 Rule'. The 90-10 Rule states that both 100% face-to-face courses and 100% Internet-based courses are inferior to blended learning or mixed courses. For some students (and subject areas), the most effective mix will be as high as 90% face-to-face learning and only

10% Internet-based learning. In other circumstances, the most effective mix will be as much as 90% Internet-based and only 10% face-to-face. Usually the optimum mix will be somewhere in the middle and in some cases exactly 50-50. This way, the face-to-face students benefit from the online technology, while the Internet-based students will benefit from instructor-led interaction.

The blended learning model is currently used by both educational and corporate audiences. IBM (corporation) combines several types of conventional and e-learning methodologies. They run several courses in which the participants start with an instructor-led online course, then move on to a self-study course that includes online simulations and discussion groups, followed later by a another classroom-based course and mentoring by a more experienced employee (IBM's approach to training, 2007).

The author taught a blended (or mixed mode) course at California State University at Chico for one semester. This was a social science course called *Introduction to the Information Highway*. The class met once a week and the students also used a web site to complete some of the required work. Although the cultural background of the students in this course appeared to be similar, there was a disagreement as to whether a traditional or entirely online course was preferred. With the blended format, the author was able to combine the best elements of both approaches together.

Those students who favored the entirely online course, appreciated the fact that they could speed up or slow down as needed, and could skip over material they already knew and focus on topics they most wanted or needed to learn. With an entirely online course, they would have had greater flexibility in the time that they spent on campus. Those students opposed to the entirely online course model, often feared a technological learning curve. Since the Internet was relatively new to some of them, they resisted the

personal responsibility of operating the course alone. With online training, students have little or no direct contact with the instructor or support personnel. This makes it more difficult for a student with questions or one who does not understand part of the training to seek and obtain help. In some cases, online students do not have the incentives and pressures of classroom-based students; they can become lazy and unfocused. Finally, students sometimes complain about on-screen readability (Sheridan, 2006).

A potential solution would be to spend more time understanding the theoretical model of blended learning. An awareness of the contextual, ideational, interactive, social and reflexive components of the course design could prove to be valuable. For example, the ideational relates to the source of knowledge to be constructed, along with the process whereby knowledge is first developed. This is one consideration for determining what materials will be provided, and how it is accomplished (Pratt 2006).

3.5 Strategies for motivating students

Since adult education is typically a voluntary activity, educators of adults often need to find ways to identify the motives and barriers students face. Interest in why adults participate in learning began with the publication of Houle's *The Inquiring Mind* (1961). Houle, founder of the first doctoral program in adult education in the country at the University of Chicago, interviewed 22 adult learners. He was able to identify three different orientations to learning: Goal Oriented, Activity Oriented, and Learning-Oriented. Within each category there are differences based on variables such as age, sex, level of education, and other related characteristics. These three categories provide a way to understand more about the details of those people who participate in formal learning activities. There is considerable overlap in all the categories described here, and it is probable that learners move through each category, depending upon their needs, their stage of

development, or the availability of learning resources. In addition, it is just as probable that many more categories will emerge as the learner becomes better understood.

a. Goal-Oriented — Houle identifies this learner as one who has some particular goal in mind as the motivation for participating in some learning activity or activities. Such a goal might be the desire to send pictures to friends through e-mail, researching investments, sports, or some other topic. Often the learner can justify or tie each learning endeavor to a distinct purpose they believe to be important.

b. Activity-Oriented — The activity-oriented learner is one who participates in education because of a love for social contact or participation in something new (Demers *et al.* 2009). They might be motivated by loneliness, boredom, thrill seeking, or some other reason.

c. Learning-Oriented — People in this category enjoy learning for its own sake, they typically read a lot, visit the library, the museum, the Internet, or other, similar resources, and they often seem to have an interest in a variety of subjects (Houle, 1961, cited from Self Directed Learning site, 2006).

Based on the author's experiences in teaching and interviewing, many subject group members are enthusiastic about learning Internet skills, but some of these individuals may expect their instructors to inspire, challenge, and stimulate them. In reality there is no one method for motivating students. According to Sass (1989), many factors seem to affect a student's motivation to do the necessary work and to develop interest in the subject being taught. These include such factors as the perception of its usefulness, the student's motivation to achieve, their self-confidence, patience and persistence, amongst others. Not all students are motivated by the same set of beliefs or rewards.

According to Leonard and Beauvais (1999), there are two categories of motivation, namely Intrinsic and Instrumental. The Intrinsic Process Motivation mainly applies to those individuals primarily motivated by activities which they consider fun. These individuals often pursue fun activities instead of those activities that are more relevant to goal attainment and personal development. Since they are somewhat indifferent to task and social feedback, such feedback will not serve to motivate continued performance on the part of the intrinsically motivated person. Instrumental Motivation, on the other hand, is where individuals believe that the behaviors they engage in will lead to certain outcomes such as higher salary or peer recognition. Another variation is the External Self Concept-based Motivation where learning is motivated by the role expectations of reference or peer groups. The individual behaves in ways which satisfy peer group members, first to gain acceptance and, after achieving that, to gain status. These two needs, for acceptance and status, are similar to McClelland's (1961) description for the needs for affiliation and power. Finally, according to Ingalls (1984), motivation also appears to be related to concept of self-directed learning, "When adults discover that they are capable of self-direction in learning, as they are in other activities in their lives, they often experience a remarkable increase of motivation to learn and a strong desire to continue the learning process."

Sass (1989) lists eight characteristics as major contributors to student motivation:

- Instructor's enthusiasm
- Relevance of the material
- Organization of the course
- Appropriate difficulty level of the material
- Active involvement of students

- Variety
- Rapport between teacher and students
- Use of appropriate, concrete, and understandable examples (University of California, USA, n.d.)

3.6 Additional methods for learning motivation and enhancement

Below are several of the recommended methods for learning motivation. They are all discussed in more detail elsewhere in this thesis. The author has tested most of these, either individually during the interviews or while teaching the “Computers and Internet Made Easy for Senior Citizens” class for two years at Butte College. These learning motivation methods can be tested and used individually by members of the subject group, and adapted to their individual needs or preferences. This section is designed to be expanded and updated as new methods are discovered, rather than as rigid criteria to be followed.

- Multiple intelligence: many educational researchers believe that there are several learning styles that are commonly used. These include such things as Linguistic Intelligence, Spatial Intelligence, Musical Intelligence, Bodily-kinesthetic Intelligence, Interpersonal Intelligence, Intrapersonal Intelligence, Logical-mathematical Intelligence and so on. Most members of the subject group have aptitudes in one or more of these categories. Ideally, the lessons should include all of these as part of an effective plan. As mentioned earlier (pp 33-37), Professor Howard Gardner, founder of the Theory of Multiple Intelligences, sees most typical classroom learning situations as 'single chance' models since they often only utilize one of these categories.

- Aptitude testing: aptitudes are special abilities for learning to do certain kinds of things easily and quickly. Some examples of aptitudes are finger dexterity, musical ability, color perception, spatial visualization, inductive reasoning and memory of numbers. These measured traits are highly stable over long periods of time, and can benefit the learning process by directing students towards those areas where they already have existing aptitudes (or compensate for undeveloped aptitudes). This section will review an established aptitude testing program.

- Priority method: the author's approach while teaching is to focus on the fundamental 'core' skills. These are the skills that the average person is going to need practically every time they use the software, such as saving a document, selecting text, changing the font size, and so on. Less important skills, such as using macros or tracking changes can be looked up later, rather than being memorized along with the more fundamental skills. This teaching method has been very effective in prompting students to learn the essentials quickly.

- Neuro Linguistic Programming (NLP): how to use language to consistently achieve your specific and desired outcomes. NLP is a methodology that can be applied to many situations, and its techniques have been used to train Olympic athletes, educators and business leaders to consistently model or duplicate their best performances. The author has used several NLP techniques in his classroom teaching, as mentioned in more detail later.

- Time management and goal setting: important skills for subject group members to consider developing. Many people spend their days in a frenzy of activity, but achieve very little because they are not managing their time effectively. Goal setting is a formal process of determining what is important in your life and deciding how you are going to reach those

goals. By setting goals on a routine basis you decide what you want to achieve, and then move step-by-step towards the achievement of these goals.

- Memory: several established memory techniques that have the potential to improve the subject group's ability to process and recall information will be reviewed in this thesis. The author acknowledges that some memory deterioration is based on disease or brain injury and cannot be influenced with these methods. The author posts information about increasing memory on his class website, and encourages students to study this material. This would represent an adjunct skill that has the potential to enhance any of the learning methods mentioned previously.
- Fitness: substantial research shows that physical fitness provides a direct benefit for learning. According to several established medical organizations, exercise has a positive influence on everything from increasing the attention span to energy level in the classroom. Researchers from the University of California at Irvine found that a healthy brain continues to grow new neurons indefinitely, which can actually slow the brain's ageing process and even reverse some existing damage. The author has used several simple stretching exercises in his "Computers and Internet Made Easy for Senior Citizens" classes. This appears to increase alertness and concentration levels of the subject group.
- Symbols: designs, drawings or other emblems which represents a concept generally understood by people viewing it. Symbols and mnemonics have the potential to communicate beyond language and are worth exploring in teaching this subject group. Words can usually only be understood within a specific language, but symbols and pictures can often communicate across cultures. The author explored several of the different

symbols and mnemonics that could be used to communicate with the subject group.

- Metaphors: when one concept or example is used to describe or understand something else. The metaphor is something familiar and directly relates to the topic being taught. A metaphor is a figure of speech in which a word or phrase denoting one kind of object or action is used in place of another to suggest a likeness or analogy between them. The effect of the metaphor is to transfer the understanding from the better-known “source” to the lesser-known “target”. The essence of metaphor is to understand and experience one kind of thing in terms of another. The author regularly uses metaphors in his classroom lectures to help the subject group to understand the material.
- Subject group members’ ability to manage their learning: perhaps one of the best motivational strategies for the subject group is for them to take more responsibility for their own learning. The eventual goal is for them to become more effective and self-reliant learners. Effective learners plan for learning, and they don't wait for learning opportunities to appear. They analyze carefully their needs for learning and aggressively seek out experiences that will meet those needs. The expanded section later in this thesis will review some ideas in this area.
- Additional categories: this model is designed to be a work-in-progress and the author will continue to seek and develop new methods for learning motivation and enhancement that could be tested with the subject group.

3.6 Conclusion

The learning theories and additional components reviewed in this chapter are helpful for putting the “hybrid approach” into perspective and applying it

to the practical task of teaching the subject group effectively, and to encourage them to take more responsibility for their own learning. We began by reviewing the common teaching methods, including classroom-based, distance learning options, learning through a book or DVD, individual tutoring and several others. Although the individual tutoring was the preferred method for a majority of interviewees, this approach is not always available and has potential problems regarding the qualifications of the instructor. This chapter has also covered several additional topics, including the background and evaluation of distance learning. This method has become increasingly popular in the United States, and can be very practical in areas where there is no classroom-based instruction available. Neuro-Linguistic Programming, a method of encouraging improved performance through the awareness of words and actions was summarized and put into perspective, and in fact represents an important theoretical breakthrough in this study, as it explains much of the data on the responses of elderly users to the various kinds of mental processing both applied and reinforced by use of the Internet. There was an additional section on the subject of memory and the potential for its improvement. Once again, this is a related topic that has the potential for increasing knowledge retention and general satisfaction with the learning process. Concept mapping, metaphors and symbols are a way for the subject group to begin accounting for the progress (or lack of) that they are making and making connections between the related concepts that they are absorbing. Fitness and exercise is another area which already shows great potential for increasing the ability of students to concentrate, increase their energy level, and stay on-task. A further section on assistive technology provides a basic overview of tools that individuals with impairments, such as decreased vision, can use to increase their ability to use the computer. And finally, a section on Kaizen applies a concept from the Japanese manufacturing sector to the improved teaching of elderly students. The author understands that the theories and approaches mentioned in this chapter vary in their complexity and academic rigor. However, they all

appear to have the potential of contributing to understanding the learning processes of the subject group.

CHAPTER 4: RESEARCH APPROACH AND METHODOLOGY

4.1 Introduction

This chapter addresses the research design, which was qualitative, and the research approach, which was ethnographic, with a tendency towards auto-ethnography as the research progressed. The issue of validity is dealt with as well as the specific research methods used. It will be shown that the author's primary teaching method served as research tool as well as well as being a product of the research. The chapter then goes on to discuss the interview data and how it was analyzed, and sums up the conduct of the study. Various coding systems used to both monitor and analyze data are explained.

4.2 Qualitative research design

This study lends itself to a qualitative approach, primarily with the use of detailed interviews, along with first-hand observations on the way the subject group approached Internet and computer training.

4.2.1 Characteristics of qualitative research

In a qualitative study, the researcher interacts with those being researched, which is especially true and necessary for this study. Patterns and theories are developed for understanding, and there is an attempt to make the study accurate and credible. The researcher in a typical qualitative study tries to minimize the distance between him/herself and those being researched, while maintaining an independent and non-biased perspective. The qualitative method allows the participants to express in their own words their

experiences with the Internet and technology in general, along with their personal learning process. Persistent observation is necessary to identify characteristics that are most relevant to the questions being studied.

4.2.2 Advantages of qualitative research

The author discovered the following advantages of qualitative research as related to this study population:

a. Capturing the individual's point of view - Even though both quantitative and qualitative researchers are concerned with the individual's point of view, qualitative researchers often get closer to the individual's perspective through detailed interviewing and observation. Quantitative researchers rely more on remote, inferential statistics and other methods,

b. Examining the constraints of everyday life - qualitative researchers use a more flexible approach that is able to adapt to the realities and constraints of everyday life. Quantitative researchers abstract from this world and seldom study it directly. They seek a set of probabilities derived from a study of large numbers of randomly selected cases.

c. Securing rich descriptions - quantitative researchers are deliberately not concerned with a rich and detailed description of their subject group population because such detail interrupts the process of developing generalizations. Qualitative researchers see the value of in-depth understanding of the individuals they are surveying (Huber, 1995).

4.2.3 Ensuring the credibility of qualitative research

Guba and Lincoln (1989) recommended the following techniques to increase the credibility of qualitative research:

1. Prolonged engagement at the study site in order to avoid any misinformation, and to establish a trusting relationship that encourages full disclosure along with the understanding by the interviewer of the context of the situation.
2. Persistent observation in order to identify and focus on the relevant characteristics of the situation being studied.
3. A continued refinement of study hypotheses or findings by examination of any cases that do not fit emerging findings or hypotheses. These recommendations were considered and applied by the author for this study.

Regardless of whether a qualitative or quantitative research method is used, researchers must take steps to ensure that the results are valid, reliable, and can be generalized to other settings. Validity also refers to the extent to which the research findings are consistent with reality (Duay, 2007).

To enhance the validity of this study, the author collected data through multiple methods, including interviews, participant observation, and document analysis and used each to confirm the emerging findings. Creswell (2003:224) offered some assumptions about the characteristics of qualitative research:

1. Qualitative research focuses on the process that is occurring as well as the product or outcome.
2. The data that emerges from qualitative study is descriptive.
3. The focus of qualitative research is on participant's experiences and the way they are perceived to make sense of their lives. Qualitative research often engages the participants as collaborative partners.
4. Qualitative research often occurs in natural settings where events related to human behavior happen.

5. The researcher is considered the primary instrument in data collection.
6. Qualitative research is a method of inquiry that leads to additional questions rather than definitive answers.

4.2.4 Elements of quantitative research used

While the research design was qualitative, elements of quantitative research were included. A primarily quantitative study would be an inquiry into a problem based on testing a theory composed of variables, measured with numbers, and analyzed with statistical procedures, in order to determine whether the predictive generalizations hold true. With the quantitative approach the researcher should remain independent and distant from the study, controlling any bias by selecting a systematic sample and remaining objective in assessing a situation. The researcher's values are kept out of the study in a quantitative effort (Creswell, 2003). While this thesis is primarily qualitative, the author examined several quantitative studies to get a perspective on this research methodology as cited in the literature review. The author also assessed the subject group interviews and presented some of the recommendations based on a simple quantitative format. However, while statistical elements were included to give a brief overview of general trends, the author chose not use a primarily quantitative approach for this study because statistics-based methodology alone is not able to provide enough detail related to the subtle nuances of teaching and observing this subject group while they learned to use the Internet.

4.3 The ethnographic approach used for the empirical work

An ethnographic research approach was used for the empirical work, because it involved study of a special population (i.e. the elderly), was based on immersion and participation, and attempted to arrive at an

overall understanding of the learning culture of that group; it also looked at how behaviors were related and interlinked.

Ethnography is a long term investigation of a group (often a culture) that is based on immersion and, optimally, participation in that group. Ethnography provides a detailed exploration of group activity and may include literature about and/or by the group. It is an approach which employs multiple methodologies to arrive at a theoretically comprehensive understanding of a group or culture. The issue for the observer is how the particulars in a given situation are interrelated. In other words, ethnography attempts to explain the Web of interdependence of group behaviors and interactions (Writing guides: conducting observational research, <http://writing.colostate.edu/guides/research/observe/>).

The empirical work involved participant observation of several naturally occurring cases of senior citizens (i.e. over age 65) using computers and the Internet in home or classroom situations. Participant observation included the author's participation as teacher or observer, along with five other teachers of the elderly who provided details of their experience on a questionnaire that is part of the appendix.

Empirical research is defined in this thesis as matching one or more of these categories:

1. It is based on or characterized by observation and experiment rather than theory, interview with other teachers, relevant statistics, and so on .
2. It is based on practical experience of real cases rather than on applied theory or scientific proof.
3. It is derived as knowledge from experience, particularly from sensory observation, rather than from the application of logic, (Hoepfl, 1997).

This type of research usually involves a range of methods, such as informal interviews, direct observation, participation in the activities of the group,

collective discussions, analyses of personal documents related to the group's activities, self-analysis, and life-histories. Participant observation is usually undertaken over an extended period of time, ranging from several months to many years. An extended research time period means that the researcher will be able to obtain more detailed and accurate information about the people he/she is studying.

Participant observation is an established research technique which allows the observer to gain a close familiarity with a given group of individuals (such as a religious, occupational, or demographic group) and their practices through an intensive involvement with people in their natural environment. According to Muller (1995), research on ageing and the aged in the U.S. is one area that has seen a gradual increase in the number of studies that have employed participant observation methods. The benefits, according to Muller, permit flexibility in research design by utilizing the perspective of the 'insider' (participant observer) as they watch others go about their everyday lives. By being with a group over time, the participant observer can capture the process of change as well as the changes themselves. Participant observation allows for research questions to be modified and refined as the problem is clarified. At the same time, its flexibility permits the collection of data that could not be anticipated beforehand. According to Kuper (1996), participant observation has its roots in anthropology, and as a methodology can be attributed to Frank Hamilton Cushing in his study of the Zuni Indians in the later part of the nineteenth century, followed by the studies of non-Western societies by people such as Bronislaw Malinowski, Edward Evans-Pritchard, and Margaret Mead in the early 20th century. It emerged as a main approach to ethnographic research by anthropologists and relied on the development of personal relationships with local informants as a way of learning about a culture, involving both observing and participating in the social life of a group. By living with the cultures they studied, these researchers were able to formulate first-hand accounts of their subjects' lives

and gain novel insights. Participant observation has since expanded to other fields.

The author of this study has designed part of his research on the model of participant observation. He immersed himself in teaching a course for the elderly for two years, (*Computers and Internet Made Easy for Seniors*), and also observed them in their homes and at a community learning centre. This method was very useful in getting a realistic appraisal of the individual subject group member's ability to use the Internet, research interests and general fears related to technology. Comparing individuals working within a group, and also at home working alone, the author was able to discover some valuable insights. Many of the approximately 200 students and other individuals observed were successful in their ability to master basic computer and Internet skills based on the checklist presented in this thesis.

A similar technique, also experimented with by the author, is known as direct observation. According to Salkind (2003), this occurs when the researcher is actually in or directly adjacent to the environment being studied but is not actually a participant in the group. The surroundings, as well as the interactions of people are viewed in order to confirm or dispute theories or as a way to gain an understanding of the study setting and to help form a hypothesis. Direct observation is unobtrusive and the researcher allows the normal activity of the group to proceed without interruption. Any questions are saved for a time when the normal flow of events has slowed down.

The core study finding, as mentioned elsewhere in this thesis, was that the seniors were varied in their approach to learning with some preferring a more traditional classroom style, while others preferred a self-directed approach that included the use of instructional manuals, DVD's, online instruction and/or individual tutoring. Another variable was the availability of training options in the various geographic areas. The outcomes that these

seniors were expecting from the training also varied greatly. As a result, the most effective teachers need to be willing to test-out a variety of approaches to learning that are covered in more detail in this thesis, in order to account for the variations in learner expectation and aptitude.

The ethnographic research approach was used to explore and explain the process of determining the learning approaches, challenges, expectations and outcomes from this subject group population. Historically, the ethnographic method evolved from cultural anthropology and often includes a description of a culture or a part of that culture. Eventually, these 'cultures' described by ethnography are broadened to include not only 'ethnic populations' but also societies, communities, organizations, spatial locations, and other groups (Atkinson & Hammersley, 1994).

Ethnography, like other forms of qualitative research, provides a “big-picture” perspective through its concern with context preservation rather than context control (Germain, 1993). As a result, the focus is on the study of naturally occurring rather than researcher-induced phenomena. The process of ethnography is generally characterized by intensive, ongoing, face-to-face involvement with participants of the “culture”. This ethnographic study required the author’s extended participation in the activities of seniors engaged in the process of learning and applying their basic Internet skills. My participation included systematically observing and recording conversations and behaviors, and asking questions of seniors related to computers and the Internet.

There were a number of reasons why ethnography was the method of choice for this study. First, as discussed elsewhere in the thesis, the literature demonstrates the significant limitations in the perspective of seniors related to their experiences with computers and the Internet. The ethnographic method is ideally suited to provide a background and perspective in which

humans interact in their social worlds. The requirement of the ethnographic method was for the researcher to spend an extended period of time in participant observation of the phenomenon that was relevant to this research objective. Additionally, the author wished to study the process of computer and Internet skill development as it was naturally occurring in community training facilities, not as it was artificially created for research purposes.

In recent years, ethnographic research has been acknowledged as an alternative research strategy for inquiring into education, social sciences and related subjects. According to Jaeger (1988), ethnography means a picture of the way of life of some identifiable group. Ethnography puts more emphasis on the adequacy of its explanation rather than in the power of its method. Its significance is determined socially, not statistically. The ethnographic researcher does not rely on a single observation, a single instrument, or a single approach. They are more likely to be concerned with the suitability of the technique in a particular setting than with the standardization of the technique across different populations or with finding manageable data.

Ethnographers attempt to capture and understand specific aspects of the group they are studying through prolonged contact and immersion in a setting of interest. According to Guba and Lincoln (1989), the data sample is reduced partly through consensus with the participants in the study as to what is important, along with the development of categories. From there, the information is fragmented into smaller pieces, deconstructed to be reconstructed later. According the authors, this process can make the data more manageable as well as more comprehensible. Ethnographic research can use most teaching and learning theories for the evolving of data. As the categories emerge and are refined, the researcher begins to consider how they relate to one another and what the theoretical implications are. Ethnographic Inquiry originated in the field of anthropology and has spread

to other disciplines. The strength of fieldwork often comes from its ability to obtain information in many ways rather than relying solely on one. The ethnographic research has the continual opportunity to learn which questions to ask.

Gradually a pattern often emerges that is sometimes called grounded theory. According to Glaser and Strauss (1967), grounded theory is an approach for looking systematically at qualitative data, such as transcripts of interviews or participant observations, with the idea of generating theory. This data is broken down into categories, codes and codings. This leads to a research practice where data sampling, data analysis and theory development are not seen as distinct but as different steps to be repeated until it is possible to describe and explain the phenomenon that is to be researched. A general conclusion is reached when new data does not change the emerging theory any more. The analysis of the data is consistent with the theories expounded In Chapter 3.

A purposive sampling technique (Guba & Lincoln, 1989) was used to guide the selection of the current approaches that seniors typically use to learn computers and the Internet. The purpose was to generate information in sufficient detail to be able to describe and explain the process of learning and its conditions and constraints. The use of multiple settings, events, and people were selected for data collection in order to maximize the potential to uncover the complexities of the learning process. The sampling principle used was a purposive one that was not based primarily on statistical numbers but rather on the richness of the data, that is, how accurately they portray the full context of the culture as well as answers to the research questions. Settings where data collection occurred included computer classrooms and individual homes of the elderly subject group members, along with community centers where related programs and event were held. The events sampled included typical classroom situations along with an

observation of individuals who were working on Internet research or similar endeavor on their home computers. A combination of face-to-face and telephone interviews were conducted to reinforce the data that was collected through participant observation.

Sampling adequacy was demonstrated at the point when no new information about the learning process was forthcoming from ongoing participant observation, a point referred to as saturation or informational redundancy by Lincoln and Guba (1985). The author anticipated that approximately twenty-four months of participant observation of the seniors using computers, combined with simultaneous interviews would be adequate for saturation.

Following the period of participant observation of the 200-plus subject group members, the author recognized gaps in data related to the research question about the conditions and constraints in the learning process. Additional interviews with subject group members along with other adults who were currently teaching the elderly helped to formulate the findings in this thesis. Additional details about the types of questions and the approach to interviewing are covered in the appendix.

Ethnography frequently embraces change over time and the analysis of archival data such as the interview transcripts and participant observation notes permits the researcher to determine the influence of past events on current behaviors (Germain, 1993). Data organization strategies consisted of entering the data into a computer software program for the analysis of any qualitative data patterns and the creation of a simple coding system to organize the data for interpretation. The coding system was used as an organizing device in this study and as a possible tool for future researchers. The data was assessed for the applicability of identifiable themes in certain contexts and at certain time periods. There was a constant search for

uniqueness in the data that made possible the identification and examination of any characteristics that appeared to be exceptions to the rule.

Further relevance of ethnographic research is associated with its transferability or generalizability. Traditionally, generalization has not been a central concern of qualitative research. Schofield (1993:221) conceptualized generalizability as "a matter of the 'fit' between the situation studied and others to which one might be interested in applying the concepts and conclusions of that study" .

The following techniques were used to ensure the validity of the findings of this study:

1. A variety of interview locations and times were sampled to ensure representativity of the data when drawing study conclusions.
2. Any potential biases from the effects of the researcher or the research process on the behavior of participants was avoided by
 - (a) maintaining prolonged and continuous engagement with the subject group to gain the familiarity with their learning process and difficulties.
 - (b) checking my findings with five other teachers of adults to ensure that my conclusions were relevant and accurate.

4.3.1 Auto-ethnography

There were also elements of auto-ethnography in this study. According to Wall (2006), auto-ethnography is an emerging qualitative research method that allows the author to write in a highly personalized style, drawing on his or her experience, as kind of an autobiographical personal narrative. Auto-ethnography focuses on the writer's subjective experience rather than the beliefs and practices of others. The intent of auto-ethnography is to acknowledge the link between the personal and the cultural and to make room for nontraditional forms of inquiry and expression. Auto-ethnography is

now becoming more widely used (though controversial) in journalism, communication, and applied fields such as management studies. In auto-ethnography the researcher becomes the primary participant/subject of the research in the process of writing personal stories and narratives. In producing an autoethnographic work, most researchers attempt to be reflexive and acknowledge their role as a researcher. In embracing personal thoughts, feelings, stories, and observations as a way of understanding the social context they are studying, these researchers are also shedding light on their total interaction with that setting by making their every emotion and thought visible to the reader. This is much the opposite of hypothesis-driven, or positivist research. It differs from traditional ethnography as practiced by anthropologists and sociologists in that it embraces and foregrounds the researcher's subjectivity rather than backgrounding it (Mitchell, Moletsane, Chisholm, 2008).

Autoethnographic methods include journaling, looking at archival records, interviewing one's own self, and using writing to generate a self-cultural understanding. Auto-ethnography also gives students an opportunity to do primary research. Rather than starting a critical question and going to the library for examples and answers from authorities, students can use their personal experiences as data from which to draw interpretations.

Chang (2008) argues that auto-ethnography offers a research method friendly to researchers and readers because autoethnographic texts are engaging and enabling researchers to gain a cultural understanding of self in relation to others, on which cross-cultural coalition can be built between self and others. Chang (2008:54) also warns autoethnographers of pitfalls that they should avoid in doing auto-ethnography:

1. excessive focus on self in isolation from others;

2. overemphasis on narration rather than analysis and cultural interpretation;
3. exclusive reliance on personal memory and recalling as a data source;
4. negligence of ethical standards regarding others in self-narratives; and
5. inappropriate application of the label auto-ethnography.

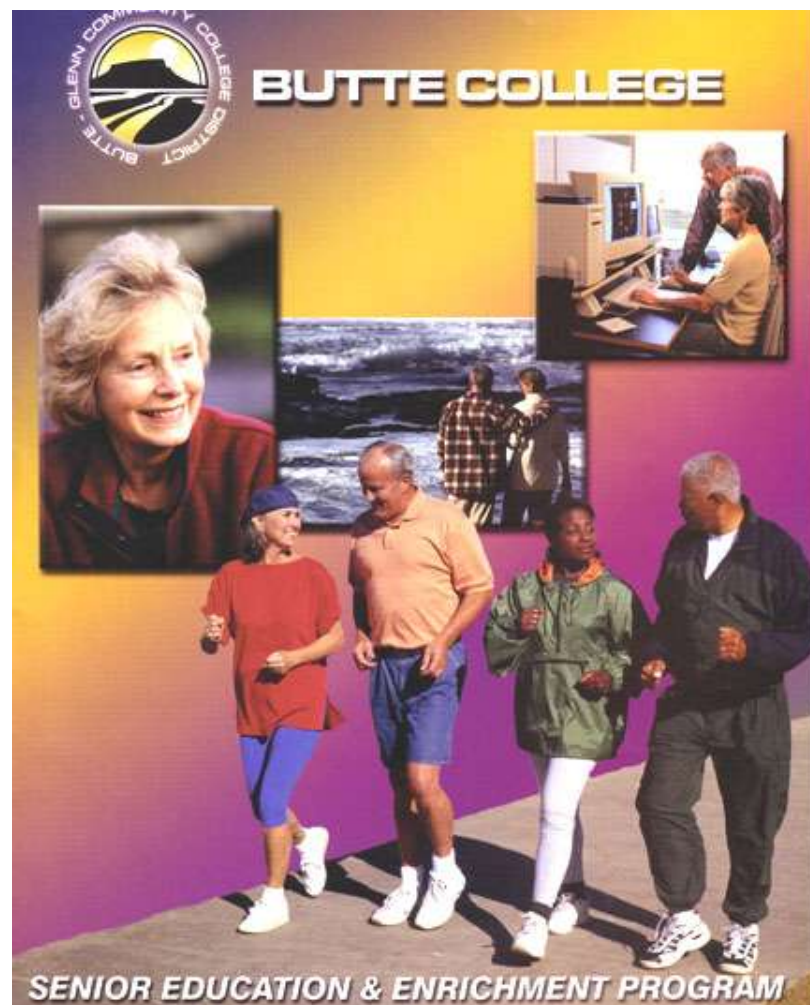


Figure 4.1: Brochure from the author's Internet classes for the elderly

Two examples are given below of the author's use of auto-ethnography in a first-person account of his experiences teaching and interviewing the elderly subject group:

Sample1: I was continually filled with emotional conflict during the two years that I taught an *Internet and Computers Made Easy for Seniors* class through a small college (Butte College, see Figure 4.1) in California, USA. Throughout the class sessions, I had to continually remind myself that these seniors were important members of society and worthy of respect. The reason for this feeling was that most of them had a slow reaction time due to cognitive decline and/or illness, and were not able to learn new material very easily. I had to continually avoid the temptation to shout at them to pay more attention. In fact, several of the other teachers of this same class at Butte College had begun to treat their class members as small children who needed constant supervision and discipline. I did ask them to take notes and pay close attention to certain learning suggestions, but I tried to motivate them with positive statements such as, "you will love what you can do with this new skill."

Sample 2: During the entire two years that I taught the *Internet and Computers Made Easy for Seniors* class, I was fascinated with the process that this elderly group (seniors) used to learn along with their motivation to make the efforts to learn this subject. As far as the learning process, most of these seniors had previously purchased books about how to use the Internet (on their own), and had asked friends to tutor them on an informal basis. What seemed to help many of them to learn was the use of a combination of approaches, for example, combining metaphors with practical instruction. Almost all of them had used an electric

typewriter earlier in their life. The metaphorical link between the typewriter and computer was obvious. As the teacher, I was able to compare the two and point out the similarities and differences. Many of the seniors adapted to the classroom teaching situation with success. Some, however, struggled with this format. For the seniors who were not able to keep up, I suggested that they experiment with instructional video (now DVD) programs. These videos were readily available at the local library at no cost. The advantage of the video programs was that they could be repeated as many times as necessary, unlike this instructor whose hot temper threatened to emerge after the third or fourth repetition request. The motivation to learn was the driving force that got most of these seniors to class every time and moved them through the frustration and stress of learning a new skill. The primary motivation, as far as I could see, was a desire to communicate with friends and family by e-mail, along with a curiosity about all of the interesting sites which they had heard friends talking about. These findings discovered through the autoethnographic approach are not much different that what I found through the more conventional research methods. The main difference, perhaps, would be the enhanced ability to understand these findings myself, and also to communicate them to future researchers in this field.

4.4 Teaching as research method

The “priority teaching system” developed in the course of this study was also in a sense a research method as well as a product of the research. This is because the exploratory style used enabled both the author and students to arrive at optimum ways of approaching computer and Internet learning. As a result of the research on this Ph.D. along with practical teaching

experiences, the author has developed a teaching style where he focuses the student's attention toward the most fundamental or important components of the computer or Internet program they are attempting to learn.

One challenge for anyone teaching this subject group is to teach the students enough to make them competent without overwhelming them with too much detail. Each additional piece of information is a potential distraction from the initial task. It is vital not to expose the whole complexity of the computer or the web to the learner, and not to present them with more challenge than is necessary. The tremendous difficulty of learning entirely new and complex context is difficult to overstate. The strategy of protecting learners from the excessive complexity of standard software applications by simplifying the instructions and interface is a large part of the author's priority method. This priority teaching method has been well-received by students, based on evaluation forms that the author was allowed to review but not keep in his possession. Specifically, there were questions on the evaluation form about "Teachers ability to communicate complex subject material": "Was the lecture format understandable as presented by the teacher?" and other questions where the results were positive.

The author's approach is different from that of many computer teachers who often overload students with material of both primary and secondary importance. Unfortunately, with this approach, much of the high-priority tasks are forgotten since they are grouped in with the low-priority tasks, resulting in memory overload.

For the past eight years this author has collected information about innovative teaching methods, especially in relation to teaching computer teaching skills. An example of one technique that the author found helpful was to focus student's attention on the toolbar icons rather than on the drop-

down menus. Computer icons are useful because they support recognition rather than forcing the user to memorize commands. Another way in which complexity is unintentionally introduced in the learning process by teachers is by showing people more than one way to do one thing (such as doing a task by alternating the use of the keyboard shortcut, right-clicking, drop-down menu, and so on). In general it is preferable to stay with one method for doing a task until it is learnt by the subject group. Teachers should identify the 'best' way to do something in terms of ease of use and ease of learning and introduce this technique to their learners. Every additional feature or item of information on a screen is one more thing to learn, one more thing to possibly misunderstand, and one more thing to search through when looking for the thing you want (Nielsen, 2005).

Below are several additional components that the author developed and used while teaching the *Computers and Internet for Seniors* class:

Similarities: during class the teacher tries to point the similarities between the features of several different software programs (e.g. Internet browser, Microsoft Word, Outlook Express). This would include such things as the menu items, buttons and the keyboard shortcuts that look and act the same in each program. This method helps students to quickly master new software programs based on their previous experience with similar or identical features of the programs they already know, and allows them to carry new skills over to the next computer-related task that has a similar approach (see behaviorism, stimuli/response theory in Chapter 3). While pointing out these similarities, the author also helps the students to prioritize the ones that will be most valuable to them. Based on student evaluations completed at the end of class, this method received several compliments (and no complaints), indicating its potential effectiveness for others in this field.

Partners: the teacher tries to match up beginners with more experienced computer learners for some of the in-class projects (this is consistent with Vygotsky's theory, see Chapter 3). This appears to benefit both the beginner and the advanced student and allows the author to focus his time on directing the class as a whole rather than jumping around to help individuals who are not able to keep up with the flow. The partners discuss the learning priorities and go over the strategies with the instructor.

In their own words: the teacher should ask the students consistently to remind themselves what they have learned at the end of the day, or class period, and what was the most important. By describing what they have learned to themselves (or another person), it is often possible to master the materials more rapidly. For example, some recommended questions include: "what specific new skills did I learn today?"; "how do I relate this new skill to my everyday life or job?"; "how is this similar to another one that I already know how to use?" (Sheridan, 2001).

Segments: notice that the day (or classroom period) goes in segments. The day is a chain of events rather than one long stream. Students are encouraged to pause and relax for a few seconds during one of these in-between periods. A similar approach would be to mentally divide the day (or class period) into two segments. End the old segment and then start the new segment as a fresh beginning with new goals and priorities. Students should remember their purpose for the day (or class period) and plan it again. Ideally, students should try for a succession of successful single segments rather than one grand achievement. This segmenting and organization of experience is congruent with criterion referenced theory (see Chapter 3). All of these teaching techniques were corroborated by my observation and practical experience.

This priority teaching system is thought to be the main reason why the author received high evaluations from the students in all of the *Internet for Seniors* classes he taught. This contrasted with other teachers using the conventional approach where they tried to include as many components in their classes as possible. These teachers often received much lower student evaluations.

The questions asked on the survey presented to the elderly students at the end of the term included:

- The instructor clearly explained the course objectives.
- The instructor helped me understand the importance of the subject matter.
- The instructor was able to break down the components into understandable segments.
- The instructor was available and helpful during class activities.
- The instructor had a considerate attitude toward students.
- Overall, the instructor was an effective teacher.

The author was rated highly by elderly students in all of the responses.

4.5 Interview data

The interview questions were developed in close deliberation with several elderly students in the author's class to obtain their feedback on relevant questions. The questions were designed to explore the subject group's level of comfort with technology, their reasons for wanting to use the Internet, and other related topics. The author initially presented a questionnaire to the interviewees. The author used the completed questionnaire (see the Appendix) as a guide in generating the open-ended questions throughout the entire interview process. He discovered that the first respondents were

not elaborating on many details, and were hardly even filling in the questionnaire completely. He therefore began to prompt them with additional questions related to answers given to the questionnaire. This spontaneous interview format proved to be effective in gathering data and focusing the interviews towards topics that the individuals were interested in, and which they planned to spend time exploring as part of their use of computers and the Internet.



Figure 4.2: Photographs of several of the elderly who were interviewed for this study

The author spent over 100 hours performing detailed interviews with 14 elderly computer users, some of whom are shown in Figure 4.2. The interview process focused on the interviewees' learning strategies, their interest in the various online research topics, their technology-related issues, and other topics. In most cases, the author mailed the questionnaire and followed up with an in-person or telephone interview. The author has worked for several years as a journalist in the U.S., and this approach was consistent with his professional background. He also reviewed the literature

on telephone survey methods. He asked each participant one-to-two weeks in advance if they would be willing to participate in the interviews. In several cases, the interviewees had discovered the author's website and contacted him by e-mail, offering themselves as potential interview candidates. About one half the interviews were conducted by phone and the other half in person.

The question results did not change dramatically from those individuals interviewed in-person by the author versus those interviewed by telephone. Most of the in-person interviews were conducted at the homes of the interviewees, giving the author additional opportunity to observe them operating their computer.

At the outset of this study, the author developed a questionnaire (i.e. the one mentioned above) which encouraged the subject group members to describe their technological experiences, expectations and frustrations, and their practical applications of this technology. This allowed him the flexibility to explore areas of interest and avoid topics in which the interviewee had no interest. After the first 12 of the 14 interviews, the author established the fact that he was not obtaining any significant new information, and began to focus more on the participant observation of the 200-plus students in his classes.

A second set of interviews, designed to confirm the findings that were emerging, was sent to five individuals who teach computer and Internet skills to the elderly. The author decided to send this questionnaire to obtain their opinions and other pertinent feedback, and to establish whether his findings showed resonances with those of other computer and Internet instructors with similar populations. This information generally supported the author's findings from an outside independent perspective. These interview transcripts are presented in their entirety in the appendix, chronologically,

from the oldest to the most recent, over a two-year period. The author has tried to provide a verbatim account of the interview and has used first-person language throughout. First names only are used to protect the privacy of the interviewees.

4.6 Conduct of the Study

As an interviewer, the author initially gave 20 elderly Internet users a questionnaire for data collection. Of those 20, 14 were selected for additional interviews. Those 14, who completed both questionnaire and interview, were selected to be used in the data analysis of this study. The sample was reduced from 20 to 14 once the rigid questionnaire had been modified to include open-ended questions; those 14 respondents then supplied in-depth answers which could be more specifically applied for the purposes of this study. Of the 14, eight were females and six were males. They ranged in age from 65 to 81. The author included diverse members of the subject group in the sample, which differed in race, sex, income level and technological experience. These variables are not part of this study, but it was considered important to include a diverse demographic, not only for the purpose of gathering rich data, but also because it might point to the direction to take in future studies.

Part of the instrumentation for the study includes transcripts and notes of interviews from the author's tape recorder, along with a photograph taken of the individual being interviewed when possible. These photographs allowed the author to remember that individual, and added a human element to the practice-based project website. Though this study was launched from a questionnaire, the questionnaire was a secondary instrumentation and employed as an initial foundation from which the interviews could be designed. These interviews were intended to fill the gaps in information still

existing after the author's participant observation and other background research (i.e. primarily ethnographic).

Locations of this study consisted of classrooms in the United States, along with direct observation of the interviewees while they were working at home on their computer. All the interviews were conducted individually with the participants at the location of their choice (typically at their home, a local café, or by telephone). Half (seven) were interviewed in-person, and the other half primarily by telephone. The primary method of observation was for the author of this study to systematically set aside time while the class members worked on computer projects and watch them. He observed for such things as general comfort with the mouse, keyboard and other technology, enthusiasm for the project, and the ability to complete parts or all of the assignment in a timely manner. For the observation of the interviewees, the author used a more flexible approach where he would ask them to sit at their computer after the interview and see if they were able to navigate around the Internet.

All interviews, except the first three pilot studies, were audio taped and transcribed. The transcribing and proofing process allowed the author to obtain a sense of the interview as a whole. He wrote down additional ideas and impressions related to the content and used these ideas to structure future interviews. During the interviews, specific questions were asked of the subjects concerning their general experiences with technology, goals for their training, and related factors. The author began with broad questions and refined them during the course of the interviews as various themes and issues began to emerge. Eventually, he began to notice a pattern where the elderly seemed often to express the same general interests in the Internet, along with their preferences for learning.

The interviews were conducted both during and after the period when the author did his participant observation of the class of elderly computer users. The purpose of the interviews was to complete the formation of the emerging study findings. According to Denzin and Lincoln (2008), qualitative researchers typically employ several methods for collecting empirical materials, which include interviewing, direct observation, the analysis of artifacts, and the use of personal experience. Qualitative research is a field of inquiry in its own right, which crosses disciplines, fields, and subject matters, using a complex interconnected set of terms, concepts and assumptions.

4.6.1 Use of participant observation

Specifically, the author practiced participation observation both during his “Internet for Seniors” class, and also on nine different occasions when he went to the college’s computer lab, which was being used mainly by elderly subject group members on a casual basis. Additionally the author observed several of the interviewees at their homes while conducting the interview. The author had previously read about ethnographic and participant observer methods while taking an anthropology class, and he was able to record his observations while watching the elderly computer users. Participant observation also allowed flexibility in the research design by utilizing the perspective of the subject group member and allowed for the research questions to be modified based on the subject group member’s interests, aptitudes and their access to technology. At the same time, its flexibility permits the collection of data which could not be anticipated beforehand, especially during the interviews. Research on ageing and the aged in the U.S. is one area that has seen a gradual increase in the number of studies that have employed participant observation methods (Cooper, 2004).

4.6.2 Interpretation and analysis of the data

The author collected data primarily through participant observation and interviewing. For the interviewing component, he organized it into several stages:

1. Two months of collaboration with elderly computer users (subject group) as to the content of the questionnaire. This included the formulation of questions along with an analysis of their relevance and effectiveness.
2. During the second phase in 2000-2001, the author distributed the questionnaires to members of the subject group who were either in his course or who had discovered the author's web site and asked to be interviewed.



Figure 4.3: Online practice-based project site

4.7 Additional Components of this Study

Figure 4.3 (above) is a screen shot from the online practice-based project site. This entire course is available for viewing as a CD-ROM that is attached to the thesis.

The Combination Interface (Figure 4.4) was one of the many experimental projects as a way to explore the options for providing the elderly with an effective all-purpose site interface that would accompany many of their needs.



Figure 4.4: The Combination Interface

The Archive of Projects (Figure 4.5) is an archive the author compiled from 2000-2002 that contained direct links to several of the projects that were assigned to him.



Figure 4.5: The Archive of projects

The Java Script figure (Figure 4.6) is another assigned project where the author was instructed to make the website interface more easily adjusted by subject group members who might want to change the color contrast for better viewing. The author learned basic Java as a result of this project.

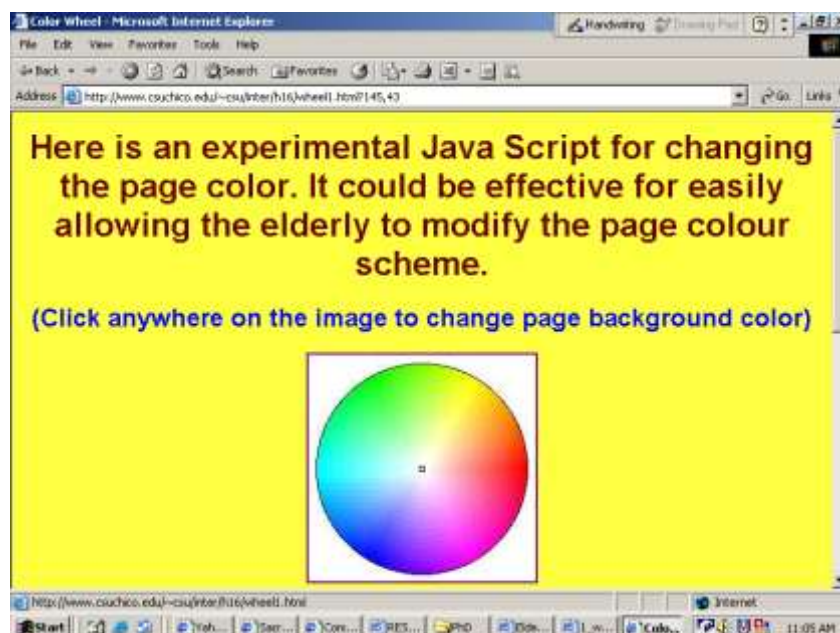


Figure 4.6: The Java Script figure

The Quote Idea (Figure 4.7) was an experimental way of visually communicating some of the main ideas from the interviews. The photo of the interviewee was transposed into a cartoon figure with a quote added.

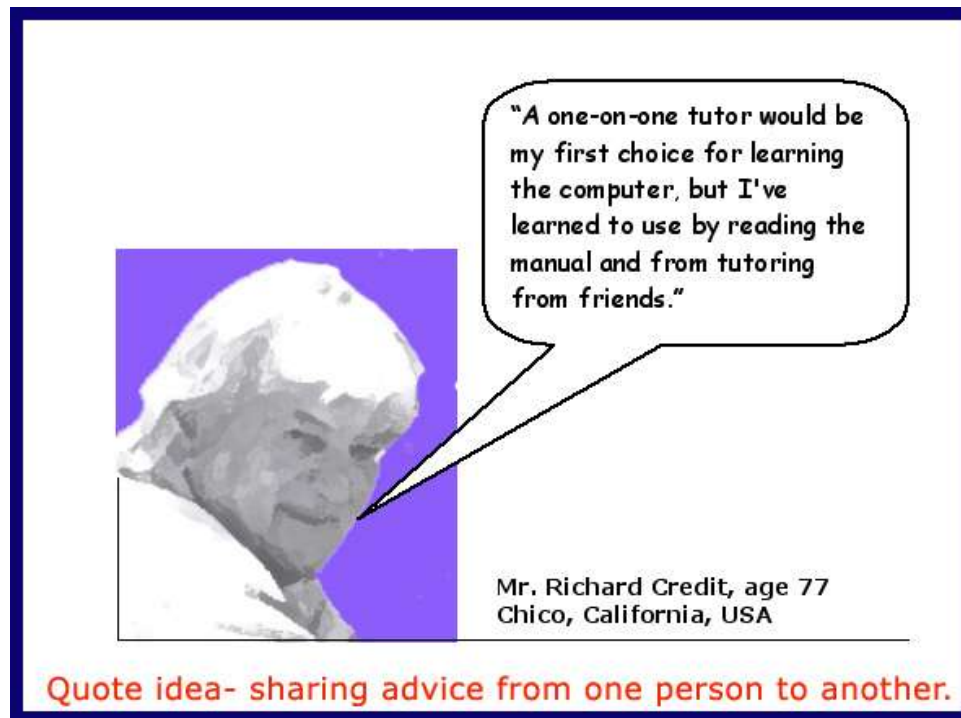


Figure 4.7: The Quote Idea

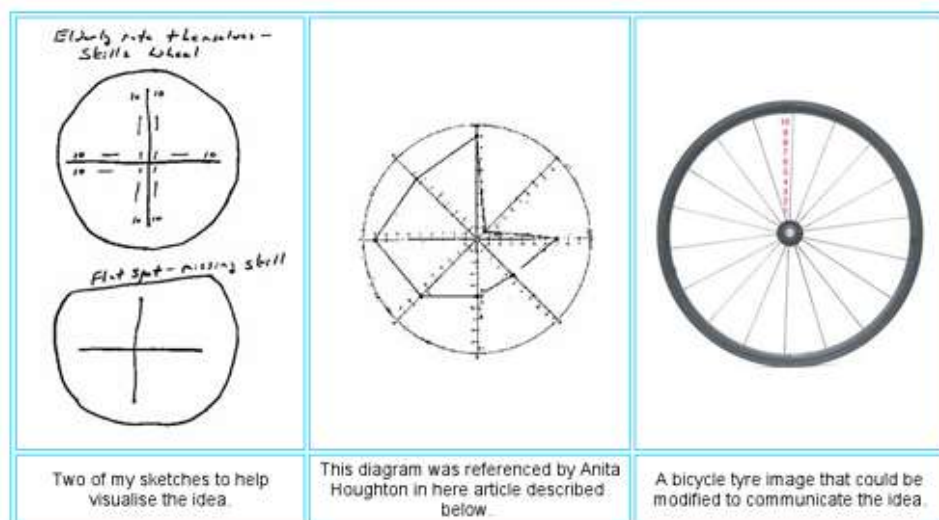


Figure 4.8: The Spoke Diagram

The Spoke Diagram (Figure 4.8) is another experimental method for testing-out several of the recommended ways of comparing the learning options and for subject group members to be able to assess their own progress in learning to use the Internet.

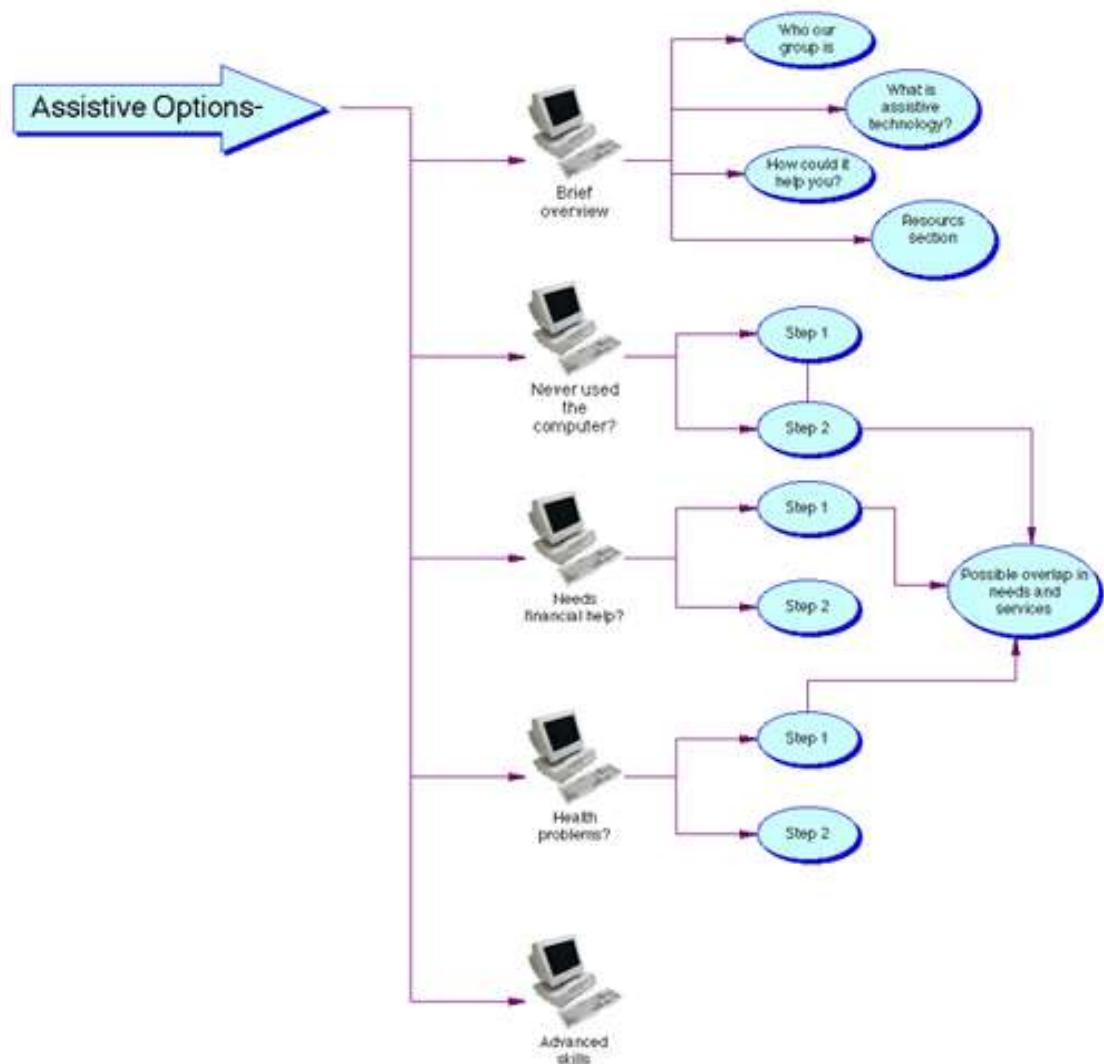


Figure 4.9: Diagram to help direct the clients

Finally, the Diagram to help direct the clients (Figure 4.9) was one of many mind maps and diagrams that the author experimented with to help clarify ideas and communicate more effectively.

4.8 Data Analysis Evaluation

This section will detail the method the author used to evaluate his primary research data, including data from the questionnaires, interviews and interview transcripts, participant observations and field notes. The first component was the questionnaire which was developed between 2000 and 2001, and which attempted to include all necessary components to prompt the elderly interviewee to disclose as many aspects of their relationship with computers, the Internet and technology as possible. The author chose to include many specific questions that encouraged the subject group members to describe their technological experiences, expectations, frustrations and their practical applications of this technology. The questionnaire was designed around several of the research questions for this study, and attempted to discover how this subject group is currently learning to use the Internet, what are the typical barriers, how can these barriers be overcome, and the learning preferences of this group. The questionnaire development process was valuable in motivating the author to consider the range of questions that would obtain useful data.

The interviews were the next stage. The author initially gave the questionnaire to six elderly individuals, four of whom were enrolled in his class. The questionnaire by itself often provided only one-word answers and the author began to follow up with an in-person or telephone interview to clarify and expand the responses. In every interview there were topics of interest that the interviewee expanded on, while other topics were skipped

over by the interviewee because of lack of interest. This flexible interviewing style appeared to bring out the most relevant topics and minimize the time wasted on topics that did not apply (such as the general lack of interest in changing screen or font colors). Over a two year period, 14 subject group members completed both the questionnaire and the interview, and were selected to be used in the data analysis of this study. The sample was reduced from 20 to 14, once the rigid questionnaire was modified to include open-ended questions; those 14 respondents supplied more in-depth answers that were more practically applicable to the purposes of this study. As mentioned previously, of the 14 interviewed, eight were females and six were males. They ranged in age from 65 to 81. The author has attempted to include diverse members of the subject group in the samples, and they differ in race, sex, income level and technological experience. The interviews were transcribed into a word processor by the author, often with the assistance of a tape recorder. He printed the transcripts for his own evaluation and forwarded them to his peers for additional comments. This feedback process helped continually improve the interview process.

Participant observation provided an extended opportunity to observe beginning and experienced subject group members using the Internet in both the classroom and in their home environment. The author recorded field notes from the observations and compared them with the interview transcripts. An identifiable pattern that is reviewed in more detail in the Results section emerged from these different findings. During several of the interviews, the author was invited into the home of the interviewee and was also able to observe them in their preferred environment. The author recorded informal notes on the subject group member's learning approach, activities of interest, reasons for using the Internet, motivation, real and perceived barriers, along with the potential innovations in this area, such as the use of assistive technology or memory improvement practices.

4.8.1 Communication symbols and mnemonics for possible coding

A symbol is a design, drawing or other emblem that represents a concept generally understood by people viewing it. Humans encounter symbols constantly in their daily lives. Examples include such things as road signs, no smoking signs and so on. Symbols supplement language and can often be helpful learning tools for students. Mnemonics are where certain letters are used to represent whole words or concepts. The author explored several of the different symbols and mnemonics that could be used to communicate with the subject group. One area was Internet lingo, which is widely used to communicate on chat and e-mail. These symbols and abbreviations are relatively easy to figure out, and are often used together to create some form of picture symbol like :o) that is a smiling face, (turn your head to the left and take a look at it, if necessary). Although these lingos are simplistic and anecdotal, they could possibly be combined with other triggering devices to help the elderly learn computer and Internet skills more easily. Symbols and mnemonics have the potential to communicate beyond language and are worth exploring in teaching this subject group. Words can usually only be understood within a specific language, but symbols and pictures can often communicate across cultures (Yildiz, 2005).

4.8.2 The coding system developed in this study

The author developed his own set of coding to begin to classify and identify the elderly subject group that he was working with. Many of these symbols were discussed during the Computers and Internet Made Easy classes to assist the elderly students motivate themselves in the learning process. Below are several examples:

HFT = high frustration tolerance (Develop a high frustration tolerance attitude).

<Comfort zone = expand your comfort zone.

CANI = constant and never ending improvement (Japanese term= 'kaizen').

80/20 = spend 80% of your time focusing on the most essential activities.

10/1 & 1/10 = at first, it often takes ten parts of effort to get one part of results. Eventually this trend reverses itself (in other words, keep trying to learn and eventually your efforts will pay off).

P⁵ = proper preparation prevents poor performance.

S⁴ = successful single segment succession (break the task into manageable segments and focus on one at a time).

QQ = quantity qualifier. Objectively rate your present situation and then decide how you could improve it.

PMA = positive mental attitude towards this task.

S&S = similarities and shortcuts. See if you can identify similar features in this program that match others you have used (keyboard shortcut and so on).

IP = identify the priorities to accomplish this task.

4.8.3 Mnemonics used to assist students

Here is a mnemonic the author has developed to help students MASTER their Internet learning materials:

M = Matter - decide how much this skill or technique will matter in the total operation of the software (priority).

A = Approach - be willing to change your approach and be flexible if 'your way' does not work.

S = Steps - break the problem down into simple steps. Decide on the importance and priority.

T = Time Management - what is the best way to manage your time on this project?

E = Effort - be willing to put in extra effort at first to master the basics of a new software.

R = Rules - what are the most important rules to follow to quickly master this computer?

4.8.4 Categories used to assist observation

The author also developed a basic set of coding to begin to categorize the subject group for later observation and insight. No action was taken on this during the teaching or interviews. It was primarily compiled as an adjunct coding system for possible application later.

Middle Income: MI

Low income: LI

High income: HI

Retired-young (age 65-75): RY

Retired-old (age 76-90): RO

Former career-clerical: CC

Former career-trades: CT

Disabled-physical: DP

Disabled-mental: DM

Previous computer experience: PC

No computer experience: NC

The methods of dividing and segmenting this subject group are diverse and continually being revised and updated. For the sake of clarity and continuity, the author will stay with the basic definition of the subject group as 'those individuals in the United States over the age of 65.'

4.9 Defining core computer and Internet skills

This final section includes a checklist of primary and intermediate skills that were typically used in the courses that the author taught. The checklist was

valuable in determining what types of methodology to pursue for this particular subject group. This is consistent with what cognitive scientists view as the pre-knowledge frames necessary for learning before a new learning programme starts. These lists are not meant to be an exhaustive investigation of every possible skill, but simply as a tool for establishing and testing some of the fundamentals. The purpose of this section is to provide a guideline to begin to understand what level of skills the typical elderly Internet learner has at the beginning and end of any training that they may take.

4.9.1 Necessary skills

Although any list of necessary and intermediate Internet and computer skills are somewhat arbitrary and subjective, the author has developed a basic list and has included several fundamental skills necessary for the average subject group member to develop in order to operate the Internet at a minimum standard (see Behaviorist theory in Chapter 3). Below are several basic skills that are necessary to do simple searches on the Internet and effectively operate the computer. Although members of the subject group may not be familiar with all of these when they start, the skills below are fundamental to Internet operation and need to be learned as quickly as possible (Computer Skills Self-Assessment, 2010):

- Ability to start up and shut down a computer.
- Familiarity with keyboard.
- Use of mouse (double clicking, highlighting, scrolling down text).
- Familiarity with an Internet browser (This would include such things as the location and use of tool bar, pull down menus, location of back button, maximize and minimize button, location of address bar where URL will be typed).
- Be able to conduct a simple search using a search engine.

4.9.2 Intermediate skills

Below are several secondary skills that need to be developed eventually for the subject group members to continue expanding their Internet skills. There is practically no limit as to how far the individual can go with skill development, but these necessary and secondary skills are important for basic operations.

- Identify and operate other parts of a computer system including keyboard, monitor, CPU, mouse, speakers, printer, disk drive, CD-ROM drive.
- Move between two or more windows.
- Copy, move, paste, and rename files, folders, and icons.
- Select and use the printer.
- Compose and send an e-mail message.
- Send and receive an e-mail attachment.
- Create and use a favorite or bookmark.
- Use the help menu, including online resources.
- The ability to explore the different search engines and other search tools (bots, subject directories, and so on.)

4.10 Data analysis

This section will review how the author collected his data and will also explain how he evaluated his primary and secondary research. This will include the questionnaires, interviews and interview transcripts, participant observations and field notes. Firstly, the author went through the different sources and identified which elements qualified as key themes. There were remarkable similarities between the interview data findings and the observations gathered through participant observation.

The conceptual framework that emerged is that a combination of qualitative sources, often called triangulation, was necessary for the author to obtain a valid sample. The consistent findings from the sources supported the major themes, including the desire for one-on-one tutoring, the widespread use of e-mail, the influence of friends and family, the types of Internet site of interest and the use of other personal technology. Part of the strategy in this study was to build on findings as they emerged. For example, the interviews were extended from the simple use of the questionnaire to include a two-way conversation about topics from the questionnaire where the author responded to themes that emerged by extending the discussion (or quickly ending the discussion of topics of no interest or relevance to the interviewee).

Participant observation was used to follow up themes emerging in the questionnaire and interviews, and to back up conclusions emerging from the latter. The author had over 200 students in his *Internet Made Easy for Seniors* course over a two-year period, and this provided an extended opportunity to observe beginning and experienced subject group members using the Internet. Using field notes from the observations and comparing them with the interview transcripts, the author was able to arrive at an identifiable pattern, described in more detail in the Results section.

4.11 Conclusion

This chapter has included several sections relevant to the development of this study. First of all, a discussion of some of the research methodology was included, such as the decision to use a qualitative design, combined with an ethnographic approach which tended towards auto-ethnography in the later stages of the research. The research methodology used was shown to be consistent with the learning theories stated in Chapter 3. The author discussed the advantages of using the combination of these methodological

approaches, which allowed him to gain a close familiarity with this specific subject group population, along with the steps that were taken to ensure the credibility of these research methods. Participant observation allows flexibility and responsiveness in the research design by utilizing the perspective of the subject group members and allowed for the research questions to be modified based on the subject group members' interests, aptitudes and their access to technology. At the same time, its flexibility permits the collection of data that could not be anticipated beforehand or duplicated in a typical quantitative study. Research on ageing and the aged in the U.S. is one area that has seen a gradual increase in the number of studies that have employed participant observation methods. This chapter also included an additional section about the use of symbols and mnemonics to assist in the teaching and learning process.

CHAPTER 5: RESULTS AND ANALYSIS

5.1 Introduction

This chapter will provide an overview and summary of the results gathered throughout this thesis along with a basic analysis. It begins with a review of the results from the interviews and observations. The chapter continues with an overview of the other findings based on both the research along with the author's participant observation in various settings. Many of these student interview responses matched the opinions of a group of teachers of the elderly that the author also interviewed. This chapter will also explore further study recommendations largely based on the interview findings. The final section will include a practical application of Howard Gardner's Theory of Multiple Intelligence (1984). As mentioned previously, the percentage of older adults in the American population is expected to increase from approximately 12% now to 22% by the year 2030 (Eisen, 2005). Clearly this demographic trend will provide a significant number of elderly subject group members who are interested in finding out more about the Internet. By designing educational programs which effectively teach computer and Internet skills to this group, there are many positive trends that can be implemented, along with additional challenges which will have to be overcome. One of the predicted trends from this study is that there will be a growth industry in products and services for this market. Besides the increased demand for new computers and the accessories that go with them, there should also be more demand for adjunct components such as assistive technology devices, and even the possibility of the Internet as a means of entertainment (similar to the way television is currently used) in assisted living facilities for the elderly.

Since the goal of this research was to gain a detailed understanding of how the elderly learn and use technology, this study utilized a basic qualitative design, (Huber, 1995). Data was collected through in-depth one-on-one interviews, direct observation and document analysis. Specifically, the author interviewed each subject group member for one to three hours each, using a questionnaire and a protocol of open-ended questions. This data was cross-checked by additional questionnaires sent to five teachers of the elderly. Several previous studies have found similar themes which emerged (Namazi & McClintic, 2003; White *et al.*, 2002; Maheu, 2000; Lang, 2006; Nielsen, 2005).

The first section in this chapter reviews the findings in relation to the research questions. This section sets out to establish a link between the literature review, data findings and the main topics in the research questions. The charts 5.1- 5.4 show some of the results of the interviews and demographic details.

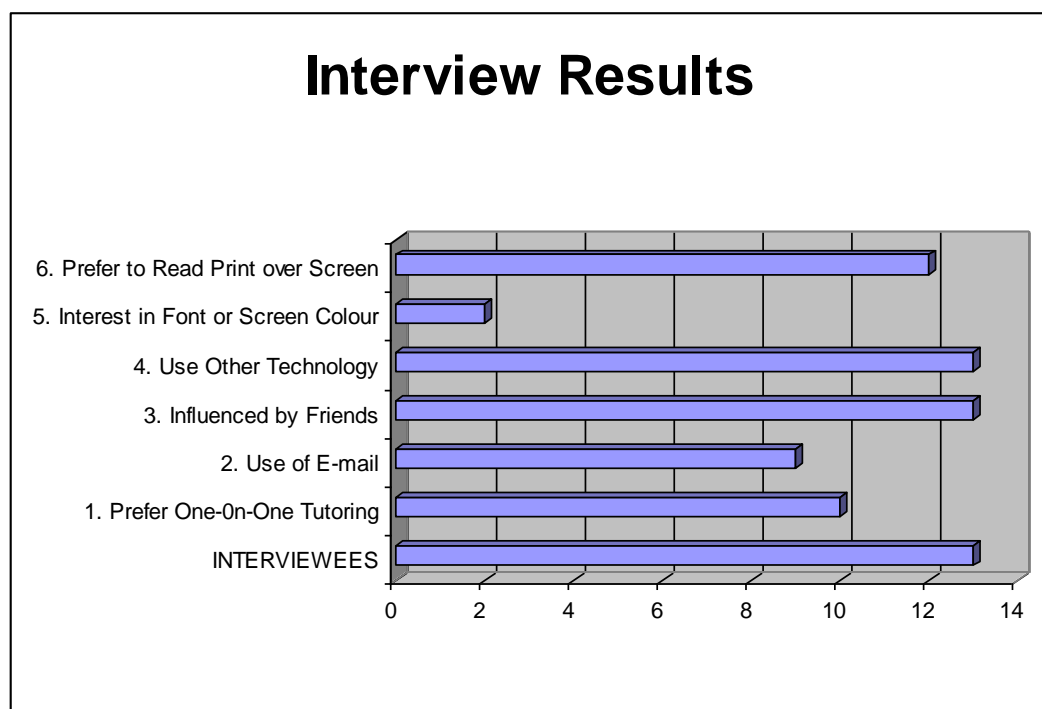


Figure 5.1: Interview Results Chart

Figure 5.1 (above) shows some of the trends and preferences emerging in the interview, and figure 5.2 (below) gives some of the background to interviewee training preferences in terms of availability of feedback for various methods, availability of the training option, and cost.

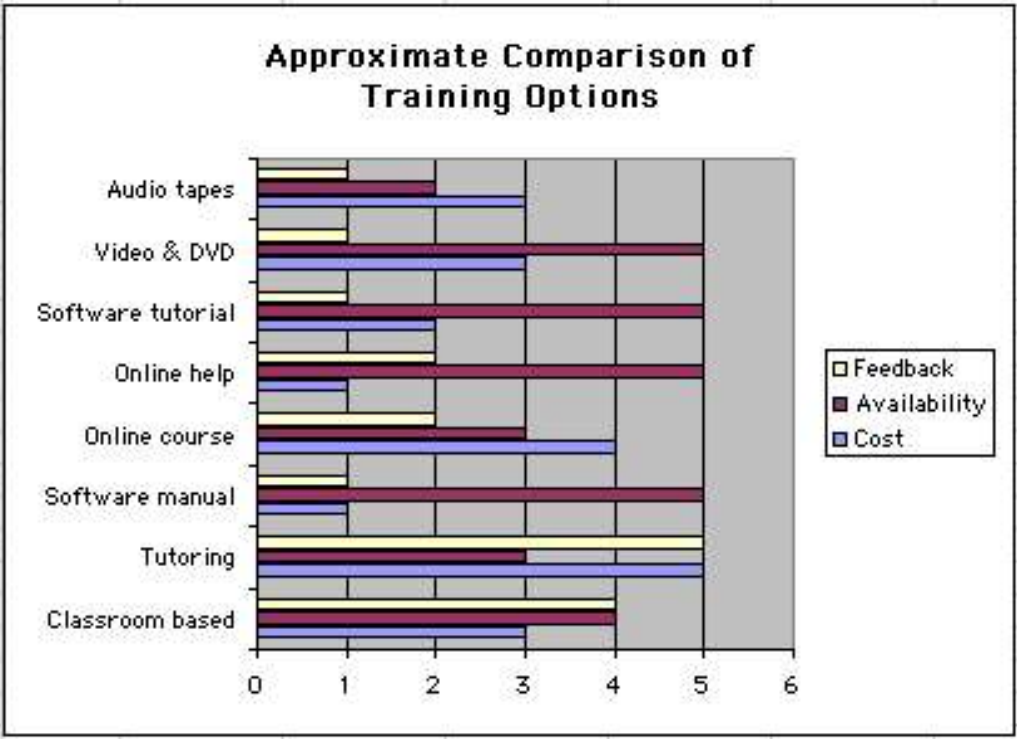


Figure 5.2: Chart providing a comparison of the training options

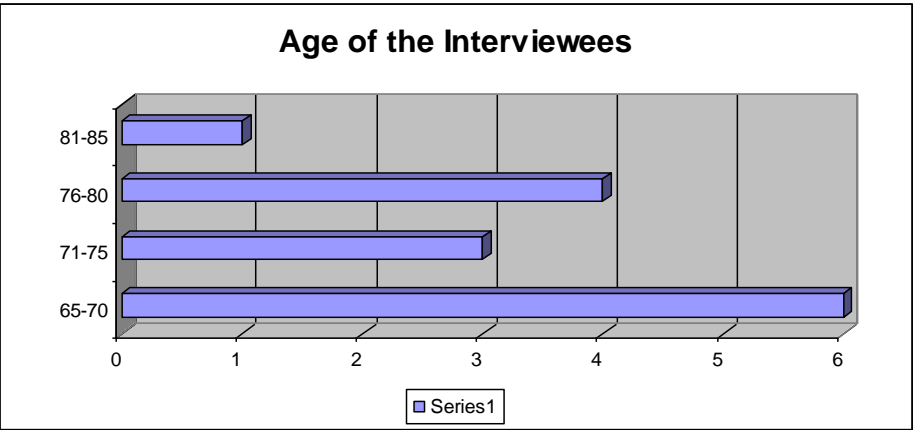


Figure 5.3: Age of interviewees

Figures 5.3 and 5.4 give an indication of the age and gender distribution of the interviewees.

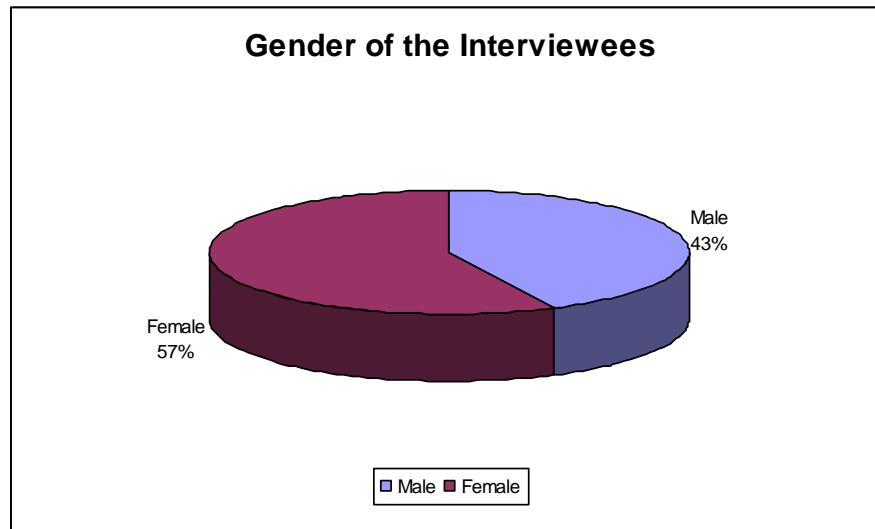


Figure 5.4: Chart indicating the gender of interviewees

5.2 Summary of results from the interviews and participant observation perspective

This section includes a summary of the research questions and the findings generated by this thesis based on participant observation of the elderly subject group in the author's *Internet Made Easy* course along with several of the interviews. This section contains detailed findings from the interviews conducted by the author, along with several identifiable characteristics of the subject group members who were interviewed and observed. These interviews helped clarify the process that the subject group goes through when they learn and use technology. Besides the 14 detailed interviews with subject group members and the participant observation of class members, the author sent questionnaires to five individuals who teach computer and

Internet courses for the elderly. Many of the findings from the teacher questionnaire supported the independent findings of the author. The reader should be aware that these findings will continually evolve as a higher percentage of this population of elderly Internet users has learned the basics and has had the opportunity to experiment through trial-and-error. These questions in this section are interrelated. For example, the first question about the methods and materials that the subject group is currently using to learn the Internet is influenced by real and perceived barriers, their motivation for learning along with their ability to link together different approaches to learning that work for them individually.

5.2.1 What existing methods and materials are employed to teach the elderly to use the Internet?

Typically, the primary ways that this age group learns to use the Internet include: classroom-based learning, tutoring from a friend or family member, online, and self-study with a textbook or video/DVD. The effectiveness of any one of these ways is often based on the subject group member's current ability and attitude, availability of local resources and their willingness to practice the material until they achieve mastery. Based on the interviews conducted for this study, approximately 85% of the subject group preferred the one-on-one tutoring. Since this is not always an option, this thesis explores several of the other methods, both alone and in combination. A data search reveals that people over the age of 65 use the Internet for e-mail, health research, online banking and other uses (Fox, 2004). The interviews, observations, and focus groups yield data that indicate people over the age of 65 use the Internet for the three items listed above, along with such things as attaching photographs to e-mails, comparison shopping for consumer goods and other uses.

The evidence gathered from the interviews, along with the material previously examined in the literature review, indicates that a large percentage of the elderly are willing to explore a variety of learning methods if it brings them closer to their goal and outcome. Many of them have already engaged in at least one self-directed learning project in the last year.

While the author looks favorably at self-directed learning, he also has learned that a flexible combination of approaches will often provide the most effective way to deal with individual aptitudes, needs and local availability. For example, many rural villages do not have any computer courses available. In that case, the subject group member needs to rely on DVD training, enrolment in an online course through the Open University or other institution, or the recruitment of a private tutor. The individual may determine that a self-directed learning approach is needed, with DVD tutorials, as well as use of assistive learning technology to compensate for their inability to use a conventional mouse; this approach might be combined further with consideration of the humanistic theory, where they account for other needs in their life which might impair their study if not satisfied (e.g. that internet use assists them to find health remedies, or to pursue specific interests, hobbies or social needs). Of course, this is just one hybrid approach for one individual learner who might otherwise not be able to learn to use the Internet. Table 5.1: Learning Preference Chart gives a perspective on what other interviewees thought about learning options.

The interviews and participant observation indicate that most of the subject group students had, typically, first attempted to learn the Internet through friends and paid helpers (one-on-one tutoring), then experimented with local classroom-based learning (the author's course). Occasionally they would attempt to learn through videos or DVD's, popularized computer books, and so on. Ten of the 14 of those who were interviewed preferred the one-on-one tutoring, but understood that it was not always practical. Individualized

tutoring was preferred whenever possible, even though the option of attending a course, reading a computer manual, or experimenting with other ways to learn how to use computers was considered. The numbers from Table 5.1 indicates that all 14 of the interviewees were willing to try classroom learning, one-to-one tutoring or DVD tutorials, yet most preferred the concept of one-to-one tutoring.

A one-on-one tutor would be my first choice. I have two friends who come down from Reading (a city about 90 miles north) and every time that they come down they like to play with my computer. These guys are really into it. Both of them produce videos and they know about technology. They show me a few new skills every time they are here, said Richard C. one of the interviewees. An additional comment expressed the general frustration with the typical computer manuals. *I think that the big problem with computer manuals is that they are written by people who have much more technical knowledge (than the average person) and so that they forget that the people using them don't have this knowledge. It seems so simple to them so they don't bother to put it in and it's very confusing to someone who does not quite understand how things go, said Amy L. one of the interviewees.*

Probably one-on-one tutoring (would be my choice). You can move so much faster because everyone is different, some people can move ahead quite quickly and others get stuck on one particular kind of a process, said Rachel B, one of the interviewees.

(Teacher interview quote) *By working in their own home with occasional visits from a tutor (this is done, often by younger*

relatives and works as long as they have reliable access to the relative.) They'd like someone to sit by them doing their own thing, who was very interruptible and would wait while they do it.

Sophia K in Teacher Interview #1

Besides the consistent word-of-mouth feedback from the class members and interviewees, the author also received several comments from other teachers in his city who had received numerous requests for private tutoring from this population. Most of these teachers were not associated with the 'Internet Made Easy for Seniors' classes (Participant observation finding).

When asked about their reasons to use the Internet, nine of the 14 used e-mail (at the time of the interview) as the primary activity that they do while online. Although most of them enjoy exploring the Internet and trying out many different sites, they all were interested in using e-mail as a way to communicate with friends and family. Most were also very interested in using e-mail to attach and send photographs.

Most of my correspondence is to grandchildren and other family members. E-mail has been very helpful for any family emergencies. It is wonderful and I use it all the time. One of my relatives has a grave illness and e-mail has allowed her and I to stay in contact on a daily basis, said Rachel B, one of the interviewees.

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I agree, said Patricia S in Teacher Interview # 3, *most of them use e-mail as the primary thing that they do while online... they all appear to use e-mail as a daily or weekly way to communicate with friends and family. Most were also very interested in using e-mail to attach and send photographs,* (all of the teachers

interviewed agreed that e-mail is one of the primary activities that this elderly subject group does when they are online).

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The author received over 50 e-mails from elderly subject group members living in other locations in the United States who had discovered his Internet site for the elderly. Many of them described their excitement with using e-mail as a primary feature of the Internet.

Additionally, there are several categories of Internet sites that appeal to most of the interviewees. These included genealogy, investments, health research, news and weather sites, and sports sites.

I put out number six of my family newsletter the other day. My mother's family, who I am researching, is Portuguese/American. My grandmother had ten children in her family, so I have 38 first cousins. On a sheet of paper, when I print the labels, I must send 28 because I still have one space left. Unfortunately, not many of them have a computer so I can't send it by e-mail. I'd like to do that eventually, said Ed S., one of the interviewees.

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In my experience all seniors seem to use it for email, sometimes with multiple accounts, and most send family photos back and forth. Some look up health information, some play online card games (Majong, bridge), some do genealogy and some do online dating/chat, said Sophia K in Teacher Interview #1

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The author gave a lecture to about 50 members of a social group for the elderly (Old Tymers Club) in Davis, California in 2004. During the discussion of the Internet, the club members discussed topics of

investments, health research and genealogy much more often than the other uses for the Internet.

5.2.2 What procedural and conceptual difficulties, if any, are experienced by the subject group?

a. Barriers experienced

The typical barriers, based on the interviews and observations, include the slow Internet connections, a fear of technology, mastering the use of the mouse, along with occasional cases where the individual had a health problem or a lack of access to adequate equipment. Other challenges included the fear of damaging the equipment and fear of embarrassment while with peers or in a classroom. Some of the other common frustrations mentioned throughout the interviews were: adverts popping up on the Internet, the difficulty in distinguishing quality sites from biased or non-referenced sites, and other computer maintenance issues. The interviews and classroom observations demonstrated to the author of this study that a large percentage of the subject group is very enthusiastic and determined to learn to use the Internet effectively. To overcome many of these problems, this thesis will present a range of evidence that a flexible, yet focused, teaching method along with the adjunct components such as assistive technology for specific disabilities seems to show the greatest promise. The evidence from Table 5.3 indicates that 12 of the 14 interviewees experienced difficulties using the mouse.

You asked about the mouse in your questionnaire. I prefer the track ball. It is easier for me to slide the ball around. If you are in a confined space you don't have to worry about trying to reposition the mouse. I learned to use the mouse a long time ago, but when I got a hold of the track ball, I thought it was the greatest thing... I've gone through the baby steps in learning how to use a computer where I could walk a little bit. Now I'm at the stage, you

know, I can get out there, like a young person learning to use a bicycle. I'm not as far advanced as I would like to be. I ask myself what I want a computer for. The first answer is to learn something. Instead of sitting by and watching TV. To also not let technology get too far away from me. There are so many things that a person can do with a computer. I am always curious as to what I can do with the computer, said Frank H., one of the interviewees.

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It seemed like several of them had hands that would shake. I know that it's not necessarily that they are nervous or that they have Parkinson's. I tried to show them how to effectively hold onto the mouse. I think that if they had one of those with the track ball it would be easier since they can just click and it does not move. With our mouse's when they would go to click, it would jump and they were on the wrong icon and they would get a screen that did not match my icon. They would complain out loud. I think that there are problems with their hand-eye coordination, or maybe there is hearing loss, I felt like I had to shout the entire hour and a half session. I'd never had my voice strained like this in all of my teaching experience. Another health-related problem for the seniors was that they could not see the screen very well. Sometimes they couldn't even see their own screen very well. So if we were doing anything with Word, I would try to get them to get a bigger font so that they could see it better, said Karen O, one of the teachers interviewed.

Yes, and this (mouse problem) was alleviated by the roller wheel mouse, or an adapted mouse for persons with physical handicaps. Cascading menus, such as the windows start menu, were the hardest to navigate, desktop shortcuts were preferred, said Sophia K in Teacher Interview #1.

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I think that the big problem with computer manuals is that they are written by people who have much more technical knowledge (than the average person) and so they forget that the people using them don't have this knowledge. It seems so simple to them so they don't bother to put it in, and it's very confusing to someone who does not quite understand how things go. Most people are very frightened by the computer and they don't make as much use of it as they should, said Amy L., another of the interviewees.

To verify and expand these findings, the author engaged in some diverse participant observation. One of his projects involved visiting several other classes for the elderly offered at different colleges. From the observer perspective, the author noticed that in a large classroom several of the students would compete for the teacher's attention, while many of the students were unintentionally ignored. Additional distractions in the class included any outside noise interference, and the embarrassment of peer oversight. Many of the interviewees had tried learning computers through a textbook, and had commented on how ineffective it had been for them. Additional learning approaches such as an educational DVD or online learning are technically demanding and unfamiliar enough to the interviewee to have been rejected as a serious option. Several of the interviewees had learned to use the Internet from a neighbor or relative and they appear to associate this positive experience with a one-on-one tutoring session to have selected it as their preferred learning mechanism. Numerous direct quotes from the interview transcripts support these assessments.

Although there was a general fear of computers, all 14 of the interviewees had other forms of technology that they have needed to learn before experiencing computers. At least nine of 14 had used an electric typewriter and often seem to link it to the personal computer. Most of them have other

technology that demands a certain level of skill, such as health monitoring devices, home burglar alarms, or television programming devices.

We have a garage door opener, and I have a blood pressure monitoring machine. They both took some practice to get used to, but are really not very complicated. I was able to teach myself how to use them with the owner's manual and by experimenting, said Ed S., one of the interviewees.

There was some disagreement on this topic with the teachers who were interviewed. Several thought that the elderly are generally overwhelmed by technology and try to avoid it as much as possible:

They tend to not even know how to use a VCR except to push the tape in. If something changes, such as an input change, they get confused often, said Ed M in Teacher Interview #5.

Despite the potential limitations of a limited range of screen and font color choices, only two of 14 of the interviewees had any interest in changing the font or screen color. During every interview, the author asked them about font color, screen design and other related issues. Most of them expressed interest in staying with the black and white font, (perhaps because of their experience with manual and electric typewriters).

Now, I have gone in and changed colors on the fonts, and I can change the color on the screen, but I have never really done a lot of things with graphics. Like the paintbrush program where you draw a picture. That is something I have never tried that. I can do some of the simple, basic things, but as far as doing a lot of changes, I really can't. I have got it set up on this computer where it goes in and defragments the hard drive (routine maintenance on

the PC) once a week. I found that in there and it was simple to setup. You just go step-by-step and it works automatically, said Frank H., one of the interviewees.

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All of the teachers who were interviewed agreed that the subject group members had no interest in changing the font or screen color, but offered no additional comments.

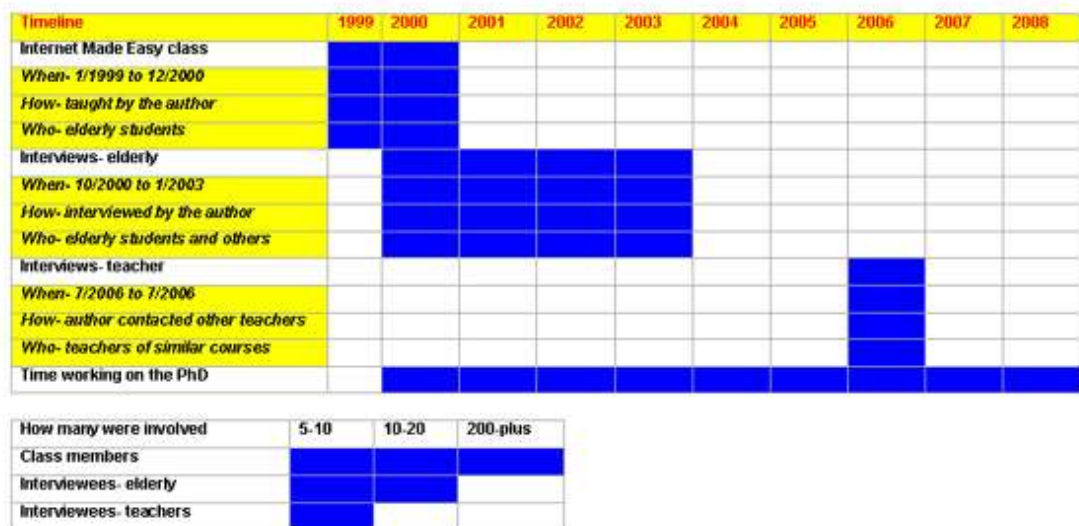


Figure 5.5: Timeline of the interviews and participant-observations

Table 5.1 : Learning Preference Chart

Learning preference:	Preferred by:	Those willing to try:
One-on-one tutoring	10	14
Video or DVD lessons	1	14
Classroom learning	3	14
Online course	0	7
Software book	0	10

Based on early testing through participant observation of new students arriving in the author's *Internet Made Easy* course, the typical beginning students arrived at the first class with the skills listed in Table 5.2. As computers and the Internet become more widespread and various training methods improve, the percentage of familiarity in each category should increase.

Table 5.2: Existing skills at the beginning of class

Ability to start up and shut down a computer adequately	30%
Familiarity with keyboard	80%
Use of mouse	30%
Familiarity with an Internet browser	15%
Be able to conduct a simple search using a search engine	10%

Table 5.3: Additional Findings Chart

Additional Findings	Interviewees who said yes	Interviewees who said no
Use of e-mail	9	6
Difficulty using the mouse	12	2
Influenced by friends	14	0
Interest in changing screen	2	12

Another potential limitation to Internet use among this subject group was the perceived difficulty of reading text from a screen. Twelve of 14 the

interviewees in this study preferred to read printed materials as opposed to on-screen materials.

Many (of the elderly) would print out all their emails. Many sites are inaccessible as the text point size is hard coded in style sheets and is not modifiable using the text size view command in windows explorer. Many sites are not formatted to be seen at 600x840, for example, let alone windows large sizes, which can make them hard to use. As well, seniors may have vision problems and be reluctant to use reading glasses, making simply formatted sites (no background graphics, with a simpler cleaner look more like the printed page) preferred. For an example of a usable site I developed see, said Sophia K. one of the teachers who was interviewed.

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Very accurate, said Ed M in Teacher Interview #5 about the question about subject group members preferring printed materials as opposed to on-screen reading. During the '*Internet Made Easy for Seniors*' classes, the author observed a large percentage of the class members printing out the material from the Internet that they planned to read in-depth.

b. Motivating factors

An important factor to consider when exploring any barriers is to learn what motivates older adults to participate in learning experiences, especially related to computers and the Internet. This is because a strong motivation to learn and use computers and the Internet can often overcome any surface barriers to learning. The interviews, observations, and focus groups yield data that indicate people over the age of 65 often use the Internet for such things as attaching photographs to e-mails, comparison shopping for

consumer goods and other uses. Several of the favorite research topics included genealogy, investments and news sites. This group typically prefer to use the Internet at home, although several of the interviewees were willing to travel to local libraries or senior centers to gain access to the Internet. Based on the interviews, many of the elderly find out from friends that they can access information about hobbies, investments, health, and information of personal relevance. Thirteen of the 14 interviewees reported being influenced by their family. Often someone who is new to computers will hear about how easy it is to chat online with grandchildren, research investments, or other tasks, and they will decide to explore learning further. There are also the motivational factors researched by Houle (1961), including Goal Oriented, Activity Oriented or Learning Oriented.

I spend a lot of time on the computer, I order my medication online, I check my bank account, I lookup news articles, I e-mail obituaries to people, I play 'Freestyle.' Freestyle is like solitaire for people who think (laugh). With Freestyle you can win every time if you are talented. A lot of times I'll find that the Internet has more on a given thing than the newspaper does. Because they don't have to put it on paper and carry it around to people, I guess. Like with a website, you don't have to put postage on it. I've also learned how to adjust the Internet radio station so that I can listen to a variety of stations, said Betty F. one of the interviewees.

"I look at real estate sites, cars for sale, and general stuff. It's great for just doing a lot of little search work. You can just go to it. You don't have to worry about encyclopedias or going to the library. You have it right there at your fingertips. My wife gets into recipe sites. She reads a lot there along with medical terminology sites. She goes in and checks to see what it is all about," added Frank H, also one of the interviewees.

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All 14 of the interviewees have been influenced by their friends or family who also use computers. Everyone the author interviewed mentioned that a friend or family member, had either encouraged them to learn computers, explained what was possible (and fun) to do on a computer, helped them decide which computer to purchase, or other related interaction.

I was ready to buy a word processor and my grand nephew said you must have a computer, you will love it and it will open up a whole new world for your. He was in his 30's and very good with computers. He helped me select a used one from the Pennysaver (advert newsletter). He set me up and gave me a lesson and then said that you can learn the rest by reading what it says on the computer and figure it out (laugh) and then he left me. I've been teaching myself ever since, said Marjorie H, one of the interviewees.

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Unfortunately this finding does not always have positive consequences for the subject group member:

A student of mine listened to her niece and bought a \$1200.00 laptop and all it did was sit because she was afraid to use it. When she came to class, I let her use her laptop but in the 9 weeks she never relaxed enough to use it comfortably. She left the class and I am sure, her niece has a new laptop, said Patricia S in Teacher Interview # 3.

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Once again, the author received consistent word-of-mouth feedback from the class members and interviewees about the influence of friends and family in regard to their inspiration for learning and using the Internet.

Many of them (10 of 14) are interested in researching their own health information, which is one of the prime motivations for the elderly in using the Internet . They are often are unable to locate exactly what they are looking for, or are unsure of the quality of the site accessed. Most of them rely on their physician for advice, and several of the subject group members share their online research with their physician.

My wife gets into the sites. She reads a lot there along with medical terminology sites. She goes in and checks to see what it is all about, said Frank H., one of the interviewees.

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Online health info is often in inaccessible language or presented in formats where the print is too small when printed out - such as PDF or small print html. In one instance, in order to get readable information to a woman with a particular health condition, I had to copy text from a PDF document and reformat it in a larger size in order to print it so she could read it. Few people would have been able to do that on her own, said Sophia K in Teacher Interview #1

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Hi Rick, I just wanted to let you know how important the Internet class I took from you early in June has been in our lives. As I told you the day our assignment was to "research a health issue" my husband had just been diagnosed with prostate cancer the night before so that would be the topic I'd research. With your help that day, and all I'd learned from you already, I was able to really dig into things and find many treatment options and the necessary information to weigh them one against the other. Anyway, your class and this computer are worth their weight in gold right now! Thank you so much for such a great class, I hope you continue to teach it for a long, long, time, Rick. Arlene A. elderly student.

The physical and cognitive changes related to ageing was one of the primary limitations, and this theme was supported by both the participation observation and interviews along with select components of the literature review. For example, in the similar studies of relevance, Namazi and McClintic (2003) examined 24 older adults and determined that age-related changes in physical, cognitive, and sensory abilities were the greatest obstacles for participants in using computers. Some individuals may not realize they have a disability, or they may be unwilling to admit its existence. Others may hide or ignore the disability from fear of discrimination or embarrassment. In other cases, the disability may have occurred so gradually that the person has adapted to it without realizing the effect on his or her everyday activities. From the author's two years of participant observation while teaching elderly computer and Internet users, he found that the typical problems experienced by the subject group include: hand-to-eye coordination (need for an accommodation for the disability with an adaptive mouse and keyboard and specialized training.), vision problems (need for screen magnifiers, and/or screen color changes), along with general alertness and reaction time (possible use of games and stretching exercises). Additional concerns by the interviewees expressed related to the frustration of learning new technology with inadequate training:

People don't explain the basics to you... But when you are getting on in life and one (computer) is put in front of you on your desk and someone tries to give you a quick training, it's too much to take in, said Sue W., one of the interviewees.

Additionally, a section on *Strategies for Motivating Students* in the literature review uncovered several academic studies related to motivation that provided valuable insight for understanding this process, especially as it applies to this elderly subject group. According to Ingalls (1984), motivation

also appears to be related to the concept of self-directed learning. When adults discover that they are capable of self-direction in learning, as they are in other activities in their lives, they often experience a remarkable increase of motivation to learn and a strong desire to continue the learning process.

According to Sass (1989), many factors seem to affect a student's motivation to do the necessary work and to develop interest in the subject being taught; these include such things as the perception of its usefulness, the students motivation to achieve, their self-confidence, patience and persistence. Not all students are motivated by the same set of beliefs or rewards.

This study has attempted to apply the findings from the literature review about adult learning motivation to this specific subject group population, especially as it relates to computer and Internet use. Many of the methods for increasing motivation are valid for this group, but future researchers need to be aware that topics that motivate someone over age 65, such as the need for accurate health-related information, may not hold the same value for an adult learner who is much younger. Meanwhile, a younger adult may be more concerned with the teacher's grading marks than someone much older who has been detached from this grading process far longer. Houle (date) identifies this learner as one who has some particular goal in mind as the motivation for participating in some learning activity or activities. Such a goal might be the desire to send pictures to friends through e-mail, researching investments, sports, or some other topic. Often the learner can justify or tie each learning endeavor to a distinct purpose they believe to be important.

5.2.3 What methods and materials do members of the group identify as being appropriate to their learning needs?

The interviews confirmed the author's hypothesis that many members of this

subject group already engage in some form of self-directed learning. One of many examples include the author's interviewee, Dick Credit, engaging in his own independent learning project on the Internet, doing research on the options for self-publishing his poetry. During the separate interviews of the teachers, all of them agreed that their elderly students were self-motivated, a primary ingredient in self-directed learning. Additional participation observation findings supported Gardner's theory of multiple intelligence where the author observed several cases of undeveloped spatial-kinesthetic intelligence that had the potential to be improved. The point of the author's findings is that an awareness and a flexible application of more than one learning theory and approach is necessary for discovering and applying the most effective approach to teaching this population.

Very accurate - can't be more correct! replied Ed M in teacher interview # 5 to the question about whether the elderly were self-motivated, a primary key to self-directed learning (Four of the five teachers who were interviewed strongly supported this finding).

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Gardner's multiple intelligences is a great work in education that has contributed to the broad spectrum of thinking about how lifelong learning occurs and how it should be addressed. Perhaps Knowles' greatest contribution to adult learning was his recognition that most educational programming in the United States, even when attended by adults, was still geared towards younger learners in credit-type settings and often career-oriented. Knowles' self-directed learning emphasized the concept of informal education as a way to distinguish between more formal career training and the type of education adults often pursued, said Professor Marvin Hunt, a professor interviewed on telephone, although not part of the formal interview processes.

Another variable for researchers to consider is the availability of training options in the various geographic areas. The outcomes that these seniors were expecting from the training also contrasted greatly. As a result, the most effective teachers need to be willing to test-out a variety of approaches to learning that are covered in more detail in this thesis, in order to account for the variations in learner expectation and aptitude.

In summary, this question provides material for debate among the different advocates of the various learning theories, as well as opportunities for combining various methods. The author believes that self-directed learning is most effective since it encourages personal initiative, helps one to combine the most helpful components from multiple learning methods, and fits well into the comfort zone of a large proportion of the study population, as evidenced by its wide adoption. Tough (1979), used a detailed interview technique, and he determined that most adults spend an average of 700-800 hours in deliberate self-directed learning projects each year. Nearly two-thirds of his original sample reported that these projects were self-planned. According to Hiemstra (2006), a survey with various groups in ten different countries has confirmed that approximately 90% of adults develop at least one intentional learning project annually. Gardner's (1983) theory of multiple intelligence has direct application with this subject group. Of the seven major intelligences: linguistic, musical, logical-mathematical, spatial, body-kinesthetic, intrapersonal and interpersonal (incomplete sentence). The author observed his elderly students to be consistently weak in some areas, such as body-kinesthetic and spatial. Future researchers could focus their studies on the predominant reasons for the confused kinesthetic and spatial responses of the elderly, along with the potential to help a percentage of this group improve their physiology and its implications for alertness and focus in the classroom.

5.2.4 What model/s of e-learning could be seen as appropriate for this

group, in view of the answers to the above?

Based on the considerable differences methods of e-learning that are currently available, along with the widely differing needs and interests of the students, it is very difficult to recommend one single method. The general hierarchy, based on the interviews and literature suggest that classroom learning, hiring a private tutor, along with the use of popularized books are three of the main methods that many elderly individuals use to learn the Internet. Based on the inconsistent quality and availability of the first two categories, a flexible or hybrid method once again appears to be the most effective approach. This author acknowledges that future researchers may discover that one particular teaching or learning method may prove superior and will be adopted on a widespread basis. He also acknowledges that one or more of the individual components, now recommended for testing, may prove to be generally ineffective to the point of elimination from the process. Meanwhile, all of the qualitative evidence gathered in this study points to the benefits of flexible and adaptive experimentation with the learning theories and methods. In several cases, the interviews yielded new approaches to teaching and learning that the author had not considered before, but which appeared to work in that particular individual's case, and which had the potential to be introduced to a larger population.

When my family lived in Malta, back in the 1960s, I bought a 'teaching machine' and I really liked it. It was a simple machine where you scrolled through text manually, and at the bottom there would be a question. You (the machine) states some facts and then poses a problem. This method might be helpful for computer studies. I also attended one year of law school through LaSalle Extension University that had a home study program. I loved the approach that they used for teaching. They used a similar approach where they would feed you some information and then

you would work on a problem. This Socratic approach gave the students the information and then posed a problem. You would analyze the chapter that you read and then apply the law case to the problem I was also involved in a local theatre group and I had to memorize up to 35 minutes worth of lines for a play that we were doing. This experience may have helped with my general memory skills, said Richard C, one of the interviewees.

The author also believes that a blended learning approach, as reviewed in 3.4.11 is a promising development and shows excellent future potential for helping the subject group combine classroom and online delivery.

5.3 A practical application of the Theory of Multiple Intelligences

Finally, this chapter will examine an approach developed by the author to apply the well-known Theory of Multiple Intelligences (MI), developed by Harvard professor Howard Gardner, to teaching this subject group. MI has been widely adopted by educators around the world, and is based on a belief that there are several distinct intelligences that can be developed in humans. As mentioned above, these intelligences include linguistic, musical, logical-mathematical, spatial, body-kinesthetic, intrapersonal, interpersonal and naturalistic. This section will include some practical applications of Gardner's Theory of Multiple Intelligences, and will include several practical exercises to help students expand their awareness of the current state of their different intelligences.

An awareness of these intelligences provides the potential for the teacher to adapt to the individual needs of the elderly students and to help them develop an effective learning plan. For example, a history lesson plan could include a project incorporating a lecture (linguistic), the use of illustrations

(spatial), sound score (musical or linguistic), and hands-on projects (bodily-kinesthetic, interpersonal, and so on). Ideally students should learn new material by linking it to as many different intelligences as possible. This helps to build cognitively and neurologically from the weak sectors of your brain to the strong ones.

1. Linguistic intelligence development and application — Talk read or write about what is being learned, keep a journal, interview an expert, or create a mnemonic to help memorize the learning materials.
2. Kinesthetic intelligence development and application— Find some hands-on activity related to the topic being taught, such as developing computer mouse skills, finger dexterity exercises and so on.
3. Musical intelligence development and application — Play background music while learning the materials. Try to use music as a way to remember facts or skills.
4. Intrapersonal intelligence development and application — Relate it to a personal feeling or inner experience.
5. Logical-mathematical intelligence development and application — Conceptualize it, quantify it, or think critically about it.
6. Intrapersonal intelligence development and application — Determine how you feel about something and why. Begin to explore what topics or learning approaches appeal to you most. Set goals and plan how to reach them.
7. Interpersonal intelligence development and application — Do a project with a partner. Participate in a service project related to computers and the Internet.

With an understanding and application of Gardner's theory of multiple intelligences, teachers, school administrators, and parents can better understand how students learn and what teaching methods are the most effective. Adults can help students to understand and appreciate their strengths, and can identify hands-on activities that will stimulate more learning (Sheridan, 2010).

5.5 Conclusion

This chapter reviewed the findings in relation to the research questions. In answering Question 1, with regard to the methods and materials that the subject group was using for e-learning at the time of the study, the data showed how both methods and materials were influenced by real and perceived barriers, and the learners' motivation for learning, along with the learners' ability to link together different approaches to learning that appeared to work for them. In answering Question 2, the author found that the elderly were motivated and willing to try using the Internet for its perceived benefits (e.g. health information, social affiliations, and business and official transactions); that they are in fact enthusiastic learners, in spite of the barriers caused by diminishing physical and mental capacity, and the sense of helplessness that this engenders, as well as the anxiety generated in the face of not being able to cope with unfamiliar or new technology. It was also found that the elderly prefer individual tutoring, but are ready to learn in groups. In answer to Question 3, the preferred approach to e-learning for the elderly was found to be a process of self-directed learning which explored a combination of approaches suited to the individual learner's needs and capacity. This finding is shown to be congruent with Gardner's theory of multiple intelligences. The answer to Question 3, together with the literature and theories consulted, pre-empted the answer to Question 4, that a hybrid approach using self-directed learning might be seen as the most appropriate model of e-learning for this group.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

As previously explored in this thesis, the percentage of the population over the age of 65 is growing rapidly in the United States and throughout the world. Unfortunately in many cases, however, their opportunities to learn how to use the Internet are limited. The interviews and participant observation in this study show that many of the elderly are enthusiastic about using the Internet and can see the practical value in applying these skills toward their own wants and needs. The self-directed approach to learning, combined with the author's hybrid teaching method, appears to have the greatest potential for a systematic way to encourage others to develop their own learning approach, even within a traditional classroom format. The self-directed approach is currently being used by many elderly for other learning goals, and should be easily adaptable to some of the other recommendations in this thesis.

6.2 Emerging trends

As a result of doing the necessary research for the body of this thesis, the author noticed several trends that are worth considering by those interested in this field of study.

6.2.1 Access to disposable income

Despite the fact that the elderly in the U.S. lag behind younger demographic groups in their Internet use, the author sees this trend as changing due to

several reasons. First, the elderly typically have more disposable income. The study by Dychtwald (2000) about older people holding more than 75% of all financial assets, combined with the generally high level of enthusiasm for the Internet should result in a higher level of use of the Internet by the subject group as a whole. Additional research by future scholars into the percentage of poor older adults who regularly use the Internet is recommended

6.2.2 Growth in computer/ Internet Industry

As a result of the increase in elderly participation in the Internet, a growth industry in products and services for this market can flourish. Besides the increased demand for new computers, and the accessories that go with them, there should also be more demand for the assistive technology mentioned elsewhere in this thesis. This includes everything from screen magnifiers to voice recognition typing devices. Improving the usability and the attractiveness of new media for the elderly may require changing interface design, software design, and/or the training process. Based on higher disposable income, many of the elderly subject group will begin insisting on faster access speed and better quality equipment. The author also predicts the use of the Internet as a means of entertainment (similar to the way television is currently used) in assisted living facilities for the elderly.

6.2.3 The overcoming of computer anxiety

Computer anxiety is still a strong barrier for some older adults, but this trend will change as more of the older adults get enough experience with computers and the Internet to begin to feel more comfortable and adapt their styles of learning to this medium. The teacher of this subject group should desensitize them the first day of class by demonstrating that they can press any key without fear of seriously damaging the computer. These fears range

from the possible danger of damaging the equipment to the embarrassment of not being able to perform in front of their peer group.

6.2.4 Trend toward self-directed learning

As previously mentioned elsewhere in this thesis, the author sees a trend toward more self-directed learning. This trend results from many factors, such as the findings by Tough (1979) that adult learners typically complete 700-800 hours of deliberate self-directed learning projects each year. Hiemstra (2006) found that approximately 90% of all adults develop at least one large learning project each year; the average is five separate projects per year, with about 100 hours on each project. Additional factors that may influence the amount of self-directed learning include the types of training that are available (or not available) locally, and the aptitude of the individual.

6.2.5 Improved technology to assist participation of elderly

Just as with younger populations, the number of older adults on the Internet will continue to rise with the advent of cheaper computers, better connectivity technology, and improved assistive learning devices for the elderly, such as speech recognition programs to help those individuals who have vision problems. This should help to remove some of the barriers that currently prevent a percentage of the elderly population from participating in the Internet.

6.2.6 Websites geared for the elderly

As the Internet develops and the number of websites increase, website designers have begun to focus on the needs of older populations. There are now websites available specifically for older users to fulfill their needs for information searches, communication, online shopping, and entertainment.

When interacting on websites, older users need to handle various computer interfaces not originally designed for them. This research attempted to investigate the impact of various computer interfaces among older users concerning browsing and searching on the Internet.

6.2.7 More active involvement in learning delivery

Older adults can offer important insights on what helps and hinders their learning. By getting older adults actively involved in the planning and development of a learning experience, the enthusiasm is higher, and students perceive that they have learned more. Teachers should ask 'What are you expecting from the class?' They should use relevant projects that most of the students will be interested in, such as searching for specific home repair information.

6.3 Significance of the study

This study is thought to be of value to other teachers of the elderly, along with the elderly themselves who choose to peruse this material. Those teachers who are striving to improve their own skills and want to compare their techniques with others in the field might find some insights here, especially with reference to the five interviews of a diverse range of teachers of the elderly. Those exploring social and government policy implications might also find relevant material here. This study found that technology impacts the lives of the elderly in important ways such as an increased access to information and a sense of self-reliance.

This study fills a gap in the research with its examination of learning Internet skills and the impact of technology on a large segment of the population which has hitherto been overlooked. This study indicates several gaps in the literature that it has attempted to fill. Perhaps the most significant gap is the

lack of current literature about the application of common learning theories and methods for older adults learning to use computers and the Internet. The books and articles on these individual learning theories rarely compare and test their ideas against the other competing theories in a systematic and coherent way that could produce a combination, or hybrid approach which would have the potential to provide a better overall learning strategy for the elderly subject group. Cook (2003) wrote that researchers with expertise in education or communications have not applied their findings to the ageing field. She believes that this has resulted in vocational teaching methods being used, with limited effectiveness, to teach the elderly.

The study also makes some new comparisons, such as applying a theory from one field (kaizen, from the Japanese manufacturing field) to an entirely different field (adult education). The author developed a method of teaching, largely as a result of this study, that focuses on the most essential aspects of the material being taught and relegates the skills used less often to a secondary role, taking into account the potential for memory overload with conventional Internet learning methods which give equal priority to every task, and often do not achieve more than short term memory status (Salthouse & Babcock, 1991).

Finally, an important aspect of this research is that assisting the elderly to master e-learning can actually be seen to improve the quality of life generally for the elderly. Research indicates that mentally stimulating tasks may improve brain health and cognitive abilities, and possibly physical health. This is reinforced by Small's (2009) study exploring the possible influence of Internet experience, which concluded that Internet use could boost the brain activity of the elderly. In view of Small's conclusion, the learning of the internet by the elderly should be facilitated, and the hybrid method developed in this study is one such approach.

6.4 Recommendations for further research

There are unlimited opportunities for further research in this area. It would be valuable to do similar studies that specifically focus on diverse communities including rural areas, inner cities, and communities other than those that have age qualifications. Future research should also be conducted with groups of older adults who are not currently using the computer to determine their attitude towards Internet use and the types of barriers that keep them from getting started. Future studies should explore possible gender differences since the participation in this study did not exhaustively study that aspect. The use of a naturalistic inquiry combined with a grounded theory from the beginning of the study would have the potential to enhance a future study.

The author discovered that obtaining feedback from the students before, during, and after completion of the course should be a highly effective means for tailoring the course to meet the needs of older adults. Instructional materials should be organized into a series of well-defined units that incrementally increase in complexity. These units should be relatively brief to prevent the presentation of "too much" information at once. In order to expand and improve future studies on this subject, there are several approaches that should be considered:

- Investigate reasons for the elderly not using computers and the Internet
- Interview the elderly who do not use computers or participate in these classes about their perceptions as to why they do not use them. Is it a lack of interest, and if so, why?
- Investigate the perceptions of both participating and nonparticipating elderly who have limited computer and Internet skills.

- Interview the elderly from a variety of ethnic, cultural and economic backgrounds about their interest in the Internet, and what experiences they have had with effective and ineffective learning.
- Conduct more in-depth research about the effects of assistive technology, such as screen magnification, an alternate mouse, or voice recognition.
- Obtain the perspectives of other teachers of the elderly on a systematic basis, at least every two years or so.
- Compare the findings from this study with members of the elderly from other countries.
- Older adults should be encouraged to use up-to-date technology.
- Public access computer and Internet sites should be proposed by government officials.

The information gathered from each interviewee is only as good as the interviewer's questioning skills and observations. Because of the author's professional experience as a journalist, he had practice observing others and reporting his findings but still struggled to formulate the best questions and to find willing interviewees. Future researchers should plan to spend adequate time in this area. Training materials should include instruction on accommodative behaviors that compensate for declines in perceptual, motor, and cognitive ability as specified during the person analysis phase. Teachers should try to associate words that have meanings which are familiar to the student's generation. This will minimize wrong interpretations. For instance the word "picture" is more easily understood than "icon."

Expansion of the current study could include a further examination of gender and racial differences, the impact of economic class as well as the influence of these and other significant factors on the use of the Internet by this group; a possible study of the elderly in other countries; and research of individual

subject areas such as assistive technology. Finally, this study will be shown to be potentially significant to other teachers of the elderly, especially those who are striving to improve their pedagogical methods and might wish to compare their techniques with others in the field. Those exploring social and government policy implications will also find relevant material here.

6.5 Further considerations affecting research with special populations

There are, however, some factors that should be considered when conducting research into computer/Internet learning with special population groups such as the elderly.

6.5.1 User-friendly physical aspects of web design

Any design for this subject group, whether it is web- or print-based, needs to factor in the limitations of some of the group members, such as diminished vision, mobility problems and other restrictions in their ability to use this medium. As stated previously, the web and print designers are often younger individuals who tend to develop their products for their younger peers. Effective design for this subject group will take some special consideration. For example, the author used a larger font size and shorter line lengths for greater visibility on his practice-based website. He experimented with a Java Script program to allow users of his course to quickly and easily change the background and font color. Despite the general lack of interest expressed in the interviews for changing font colors, this Script for changing font and background colors can quickly make the screen more readable, regardless of personal preferences for the design aesthetics.

6.5.2 More user-friendly structural aspects of web design

Currently online courses are too complex for widespread adoption by this subject group. The learning curve for a typical online course site is much more intensive than other adjunct learning tools such as playing a DVD or purchasing a book on the Internet. For example, the user would have to find the site, and negotiate through any login requirements (there were no logon requirements on the author's course site, but this is often not the case). Once they entered the course site, they had to navigate through the learning modules, case studies and other components. Even though many online courses are too complex for this subject group at this point in time, that trend will probably reverse itself as a larger percentage of this subject group is able to more easily use the Internet. Future researchers may want to re-visit this issue and devise their own criteria for testing the effectiveness of online courses for this subject group.

6.5.3 Include special aspects geared to elderly users

Regardless of the observed difficulties in using online courses by this subject group, there is the strong potential for individual components of the course site to be used by either teachers or by many elderly individuals. For example, the author's site has a large resource section that has many links to free and inexpensive training resources, other successful sites for the elderly and access to specialized search engines. Future users may be able to successfully navigate the entire course, or may decide to only use certain components of it depending on their needs and interests. Finally, as a result of the findings in this thesis, the author has determined that most members of this elderly subject group need several things to be successful while using the Internet. To summarize, the elderly need the following:

- consistent and reliable access to the Internet;
- specific reasons to use the Internet (or associated programs, as determined by the individuals);

- a system to navigate through the various learning options;
- the characteristics particular to their age group to be taken into consideration, whether emotional, physical, mental and/or social.

6.6 The recommended hybrid method of self-testing approaches

As a result of the research for this thesis, the author has developed a hybrid method to improve teaching and learning by and for this subject group. This method helps to compensate for the different skill levels, aptitudes and expectations of the subject group and this method will help demonstrate several innovative ways for the subject group to test out the options to find the most effective techniques for their own individual circumstances. This Hybrid Method encourages students to test-out of several different learning methods, along with the motivational devices, to help these individuals develop their own style of successful learning.

6.6.1 Sorting and processing the learning methods

The first step is for the subject group member (or a class instructor) to create his or her own hybrid. The approach here will be to test-out most or all of the recommended learning approaches listed above in a thorough and systematic manner. Even if only a few of the methods are tested, there is an excellent chance that the subject group member will benefit by expanding his/her approach to learning. Even in the worst case scenario where individuals found no use for any of the methods they tried, at least they would have eliminated unproductive areas and moved closer to understanding what an effective long-term training method for themselves would be. Below are several of the prompts to help these individuals determine which approach is best for them.

6.6.2 Practical experience

The most basic method of testing the recommended learning approaches listed above is with actual practice on the computer through trial and error. This is one of the most fundamental, yet effective ways of learning how to use the Internet and to test-out some or all of the recommended methods. John Dewey, considered by many to be the father of modern education, saw practical experience as the undivided continuous transaction or interaction between human beings and their environment. He included such things as feeling, doing, suffering, handling, and perceiving as part of the process. Dewey saw experience as the organic intertwining of living human beings and their natural and artificial environment. He went on to explain that experience as a whole includes all that is experienced as well as the experiencer and the way he experiences. Experience differs from person to person; each undergoes and acts differently. Each has a different "angle of vision" which touches upon a common world, (Dewey, 1983).

Howard Gardner, founder of the Theory of Multiple Intelligence mentioned earlier, sees the best way to assess a person's intelligences is through a realistic appraisal of their performance in the many kinds of tasks, activities, and experiences associated with each different intelligence. Rather than perform several artificial learning tasks, the subject group member should look back over the kinds of real-life experiences they have had in the seven areas mentioned previously. During one course that the author attended, the lecturer explained that this software (3D Studio Max) requires the average person around 100 hours of practice to learn it. So, despite the method of education, there is generally a need for hands-on practical experience. Subject group members will be encouraged to personally test as many of the recommended methods to get a sense of what will work best for them.

6.6.3 Keeping a journal

Another basic method of testing-out the recommended learning methods is for subject group members to keep a regular journal that they use to monitor their computer-related goals and progress. Journaling is a way to help explore your relation to technology, especially computers and the Internet. Writing down your thoughts and feelings can take you more deeply into each issue and help you to set goals and overcome limitations. Humans are creatures of habit, and they create patterns and routines. Keeping a journal can help in keeping track of the routines and how they can be applied to learning. The author has developed a journal (appendix) that will help subject group members organize their study and to measure their progress through time.

6.6.4 Socratic questioning

In Socratic questioning, the teacher acts as a questioner of the students' points of view. Instead of lecturing to students, the teacher participates in dialogues with them, aiming to uncover the rightness or wrongness of their beliefs. This method could be used with subject group members to gather their feedback on how effectively the different learning approaches and motivational devices were working. They would share their ideas about how well the methods work, and the teacher would guide the testing of these ideas for clarity, precision, accuracy, logical coherence or relevance through specific questioning. This rigorous scrutiny would have the potential to sharpen the subject group members critical thinking skills so that they cycle through the options and eventually devise an effective learning approach for themselves, based on their specific background, aptitudes and needs.

6.6.5 Mind mapping and decision trees

Mind mapping is a method for generating and organizing ideas, largely inspired by Leonardo da Vinci's approach to note taking. Mind maps use pictures, images, color-coding, highlighting to stimulate the creative association and enhance the memory. Mind maps would be another option for subject group members to process and evaluate the learning and motivational device options. The mind remembers key words and images more than sentences. Mind maps use key words and key images, allowing a lot more information to be put on a page. The organization of a mind map reflects the way your own brain organizes ideas. Mind maps are also useful for: thinking through complex problems, and presenting information that shows the overall structure of the subject.

6.7 Additional findings and recommendations

As a result of the interviews, participant observations and general readings, the author has developed several recommendations for others teaching members of the elderly subject group.

6.7.1 General pedagogical recommendations

- Flexibility and persistence are the keys to success with this method. Each individual (with the help of the instructor) will determine the best learning method for themselves. Although a typical class may have several students who decide to pursue one learning style with identical motivational prompts, this may shift over time for each individual, based on their evolving attitudes towards, and feedback from the methods they examine. By establishing a formal, yet flexible structure for testing out new approaches, students have the real potential of continually staying on course through self-correction and taking some responsibility for their own learning.

- The need for teaching assistants (TA's). The author has used the help of teaching assistants (TA's) for several of his courses. Some of the TA's have volunteered to help while others were hired by the author or by the university. The primary advantage of having a TA is that they can walk around the classroom and help the inexperienced students to keep up with the general pace of the others. Having a TA allows the author to focus his time on directing the class as a whole rather than continually stopping to help individuals who are not able to keep up with the pace. The administration at both universities where the author teaches have made it clear that they usually don't have money to hire TA's and they do not appear to either accept or reject the notion of the author hiring his own helpers. The TA's that the author has hired or recruited have ranged from other instructors with high levels of experience, to keen beginners who were willing to help out.

- The need for instructor's patience. The author has found that when teaching this group, a large amount of patience is required. This is due to a combination of factors covered in this thesis, including the fear of technology, lack of previous experience, physical limitations and other issues.

- The need for a projection system. Teaching this subject group requires a 'live' computer with a projection system for best results. The author has experience both teaching with and without the use of a projector. The projector provides a point-of-reference and allows the instructor to effectively demonstrate the various skills while controlling the pace of the class. Without a projector, the instructor must provide a much more detailed level of explanation and be willing to continually pace around the room helping many who are not able to understand the verbal instructions. A low-cost option is a simple device that allows the

instructors computer to be connected to a television, providing a modest level of visual feedback.

- There is also a general need for more understanding of the ageing process in the U.S. Every medical school in the UK has a department of geriatrics; half of the medical schools in Japan have geriatrics departments, but there are only three such departments in the entire U.S. In fact, 113 of America's 126 medical schools do not require even a single course in geriatrics, and fewer than 4 percent of medical students take an elective course in the subject (Dychwald, 2000).

6.7.2 Recommendations for ease of comprehension

- Use a large font size on the screen, 14 or larger. The sans-serif fonts, such as Arial, are easier to read.
- Maximize contrast of characters to background.
- Minimize glare with a glare guard.
- Minimize clutter and irrelevant information
- Use multiple sensory modalities to communicate information. For example, combine auditory, visual and kinesthetic learning methods as much as possible (covered earlier in the thesis).
- Highlight the important information on the screen and provide navigational aids as much as possible.

- Use adjustable input devices if possible (different mouse). Adjust for slower mouse double-click speed setting. Adjust for slower mouse pointer (cursor) speed.
- Keep software procedures simple. Older adults may have difficulty remembering commands and complex procedures for performing tasks when using software. Provide on-screen reminders of basic commands.
- Teach the use of toolbars. Instead of trying to remember which pull down menu to select to print a document, students can simply click on the button with the image of the printer. If you are teaching more than one software program, show students how many of the buttons are similar on both programs.
- Teach the use of on-line "help" features. Show students how to be as independent and self-reliant as possible. This will keep the pace of the class from slowing down too dramatically, and will help them manage later when there is nobody there to help them.
- Special assistive technologies such as screen readers, voice recognition, or optical readers may be necessary for persons with severe visual or other impairments, (covered earlier in the thesis).

6.7.3 Classroom structure and logistics

- Small classes with people of similar skill level are recommended. Combine a lecture and demonstration format with allowing each student to ask questions and receive individual help. As mentioned earlier in the thesis, having a teaching assistant is highly recommended for keeping the group at approximately the same pace.

- Try to make the learning environment as relaxing and non-threatening as possible. Use metaphors to help students understand concepts in a language that they understand. You could also encourage participants to bring along friends and family to the first couple of classes to provide a sense of security.
- Keep the classroom as free of distractions as possible. Try to keep noise in adjacent rooms and hallways to a minimum.
- Make sure students can see and hear the instructor. Provide seating as close to the speaker as possible so that those with impaired hearing can read lips and see the facial expressions of the instructor. Consider using visual aids and sound systems to increase understanding.
- See if you have any flexibility in schedule classes so that the elderly can choose which times they prefer. This may reduce distractions and help maintain more focus.
- Provide more rest pauses for stretching, moving about, and use of the bathroom. Limit sessions to a maximum of two hours to avoid fatigue.
- Allow more time for questions and discussion in order to increase time available for information processing. Discussion allows the students to fully understand the information to be learned.
- Provide plenty of hands-on practice time. Include more time for the rehearsal of new skills.
- Allow longer response time for the learner to respond after asking a question. This gives the learner time to hear, understand the question, and come up with a response.

- Allow older adults to complete tasks at their own pace as much as possible. Here is one area where having a teaching assistant can be very valuable.
- The author had to continue reminding himself that these elderly students are not “naturally slow,” but just need some extra attention. Expect a greater number of errors but understand that older adults can learn to use the computer. In fact, most of the students are enthusiastic and are keen learners.
- Try to make every older adult to feel that his or her opinions, needs, and thoughts are important. Try to develop rapport by learning the student’s name and something unique about them.
- Speak distinctly and slowly to accommodate hearing loss and slowing of speech processing. Provide careful directions for the different techniques used in class.
- Try a variety of teaching methods to see which ones the students are most comfortable with. For example, the discovery method is where learners attempt to find their own solutions to problems with minimal help from the instructor.
- Model (demonstrate) procedures and skills to be learned, several times if necessary. Consider asking an older adult with little computer experience to help with the instruction and model some of the procedures.
- Make learning objectives clear and explicit. Break instruction into small units with specific goals. This should reduce the amount of processing time required by older adults by helping them group the material. If

possible, structure tasks to be simple, independent and sequential. Allow practice after each step.

- Encourage students to take notes. Let students know that they need to do more than sit there and be entertained if they want to master the material.
- Help students to see the relevance of the class concepts. Relate material to projects or hobbies where they might be able to directly apply the information.
- Allow the elderly to work in pairs. Partners may be useful in helping one another to solve problems that they encounter. Both the beginner and the experienced student usually benefit from the interaction as long as they are both doing their share of the work.
- Provide information in pictorial format in addition to text. This may reduce the number of errors committed by students. Provide screen shots while lecturing. If you have the time, create handouts that have the exact step-by-step directions for common procedures.
- Evaluation: usually the courses for the elderly are not graded. It is up to the instructor if they want to develop some kind of evaluation procedure, such as an exam or practical project. Provide certificates of achievements if possible (Umiker-Sebeok, Thompson & Crosby, 1999)

6.8 Conclusion

This research during the course of this thesis has provided the author with the opportunity to explore the relationships between the elderly, health, technology and education. Over the last eight years, the author has studied many related areas, such as the appropriate use of language, evaluation of

Internet sites for credibility, self-testing for aptitude development, designing effective online learning materials, the use of assistive technology for those with physical limitations, and much more. All of these components have contributed to the general understanding of this elderly subject group, along with the author's belief that a flexible approach is often required to achieve the best results.

As the technology demands of older adults continue to grow, the need for effective training programs also will increase. My academic research along with my immersion in this subject as part of the elderly classes and interviews provided insights into the process of effective teaching of the elderly. Every person observed and interviewed had a slightly different approach to learning. They were willing to try different tactics but these individuals were often seeking a reliable learning approach that would help them master the Internet effectively. I was surprised that the participants were very eager to talk about their experiences of learning to use the Internet, despite their frustrations and setbacks. I experienced sincerity, honesty and openness from the interviewees. The participants and interviewees offered a wide range of ideas about the issues, roles, learning processes, types of learning activities, influences, benefits, favorite Internet topics, and motivations they experienced. The different levels of participation among the subject group members were interesting. For example, one of the interviewees, was designing complex websites, while others were barely able to start the computer on their own. Adapting to the participants in this study required me to hear complex stories and to attempt making sense of them, always from a supportive perspective.

This study demonstrated the validity of the theory that self-directed learning, combined with a systematic experimental testing of the learning options process, is the best method in many different circumstances. However, there are inherent vast differences between the individuals in what Internet training

resources are available to them in their town or village, and which learning approaches actually work for them. The ability and willingness of elderly learners, and their teachers, to continually experiment with the learning options will eventually be successful in matching them up with what is actually available with a system that will provide results. Rather than focus on one teaching method or theory, I would like to make the point that they all have certain advantages and disadvantages.

The study also revealed that these older adults looked to the Internet to expand many aspects of their lives, such as the knowledge of current events in the news, personal financial research and inter-family communications. This study also revealed that each participant integrates learning into his or her life through a complex blend of actions, beliefs, processes, preferences, attitudes, goals, and personal history. It is hoped that this research can be generalized among other groups in other geographic areas. The results of this research challenge the myths that are often associated with ageing and suggest that more should be done to promote Internet use among the elderly subject group. These findings, especially the hybrid approach, have widespread applications in a U.S. educational system that seems fixated on a single approach (classroom-based learning), along with an overuse of IQ testing, which is largely based on mathematic and language ability and does not account for other intelligences. Experimental self-testing goes on with or without any official approval, and the potential for systematic and innovative application has the potential to rapidly improve the learning options for a large percentage of this subject group population.

APPENDIX A:

CONTENTS AND INSTRUCTIONS FOR THE ATTACHED CD ROM

Contents

The preparation of this thesis included a practice-based project web course along with several other web-based learning resources that the author developed. These are included on the attached CD ROM:

A. Web course:

This course was designed by the author to encourage the typical subject group member tests and apply his/her Internet-related skills. Health research was chosen as the theme for this site. This practice-based web course also allowed the author to experiment with related concepts, such as a navigation system (hourglasses), sorting high quality sites (credibility checklist), along with other issues that have the potential to make the Internet more understandable for the group.

B. Additional components:

1. Early prototype web site (*Computers Made Easy for Seniors*) — this was a predecessor to the online course. I received a grant from the college where I was teaching to develop this site to encourage the elderly to learn more about computers. The site was indexed by the Yahoo search engine and remained highly ranked for several years. Most of the material from this site was incorporated into the online course mentioned previously.

2. Skills testing — After reading an article in the British Medical Journal about the assessment of nurses, I experimented with a similar model to help the elderly identify their strengths and weaknesses in using computers and the Internet. This assessment is based on a questionnaire (included in the thesis) where elderly computer users rank their basic skills and then look for any "flat spots" in the wheel below.

3. Java scripts — this script allows elderly users to choose the background color of their website. Learning basic Java helped me to understand computers better and prepared me to develop future applications in this area.

4. Combination interface — I designed this experimental site to be an "all purpose" webpage that has access to entertainment, emergency contacts and other areas of interest..

5. Electronic scrapbook — this allowed me to keep up with the various projects and share them with colleagues and elderly subject group members.

6. Interview site samples — originally I posted the interviews to allow the subject group to critique the interview and also to share the experience with colleagues.

7. Mind Map — another experimental option for communicating information through another venue than the usual standard text-based approach.

8. Another interface for the *Computers and Internet Made Easy* site, and to gather new interviewees.

CD ROM Installation

This CD was primarily designed for the Windows operating system, but should operate on Macintosh computers also.

- Place the CD disc in a CD-drive.
- Double click on that drive (i.e. D: or E:) to open it.
- Double click on the file “index.html” to view the web on the browser (N.B. the various websites described cannot be accessed unless the computer is connected to the Internet.)
- The size of all of the files combined is under 1 megabyte.

This program will not change any system files on the computer.

APPENDIX B:

INTERVIEWS

As discussed elsewhere in this thesis, the author spent over 100 hours performing detailed interviews with 14 elderly computer users along with five other teachers. Originally, the author developed a questionnaire that encouraged the subject group members to describe their technological experiences, expectations, frustrations and their practical applications. The author mailed the questionnaire and followed up with an in-person or telephone interview. After a year of experimentation, he discovered that it was much more effective to be flexible and spontaneous during the interviews, while retaining most of the original questions. This allowed the subject group member to elaborate and expand on appropriate topics, while minimizing other topics where they had no experience or interest. Originally the rigid questionnaires received simplistic one-word answers from the interviewees, while the more spontaneous interview format succeeded in bringing out much more detail from the subject group members. The author has worked for several years as a journalist in the U.S., with his news and feature stories published by several large daily newspapers. This approach was consistent with his professional journalist background. The author also reviewed the literature on telephone survey methods as detailed elsewhere in this thesis. The original questionnaire is provided in the Appendix.

The author also developed a basic set of coding to begin to categorize the subject group for later observation and insight. The methods of dividing and segmenting this subject group are diverse and continually being revised and updated. This basic code system only provides some clarity and continuity.

A code system developed to help categorize the interviews	
Middle Income	MI
Low income	LI
High income	HI
Retired-young (age 65-75)	RY
Retired-old (age 76-90)	RO
Former career- clerical	CC
Former career- trades	CT
Disabled- physical	DP
Disabled- mental	DM
Previous computer experience	PC
No computer experience	NC

There are two categories of interviews below.

The first section has the best 14 of the 20 interviews that the author conducted with members of the subject group. These interviews run chronologically over a two-year period. Please note that the author has tried to provide a verbatim account of the interview and will be using first-person language throughout. Please note that during the first interviews the author relied heavily on the questionnaire, while the later interviews are mostly based on telephone or in-person interviews. First names only are used to protect the privacy of the interviewees.

The second section contains the findings from a questionnaire sent to five individuals who teach computer and Internet skills to the elderly to get their opinion and feedback, and additional information is included there.

B1. Subject group interviews

Interview #1 of Mr. Elton_____. 2001. Interviewed by Rick Sheridan. Palo Alto, California, USA. 13 October.

On October 13, 2001, I interviewed Elton, a retired stockbroker who lives in Palo Alto, California, at his home. I also did a follow-up interview by telephone.

This was the first formal interview that I conducted, and I was able to spend almost two hours working with Elton on his home computer. This process gave me the chance to observe him working on the Internet under various conditions. Part of the time I taught him basic navigation skills and observed him trying a variety of computer and Internet skills. My objectives were to get a sense of how a typical elderly person would use the Internet in a relaxed home setting. I taped the interview with Elton to get a more accurate transcript of the discussion later.

Background information: Elton is a 77-year-old man who recently celebrated his 50th wedding anniversary. He has been using computers for over 10 years, mostly while at work. The financial stock quote machines that he has used at work since the early 1960s were very similar to computers — he would type in a symbol and would receive a current quote. Eldon has always been interested in technology: "I was the first one in the office to have a hand held calculator when the others were still using a slide rule. I think it was about 1962," he said. This is the third computer that Elton has owned (at home) over the last 10 years. He is mostly self-taught, but he did take one computer skills course from a local university. Although he was a little slow, Eldon was able to work through word processing and Internet tasks with minimal difficulty. He appeared to be patient and deliberate. Eldon was

very interested in having me show him some advanced features of Microsoft Word, and was reasonably quick to understand what I showed him. His general health appeared to be good, except for stiffness with his posture and possible eyesight problems.

Below is a summary of my observations from the interview questionnaire that I gave him:

Elton is confident in his attitudes towards technology. He gave himself a top-rated "10" for his ability to use many of the technology items, such as the Telephone, Pocket calculator, Typewriter, TV and remote, Computer - word processing, Internet.

Other questions that he responded to:

If you own a computer, what do you use it for? Please check all that apply. Elton uses all of the features of a computer, except for games. He especially enjoys email, performing financial calculations and he has recently purchased a digital camera.

For which of the following specific activities do you need the computer? He communicates with friends and relations by email and uses his computer for tax matters and investments.

Do you have any fears about working on a computer? N/A

How would you like your tutor or teacher to help you with your project? He chose: By working in your own environment with occasional visits from a tutor. He gave face-to-face a 100% balance.

What minimum size would you like the letters? Elton chose the "2"

COLOR: Has the color of your monitor or the text ever affected you in a good or bad way? He said "no," that it had not affected him in either a good or bad way.

What is your opinion about the appropriate balance of text and image (example: mostly text is OK, prefer a lot of graphics)? He wrote "Text is OK,

but picture examples in sequence is the best for the author, especially with pictures that show exactly the same as the compute screen shows."

USING YOUR OWN COMPUTER, which of the following do you find difficult to use? He wrote: "installing software is sometimes confusing." All of the other tasks in the list he could do except for occasional problems with the scanner.

Advanced skills — do you know what these do on a computer? He checked: Bookmarks or favorite sites and Multiple search engines. He can't use: Creating an alias and Changing Preferences.

Can you use the email programs on your computer? Yes, he uses email almost every day.

If so, how did you learn how to use it? Self-taught.

Who did you send your first email to? A friend (can't remember specifics).

What difficulties did you find using emails? He can't understand aliases.

What is the benefit for you in using email? "Quick to get message out to multiple addresses, and get a quick response. Convenience."

What difficulties did you find using the Internet? "Narrowing a category to obtain exactly what I need to find." He appeared to get excited about a topic and not be able to easily find his way back to the original site.

What is the benefit for you in using the Internet? "I can obtain information on so many subjects easily.

A few weeks later, I did a follow-up telephone interview to get more detailed information from Elton, below is a transcript:

Rick Sheridan (RS): How long have you been using a computer?

Elton (EB): I've been using computers for 10-15 years. Our first computer at the office was a Hewlett Packard HP 65. You put little slips (tapes) into the computer that had a particular on them. Eventually we also got better quote machines and everyone got one on their desk. These ran off of a central mainframe computer. We had a server in our office and the information was relayed from New York (Wall Street). The first quote machines that we used

at work probably qualified as computers. They were ticker tape machines, you punched in the symbol and the tape looked like a telegraph tape. Heat sensitive tape. Quotron was the brand name. These Quotron machines had vacuum tubes. Two tubes would light up to represent the number two. We only had one quote machine for an entire office full of people. I was the first one in the office to have a hand-held calculator. The others were using a slide rule. This was 1962.

RS: How long have you had a home computer?

EB: Well, this is the third one that I've had, I started with some brand that has now gone out of business (can't remember the brand). I've had a home computer almost 10 years now. I'm self-taught mostly, although I did take one course. I took a course at Foothill College in programming. I wrote programs for using punch cards. You would get a stack of cards and give them to the person who was running the main computer and you would get a printout. That was a laborious process (laughter).

RS: Have you had any technical challenges with the computer? If so, how have you solved them?

EB: A couple of days the mouse stopped working. I called my computer supplier since the author has a pretty good relationship with him, he built the computer in the first place. He said that it would be cheaper for him to just sell me the mouse since the labor on it would be so high to find out what was wrong with this one. I also had a program that I could not install properly. It turned out that the video card was bad and I took it back to the same friend. That solved that problem.

RS What computer or Internet training have you taken?

EB: I did take a course at the Senior Centre, oh about three or four years ago. I have a manual from that, and I look up things if all else fails. I also like listing the steps chronologically, the same as Rachel. It is very well documented and quite explicit. The manual was written by the teacher of the course. The course was called Having Fun With Windows 95 and there were about 12 students. What I'm planning to do.... I'm going to go and be a tutor

in a class at the Senior Centre. I think that you can learn more that way than practically any other way. You keep getting separate questions and eventually learn the material.

RS: Did your children or grandchildren get you started with computers or the Internet?

EB: No, I started using it first. I got the computer first. They learned a few things from me and I probably learned a few things from them, but I can't remember.

RS: So, you are able to type a letter effectively? Can you change the margins? Work with templates? Any other skills?

EB: I have a hard time to work with margins. I need a reference book right in front of me. I've never really used templates but I know that they are there.

RS: What is your primary use for the computer, typing letters? Researching investments...?

EB: A lot of e-mail. I guess that is probably more than anything else. Mostly sent to friends.

RS: Your choice of training?

EB: One-on-one would be the best, because you don't have to wait for the instructor to help the others.

RS: When did you first start using the Internet?

EB: Sometime in 1996. I never really got any training in how to use the Internet. I just started asking questions. All I really had to do was to put in the 'www.' I go to Google.com for research and I also go to financial sites such as Quicken.com. I've been using my computer for printing pictures. I have a digital camera and a scanner.

RS: Thank you for your time and consideration. Let me know if you have any follow-up comments later.

Interview #2 of Mr. William_____. 2001. Interviewed by Rick Sheridan. Cupertino, California, USA. 14 October.

On October 14, 2001, I interviewed William, a student in my Internet for Seniors class in Cupertino, California.

This was the first time where I had the opportunity to interview and observe actual students during one of my "Internet for Seniors" classes. This process gave me the chance to observe them working on the Internet for several hours under different conditions. Part of the class was devoted to teaching them basic navigation skills and part of the class was focused on combining several research techniques (multiple search engines or web bots). The interview process in the class was shorter than the time that I was able to spend with Elton in the first interview, but this situation had its advantages as mentioned above. My objective was to successfully teach this half-day class and observe about 14 seniors in a classroom setting. I tried to "read between the lines" on his questionnaire and add my personal observations.

Background information: William is a 79-year-old retired teacher who was one of my hardest working students in a one-day Internet for Seniors workshop that I taught recently. William kept up with the material and appeared content to work on both word processing and Internet skills that I presented throughout the workshop. He is mostly self-taught, but he did take a few computer skills courses from a local community college.

Here are some of the other observations and results from his written survey: William is fairly confident in his attitudes towards technology. He checked off most of the technology items on the survey, such as the Telephone, Pocket Calculator, Typewriter, TV and Remote, Computer - word processing.

Other questions that he responded to:

If you own a computer, what do you use it for? Please check all that apply. So far, William only uses his home computer for word processing (e.g. for letter writing). Part of the reason that he took my class was to learn the basics of how to use the Internet and email. Specifically, he wants to

communicate with relations by email, and use the Internet to do genealogy research and to investigate related topics. He also plans to start keeping a personal diary on his computer.

Do you have any fears about working on a computer? William said "no," he did not have any fears about working on the computer.

Which of the following physical environments would you prefer for computer use? He chose: A separate study area.

How would you like your tutor or teacher to help you with your project? He chose: Working in a classroom with an Internet site that has support materials. Below that he wrote: "Someone who would come to my residence and help. Costs would have to be low."

What balance of tutorial support do you think you would need? He chose: Telephone 20%, Face-to-face 80%.

What minimum size would you like the letters? William chose the "3."

COLOR: Has the color of your monitor or the text ever affected you in a good or bad way? He wrote "no affect."

What is your opinion about the appropriate balance of text and image (example: mostly text is OK, prefer a lot of graphics)? He wrote "Text is OK, but I prefer a lot of graphics if possible."

USING YOUR OWN COMPUTER, Which of the following do you find difficult to use? All of the tasks in the list he could do.

Advanced skills — do you know what these do on a computer? He wrote "no" for all of the advanced skills.

What difficulties did you find using the Internet? William has been attempting to learn the Internet recently. Since he does not have it connected at home yet, he wrote: "Finding it available" for the question about what difficulties did you find using the Internet.

What is the benefit for you in using the Internet? He is determined to learn the Internet for several different research projects that he is interested in.

**Interview #3 of Ms. Elaine _____. 2001. Interviewed by Rick Sheridan.
Lawrence, KS, USA. 23 November.**

On November 23, 2001, I interviewed Elaine, an administrative assistant who lives in Lawrence, Kansas, USA. This was a great opportunity to interview a senior who uses computers every day at work. I was able to spend a half-hour observing and interviewing Elaine at her office. We spoke about the Internet and about her experience with technology while she performed a variety of her typical work-related tasks, such as text entry, database work and e-mail monitoring. Although she is fairly new to the Internet, Elaine appears to have enough computer and technology background to make the transition smoothly. She is enthusiastic about the ability to communicate through e-mail. The objectives for the author during this interview, was to get a sense of how a typical senior would use the Internet in a work-related setting.

Elaine is generally interested in technology and is not as frightened of mistakes as many of the seniors that I have taught over the last three years, "My only fear is that I might erase something important on the computer," she said while working through her daily routine. "My kids will tell me to do one thing, but I can't find it on my computer. What they tell me to do does not always work," she said with relative confidence.

Here is a summary of the questionnaire that I gave her:

Elaine is able to use most of the items that I listed under technology. She gave herself a "10" for most of the items such as a TV and remote, computer-Internet. Although she does not own a mobile phone or health-related assistive device, this does not appear to interfere with her basic computer aptitude. She learned many of her basic computer skills at a local business college over 10 years ago.

Other questions that she responded to:

If you own a computer, what do you use it for? Please check all that apply. Elaine has owned a computer for several years and spends a combined total of about 8 hours a day on the computer at home and work.

For which of the following specific activities do you need the computer? She communicates with friends and relations by email and uses her computer to type out traditional letters and perform basic financial calculation with Microsoft Excel.

Do you have any fears about working on a computer? She said "no."

How would you like your tutor or teacher to help you with your project? She chose to either enroll in a course with other students or working in her own environment with occasional visits from a tutor. For the balance of tutorial support question, Elaine chose 90% face-to-face, and 10% from a book. She has tried telephone lessons (from her son), and did not find it to be very effective.

What minimum size would you like the letters? Elaine chose the "3"

COLOR: Has the color of your monitor or the text ever affected you in a good or bad way? She is aware that color can influence the quality of the computer experience, but has not made much efforts to change the settings, "I adjusted the color just for my convenience," she said.

USING YOUR OWN COMPUTER: Which of the following do you find difficult to use? She was not intimidated by any of the computer's components and has actually connected a printer, installed software and other intermediate skills. She has used computers long enough that she actually prefers to use the keyboard for everything (instead of the mouse).

Advanced skills: Do you know what these do on a computer? She has not performed many of the advanced Internet skills, such as bookmarks or favorite sites, multiple search engines, creating an alias or changing preferences.

Can you use the email programs on your computer? Yes, she uses email almost every day, and relies on it for communication between friends and family.

If so, how did you learn how to use it? Self-taught and also through the help of her children.

Who did you send your first email to? Her daughter.

What difficulties did you find using emails? "My children are not receiving all of the e-mail that I am sending them. I don't know if it's the company's (provider) fault."

What is the benefit for you in using email? Fast and convenient communications with friends and relations. She has email communications with her children several times a week.

What difficulties did you find using the Internet? She is just beginning to use the Internet. Because of her good general technology background, Elaine is able to learn the basics of how to use the Internet easily.

Interview #4 of Ms. Rachel_____. 2002. Interviewed by Rick Sheridan. Palo Alto, California, USA. 10 February.

With this interview, during February of 2002, I switched to the more spontaneous interview method format that was still based on the original questionnaire but was adapted to the interviewee's interests, response to questions and other considerations.

RS: Tell me how you use the Internet and what benefits you get out of it.

RB: I look up specific topics that my children (students in her class) are studying. For example, maybe I am looking up animals, looking for their pictures and information about their habits. Well, so I go to Google and it helps me get to that place. What sometimes bugs me is that I really need to get some information and I'm not up to the point where I can do all the steps where I need to go, well he (her husband Elton) will do that and I can pick and choose and I can continue from there. Well, what happens with me is that I don't know enough about the computer and all of a sudden I hit something by complete accident and something (unfamiliar) appears on the

screen or it goes blanks completely. If he (Elton) is not here, I don't do anything for a few minutes and I think: what are all these things (notes) that are on my list that I could try to use to fix the problem... Usually I just have to stop and go do something else and come back to it later to try to figure it out. I use my own shorthand and write down exactly what I should look for when the screen comes up, the exact steps that I need to follow. What I have to do is write down the steps sequentially, because that is the way that I teach. Whatever I learn from him (Elton) I write down in my own words what I'm doing every step. That's the only way that I can go back when he is not here, and do it again. Once I've done it two or three times, I don't have to look at the sheet as often. Now I don't think anything of typing addresses in the e-mail, deleting or that kind of stuff, I just do it. Something that is in short sentences, I can follow anything like that. Some of these (computer) books that we have, when we have a problem, I can't figure out for the life of me what it says to do. I've found that my dyslexic students absolutely have to have everything sequentially. With a computer it is a good idea to teach the things that you have to know first, that is basic.

RS: What difficulties have you had with some of the computer equipment?

RB: The mouse took me the longest time he (her husband, Elton) said to just barely touch it and I did not think that it would be enough to do anything (Double clicking). The other thing that I have not trained myself to do properly is to save. Last night I wanted to write a long letter to my sister and I told her about the first three days of our trip. I had written three complete pages and then pressed print. As I was typing the last page, I thought to myself, Elton has always said to always save. I thought, oh well, I'm on the third page so I will just press print. I suddenly realized that instead of just printing two copies that I might have pressed 12 and so I'll just open up the drawer of the printer to stop the machine. This took the thing off the computer completely and I did not have anything. I was so furious with

myself. (I told her about the AutoSave feature and offered to install it on her computer).

RS: Tell me some of the other benefits that the Internet has given you.

RB: We lead such busy lives that the benefits are many. It's practically instantaneous. The person can respond right away. It does not matter if the person is at home because it does not disturb them. When we got back (from three weeks on holiday) we had about 230 e-mail messages. It's more convenient. If used appropriately, it is not intrusive. We can send messages to multiple addressees. We also arranged a family reunion that we could never have done without e-mail.

RS: How did you learn about using the Internet?

RB: My husband has taught me about everything that I know about the Internet and computers. At some point it would be valuable for me to take a beginners course. There are little glitches from time to time, and I'm not sure what to do. I've learned to save everything that I'm working on. It's very discouraging to type three to four pages and then lose it. One thing that Elton has taught me is to title and save everything from the very beginning.

RS: Has there been anything that has prevented you from taking classes, such as the cost, location, being together with people who are either too advanced or too slow for you?

RB: I think that the big problem right now is that I don't have the time. A private tutor would be helpful. Another way that I have been doing it is when I learn something that I've not done before, I jot down a few words in the margins of the books that I use.

RS: Have you ever tried any distance education training?

RB: The only reason that I have not tried that is because I am so busy with grandchildren, friends that are our age who are ill, along with my teaching,

there is just no time left over. I will take that time in the future to either take a beginners class or try some distance education training. When I'm stuck, Elton shows me what it is that I need to do, and if at that time I jot down notes in the book how I know how to get out of the mess that I have gotten myself into, then usually I can go for quite some time before I have one of these debacles again. I feel like gradually I am eradicating a lot of the mistakes that I make. He (Elton) was the one person in every office he has ever been who could read the directions and put a desk together when it would not fit right. He finally decided that he was spending so much time putting desks together and answering calls for help that he really didn't have time to do his brokerage business (laugh).

RS: Do you have any favorite Internet sites that you go back to regularly?

RB: I personally don't, I occasionally look up things for my students, but many of them are further ahead than I am so they look it up. I use google.com, yahoo and britanica.com, AskJeeves, and then the Smithsonian Institute home page. These sites provide the information that I need.

RS: Any other challenges or limitations when using the computer?

RB: I find that the computer is very tiring if I use it more than two hours. By then my eyes are really tired. At the end of two hours I'm reminded of how exhausted I am. I prefer the space in the back of the computer to be a wall since windows give the screen a glare. I like to be able to look out the window, just not right behind the screen. When Elton and I get stuck, we go down to the senior's centre and get some advice from others there. Elton just got a Morse Code software and some man at the senior's centre was very helpful. It was some strange little thing that needed to be done to get the software to work.

RS: Do you mind if I ask who most of your e-mails go to?

RB: Most of my correspondence is to grandchildren and other family members. E-mail has been very helpful for any family emergencies. It is wonderful and I use it all the time. One of my relatives has a grave illness and e-mail has allowed her and I to stay in contact on a daily basis. I don't like e-mail when it's used furiously. One and two page joke-style messages. If they ask us outright if we have time to read it is not so bad. I have a distant relative who was sending me tremendous amounts of information about the situation in Afghanistan, but we have very good sources of information here in Palo Alto, so I told her just how much I appreciated her thinking of me, but that I have direct sources here that were providing me with the same information.

RS: Do you ever change the font sizes in your e-mail message? How about color, do you play around with that?

RB: Not so much with e-mail. I do change the fonts and colors for letters and a greeting card design program that we have on this computer. Yes, I'm getting there.

RS: What other computer skills have you learned?

RB: I can bold now, put it in the middle (centering), it does not upset me to underline when I need to. It gives you a great feeling of power cause I'm not a machine person. I'm absolutely not mechanical at all, although I do have a sewing machine that I can take apart if there is something wrong with it, and put it back together. But I don't think of myself as mechanically oriented, I think that lots of women don't which is why they don't think that they can use the computer. I think that lots of people are capable of using computers and the Internet, but I think that women in particular underestimate what they can do.

RS: What was your education and career?

RB: I went back to university when I was about 50 and trained to be a reading specialist. Since 1983 I've worked with children with reading disabilities, including dyslexics. They can use the computer, but they have problems of access since many are low-income and minority students.

RS: What kind of training would you like if you had a choice, such as classroom lessons, distance education, one-on-one tutoring, through a book, and so on?

RB: Probably one-on-one tutoring. You can move so much faster because everyone is different, some people can move ahead quite quickly and others get stuck on one particular kind of a process. Also, some of this has to do with if you are visually oriented. That would be it — working in your own environment with occasional visits from a tutor. Of course you would like to learn on your own computer, because that is what you are going to be using. That's ideal, but might not be cost efficient. If you were in a place where there were several computers with small classes it would be almost as good.

Interview #5 of Mr. Richard_____. 2002. Interviewed by Rick Sheridan. Chico, California, USA. 21 February.

On February 14 and February 21, 2002, I interviewed Richard (Dick), a 74 year male student who I originally met at a local poetry reading. Dick is living in Chico, California after managing several natural food stores in another part of the state. He has recently written a book of poetry and had it published. Dick is planning to put the text on CD-ROM and include some spoken material along with sound effects and drumming. His computer has a CD burner and he has learned how to use it with the help of some friends. He also did some of the typesetting for his poetry book on his computer. The poetry has a lot of his personal travel experiences in it.

Rick Sheridan (RS): Have you taken any computer or Internet classes?

Richard (RC): I started and I was not very successful at it. When I first moved to Chico I took a class... it had something to do with computers. I felt like going out there was more trouble than I was getting out of it. I already understood the skills they were teaching. One thing that I have to do is to be more consistent in putting the time in. One of the problems is that I have Multiple Sclerosis. With MS you get that cramping and it limits my computer use.

RS: What other ways have you tried to teach yourself?

RC: When my family lived in Malta, back in the 1960s, I bought a 'teaching machine' and I really liked it. It was a simple machine where you scrolled through text manually, and at the bottom there would be a question. You (the machine) states some facts and then poses a problem. This method might be helpful for computer studies. I also attended one year of law school through LaSalle Extension University that had a home study program. I loved the approach that they used for teaching. They used a similar approach where they would feed you some information and then you would work on a problem. This Socratic approach gave the students the information and then posed a problem. You would analyze the chapter that you read and then apply the law case to the problem. I was also involved in a local theatre group and I had to memorize up to 35 minutes worth of lines for a play that we were doing. This experience may have helped with my general memory skills.

RS: Does your wife share her computer knowledge with you?

RC: She doesn't have a hell of a lot (of computer knowledge). Sometimes she asks me the questions. One thing that she seems better at doing, it's probably the patience thing, she will go over everything and make sure that all the little errors are taken care of. Sometimes she will be able to help me with computer or Internet problems, and sometimes I help her. They started

using computers at the school where she teaches, so she had to become more proficient at it. When she gets home from work, she basically just wants to forget about it, but it is not that easy, there are papers to grade. She is chair of her department and vice president of the California Teachers Association, as well as being a classroom teacher. She has my old IBM computer in her study. I got her a larger monitor.

RS: What is your choice for computer training?

RC: A one-on-one tutor would be my first choice. I have two friends who come down from Reading (a city about 90 miles north) and every time that they come down they like to play with my computer. These guys are really into it. Both of them produce videos and they know about technology. They show me a few new skills every time they are here. What would be nice would be to have a dozen people who wanted to learn computers who got together once a week and tried to keep pace with each other. I was able to set up my computer system myself right after we bought it. They provided a big piece of paper (diagram) that had the instructions and illustrations on it. I was able to understand and use this to put the components together. I've got a scanner and digital camera that I've learned to use by reading the manual and from tutoring from friends.

RS: When did you first buy the computer?

RC: I bought it around the first of April, 14 years ago. It was a 286 operating system, no Windows or pretty pictures, and I used WordPerfect as the word processor. In some ways, I liked that old DOS system better. The new software is constantly being upgraded and it is hard to keep up with. If I had any problems, I used to ring this telephone number for technical support that the computer company provided. They would walk me through it. As you can see, I have recently purchased a new Hewlett-Packard computer that has 900 megahertz, a 40 gig hard drive and a 17" screen.

RS: What kind of problems have you had with the Internet?

RC: Well, this morning I got online and looked up a Multiple Sclerosis site through Yale University. They gave me an address so I could go in and fill out this questionnaire. I tried to send them an e-mail and they would not accept the e-mail address that I had (probably not set on his default browser preferences). So I stopped that and I went back on the Internet and I could not bring up that page (their questionnaire) so I had to just stop. Sometimes I hit the print command and I can't get it to stop printing the web pages. I get lots of pages that I don't want (I explained to him how to control the printing output).

RS: You told me that you have Multiple Sclerosis. How has that affected your computer use?

RC: I have to be able to recline while using the computer. If I wear a belt I can sit up for long periods of time, but I don't really enjoy wearing a belt. I go the MS support group site (on the Internet) and find some useful information about my medications and how to keep from getting worse.

Additional observations: Richard is enthusiastic about computers and the Internet, but his physical limitations prevent him from realizing its full potential. He has been able to teach himself quite a lot with the help of computer manuals, advice from friends, and occasional tutoring. While helping him two years ago, I remember that he would allow me to demonstrate the skills, and then either move his chair over and try it himself, or insist that he would never use the skill and encourage me to move on to the next item of instruction. Part of this interview was unique because I tested him on several skills, including his ability to change the type size and font. I showed him how to change the colors of the type and background and quizzed him on what color combinations that he preferred. We also looked at web pages that were hard to read because of their color scheme. Dick

acknowledged the readability problem but was generally unconcerned about it.

Interview #6 of Mr. Ed _____. 2002. Interviewed by Rick Sheridan. Chico, California, USA. 12 March.

Below is an interview with Ed, a retired government employee who I originally met through my lecture at a local group for the elderly. We got together at a local cafe on March 12, 2002.

RS How did you get started in computers?

ES: My sons got me started. One is a computer programr and the other worked for Apple Macintosh. They kept nagging me and I kept saying that I'm going to get one, and about a year after that I finally did. So now they won't help me (laugh). They will help me but they are never around, they are so busy all the time. My middle son graduated in accounting from California State University here, and a professor told him that he couldn't do accounting without being on computers, so he went and took computer science courses and now he is a computer programr.

RS: Do you telephone your sons much when you have questions about the computer?

ES: Sometimes, but I also have a neighbor across the street who helps me, and I have a friend in Oroville (nearby town) who helps me. They either come over (or) they helped me on the telephone. What I've found is that these friends don't know how to teach effectively, so when they start on the computer I have to tell them: 'look, I don't want you to do that for me, I want you to tell me how to do it.' They are really nice people and I really like them. They are patient, but they would do all the work for me if I let them. I tell them 'let me do that.' One friend showed me how to send an e-mail

attachment so when he got home I sent him an e-mail message with an attachment. He rang me to let me know that I did it right.

RS: Have you taken any computer skills classes?

ES: I've taken one class, it was called Internet Made Easy. Since then I've signed up for two courses (coming up in the future). I will be taking Microsoft Word and Microsoft Publisher. Since I do my newsletter on Publisher and Word, I really look forward to learning some new skills on those two programs.

RS: When you took the Internet Made Easy course, were you about an average student? Above or below average?

ES: I'd say about average, but I had a terrible time keeping up with some of the other students. There were some people in the class who were very bright. I wondered why they were taking it they were so smart. But they kept moving out ahead all the time and it was hard for me to keep up. But you know, I took a master's degree at the University of Montana in forestry, I was working at the time, I was probably about 50 years old at the time. I had a terrible time keeping up with those kids. Our professor was going too fast for me. I told him that I could not keep taking those notes that fast. So as you get older, I guess you slow down in that department a little bit. When I hear lectures I have to really concentrate because they go so fast I can't keep up, you know. Was it you that said that when you first get started it takes ten steps to get one thing done, but when you get more proficient you can do ten things with one step?

RS: Yes, approximately 10/1 and 1/10. At first it often takes ten parts of effort to get one part of results. Eventually you start to reverse the scale and it takes less effort to learn the new skills. This is just an approximation; it obviously does not apply to some things.

ES: Well, that's what I feel about these classes, if I only get 80%, that's ok with me. I'm not trying to get an "A" (top mark in U.S. grading). All I'm there for is to learn.

RS: So you use the computer to put out a family newsletter?

ES: I put out number six of my family newsletter the other day. My mother's family, who I am researching, is Portuguese/American. My grandmother had ten children in her family, so I have 38 first cousins. On a sheet of paper, when I print the labels, I must send 28 because I still have one space left. Unfortunately, not many of them have a computer so I can't send it by e-mail. I'd like to do that eventually.

RS: What kind of computer do you have?

ES: A Dell that is a year old. It is pretty powerful and does most of the things that I need it for, but it does not have a (CD) burner built into it. I wish it did 'cause I'd like to put all of my files on a CD.

RS: So, you probably used an electric typewriter most of your life?

ES: No, not really. I grew up with a non-electric. My typing skills have improved considerably since I got the computer. It's easier to press and the text automatically wraps around each line.

RS: Do you have any complicated technology devices, a garage door opener? Any medical equipment? Anything difficult to operate?

ES: Yes, we have a garage door opener, and I have a blood pressure monitoring machine. They both took some practice to get used to, but are really not very complicated. I was able to teach myself how to use them with the owner's manual and by experimenting with them.

RS: If you had your choice of any kind of computer instruction, what would your choice be? Let's say that you could have one-on-one instruction, or if

you could be in a classroom group situation, video learning or distance learning, what would you prefer to do?

ES: I'm not sure. I was going to try one on the Internet (distance education), but I never did. I wondered about the teacher-student interaction, and if I would get much out of it. I've always been in a classroom, some as small as four or five students. I worked for the U.S. Forest Service (conservation) for 30 years and I was involved a lot in natural resource law, and I took a class in that, and what I discovered was that I was there to learn, not to teach the professor. Several times he made mistakes and I corrected him. I learned that you don't do that or they will get upset (laugh). I have three or four computer books. I bought a Computers for Dummies (book title) and I was very disappointed in it since there were not enough pictures or diagrams. The best on that I found was Readers Digest magazine's book "Everything You Want to Know About Computers," my cousin sent it to me. I was one of those special issues that showed me what I needed to know. This friend in Oroville who writes a newsletter and my neighbor across the street who is very knowledgeable about computers, and she is very willing to help me. But I want to take the classes. I'm going to take as many of the classes as I can. Now it's just a matter of finding the ones that I want.

RS: Are you aware of, or do you pay attention to the different colors of the fonts or other elements when you produce your newsletter?

ES: I did the first issue, and then I found out how much it costs to print. I type up one newsletter and I take it to Mailbox, and so on (print shop) and I have them run off 40 copies for me at four cents each. I have a color printer but it is very slow, if I start at 8 am by 6 pm that night I have my copies out of there. It's too slow and it eats up too many expensive printing cartridges. I've fooled around with color but it does not affect me. I'm much more interested in just sharing the information in my newsletter.

RS: Do you have any favorite web sites that you go to?

ES: I've gone to Google, and another one, I can't think of it right now a few times. I read my hometown newspaper on Google once a week. I grew up in Alturus, California, it's up in northeast California. It is a very small town, but they have a weekly newspaper. I've also sent letters to my congressman (MP) on the Internet. I bought things on the Internet, which scared me incidentally. I bought books and CD's. I hate to use that credit card number on the Internet.

RS: You know, I think that it is pretty safe to purchase items on the Internet. From what I've read, the most that you can be held liable for is \$50 if your credit card number is stolen.

ES: I do it, but I have a little fear about it.

RS: Have you done any of the more advanced skills like creating an alias, changing preferences, bookmarks or favorites?

ES: I have shortcuts on my desktop, but I've hardly ever created a new one. I have my newsletter on the desktop as a shortcut, so I can just click on it. I did learn how to send e-mail attachments. I send photos and that sort of stuff. I have a scanner that has an e-mail button on it, and I kept fooling around until I figured it out. I tried for a long time to send attachments without putting them on a file. I finally gave up on that. If I want to send an attachment, I save it as a file and then send it. I have this friend who is a retired newspaper editor in Sacramento. He has written several books on the Portuguese immigrants in northern California. I found out that the Portuguese built these rock walls that you see in the country around here. So a friend here in Chico got a lot of references out of the special collections at the library. I send these as attachments. He was amazed. He had no idea that the Portuguese had built these rock walls that you see along the road.

RS: Have you ever used the templates on your computer? You might know that Word and Publisher have these templates where newsletters and other

items are already partly created?

ES: I've made my own, I didn't like any of theirs (laugh). I spent a good hour searching through those pictures and clip art trying to find a rose. I had a colored rose, but I wanted one in black and white. I had some trouble with that, I can't find that rose that I had once. I don't know what happened to it. There is a million clip art things, I'm just changing it for the fun of it.

RS: What kind of problems have you had using the Internet?

ES: For some reason, Dell lost my password. I could not get back on the Internet, so I called them and called them. We only had one telephone line and the helper would tell me to just do this-and-this-and-this. I'd hang up the phone and then what they told me would not work. I spent almost a month fooling around with that. I finally called them and told them that I thought that it was their fault, not mine.

RS: Have you had problems finding sites that you were looking for?

ES: Well, not really. It might be because I have not looked for that many sites. I can't recall. I may have not used the Internet as much as some people. I'd say that 90% of my stuff is with Publisher, writing letters and with e-mail. I just don't have trouble finding things, I just type it in with Google. One time I went to the Mayo Clinic site and I would not believe how much useful information that they had in there. It was wonderful, they had graphics. For example, if you have arthritis, it shows illustrations of the joints. It's really good. I've probably used the Internet more than I realize.

RS: Do you do anything else on the Internet? Stock or investment research? Weather forecasts? Anything else?

ES: Oh yes, I look up stocks sometime. I don't think that I looked up an investment site, I just looked up the individual stock. I went to Google, and typed in for example PG&E (Pacific Gas & Electric utility company). That's just fooling around. When I get to the newsletter, I'm really serious.

RS: Are there any new features on the computer that you would like to see?

ES: Not really, I've seen these wireless mice. My mouse has a wire on it, but it is OK with me. I have an extra large monitor. It must be a 19" I've been cut off the Internet, maybe that would be something they could improve.

Interview #7 of Dr. Wayne _____. 2002. Interviewed by Rick Sheridan. Chico, California, USA. 10 April.

Here is a transcript of a telephone interview that I did in April, 2002 with best-selling author Wayne Dyer. This interview was for an article in *Magical Blend* magazine, a well-known magazine related to health and spirituality (*Finding the Spiritual Solutions: An interview with Wayne Dyer*, by Rick Sheridan and Susan Dobra. *Magical Blend* magazine, Issue 82. June, 2003). The format of this interview was structured, so I was only able to ask Dr. Dyer a couple of questions related to computers and technology.

Biographical information:

Wayne Dyer, Ph.D., is the author of 17 books, including three textbooks, and is well known for his first book, *Your Erroneous Zones*, published in 1976 and which was on the New York Times Bestseller List for almost a year, eventually selling 25 million copies. He is a psychotherapist and has taught at several U.S. universities. Wayne has appeared on thousands of radio and TV shows, and has been the subject of numerous magazine and newspaper articles. His last book, *Manifest Your Destiny*, and his new book, *Wisdom of the Ages*, are the subjects of two programs for National Public Television (PBS).

Interview:

RS: Hello Wayne, this is Rick Sheridan, a freelance writer for *Magical Blend* magazine. I have Susan Dobra, the managing editor on the other

(telephone) line. We have a few general questions that will probably take about 20 minutes.

WD: OK, go ahead....

RS: I've read your most recent book, *There's a Spiritual Solution to Every Problem*, you talk about having a recent heart attack. How has that changed your approach to living?

WD: Well, I don't think it's really changed my approach to living so much as it's given me a renewed sense of the importance of a couple of things. One is to be in the state of gratitude at all times in my life, and I really work at that. There are really two ways of approaching everything in life: One is through appreciation, which is a way that always strengthens us, and the other is through depreciation which always weakens us. I think that Rumi once said, "Sell your cleverness in search of bewilderment," and I think being in a state of awe allows you to be in the present moment, and a heart attack is an opportunity to get into a state of gratitude for lots of things, including how all your organs work, and all of the people that are there [in the hospital] — that is one of the things that I really learned very quickly. There are an awful lot of people that are dedicated to doing nothing but serving — people who stay up all night, doctors who come in any time of the day or night, even the angiogram equipment was invented by someone who said, "I just want to help prolong someone's life," and I happened to be one of those recipients. It's an opportunity to really be in a state of awe, and I am in that state more now than I was before the heart attack. Also, it's taught me how to deal with uncertainty in our lives. I mean, my daughter's boyfriend, who was 25 years old and always saying things like, "Oh I'm young, I've got lots of time," was killed ten days ago, just drove into a tree in the middle of the night, and his life is over just like that. The future is promised to none of us in the physical, material sense. Today, in this country, people will find out they have cancer, or they'll find out they have some kind of struggle or they will lose someone or their business will go bankrupt or their 401K plan isn't funded. Uncertainty is something that should be embraced, rather than

feared, and I think I learned a lot about that. And I think I learned about mortality and that we are all beings that are going to die. And most of us behave as if we're not. Castaneda says that's the real struggle that human beings face in the world, but we're afraid of death, so we don't admit it and we don't want to confront it, and therefore we miss what he calls our "appointment with infinity." So I've really embraced that and have come to understand that.

RS: How are you now? Are you feeling better?

WD: I feel great, I run every day, I meditate every day, I play tennis. I had a mild heart attack, and I had two stems placed in what they call the LAD, the lower anterior descending artery, and it opened it up, and that was it. It was a block that was genetic, because of the way the artery was shaped.

RS: We are interested in finding out who your greatest teachers have been. I know you actually trained with Abraham Maslow, as a grad student or something?

WD: Yes, during my doctoral years, he was a great mentor of mine, and also very profound teacher. Fritz Redl was another who wrote *Controls From Within*, he was in the Nazi concentration camps, along with Victor Frankl who I was on a panel with in Vienna in 1978, it was one of the great honors of my life. *Man's search for meaning*, I'm sure you're familiar with that. Emanuel Swedenborg, William Blake. If you want to know who the greatest teachers in my life are, just look at wisdom of the ages.

RS: One quick question, how are you adapting to the high-tech world. Do you own a computer, how do you use it?

WD: I don't own a computer, I've never been on a computer. I'm not a big fan of computers. When a man was nominated for the Supreme Court a few years ago, they submitted to the Judiciary committee every movie he had rented for the previous ten years, I said that's just too much information. I feel like in many ways it's an infringement. It's a natural progression, and I'm not taking a moral position one way or the other, but I just write from my heart and I write with a pen and paper, and I let it come through my heart

and onto the paper, and I feel like a machine is sort of an obstacle or an interference between my heart and the page. Some people can write that way, I just let it come out. I don't even have a typewriter, so...

SD: You're someone who has been in the self-help or the human potential movement for a long time, and I'm wondering what changes you've seen in the people you work with or the audiences over the years. Do you think we've learned something over the last 20, 30 years?

WD: Sure, absolutely. There have been enormous changes. When I graduated from high school in 1958, 1% of the people who were admitted to law school and medical school were female, 1% and they were just tokens. And that was just a few weeks ago, it seems. Today it's close to 50 %, When I was in the Navy, in 1959, I went in with my friend Ray Dudley, who was my best friend, he was black from Chicago and we were in the uniform of the U.S. Navy, we were in a little town in Maryland, and we walked in about 1 in the morning, on the way back to the base just to get a hamburger, and they wouldn't serve him, and he was in our uniform. They wouldn't serve either of us, because they wouldn't serve blacks. And that was when I was 19 years old. And that's impossible today. One of my best examples of the changes that have happened in a relatively short period of time is that I got in an airplane in Wyoming and a man came through and was a flight attendant and asked if I would like some coffee, and a woman's voice came on and announced she was the pilot. I mean you talk about changes, that's a big one. The idea of segregation that was just as prevalent in the north as it was in the south, it was just not supported by law, but it was still there, is pretty much dissipating, at least the idea of it is. And you know living here in Hawaii for most of the year, it's amazing to see all of the people from all different parts of the world, whether they are Asian, black, white, whatever. And families that are mixed and the acceptance and tolerance that people have and the love that people have. Not putting so much attention on what people look like. I think if you look at the human potential movement, as you had discussed, when I was doing these all day seminars back in the 70s, the

emphasis was almost always on. There were guys, there was a guy named Robert Ringer, I think who had written *Winning Through Intimidation*, and *Looking Out For Number One* and there were people that were speaking about power. They were speaking about how to dress for success. What you should look like when you were in business, and there was a lot of emphasis on Ra! Ra! you can beat the other guy, and you're better than everybody else. That was the emphasis in those days. That kind of stuff doesn't sell anymore. People don't attend those kinds of meetings anymore, most of the emphasis now is on Spirituality and finding God, even the PBS (similar to the BBC) specials are based on spirituality and higher awareness and returning to your source. The people who speak about these things, The Maryann Williamsons and the Carolyn Myss and the Deepak Chopras, and Louise Hayes, most of them are talking in some sense about bringing up the quality of spirit and serving and not on defeating other people or competition and what you look like, There's a major, major shift.

SD: How about the idea of refreshing, or renewing ourselves, to take our spirituality to a deeper place, do you have any brief insights? So you meditate daily, you still get out there and jog,...

WD: I walk a lot, I think walking is one of most important things you can do. I think Einstein said, "nothing happens until something moves" And it's movement, it's circulation. I think the clearest way to a higher conscious(ness) is in the service of others, and losing your self-absorption. It's the best cure for depression that there is, just to go out there and stop focusing on yourself, and figure out a way to serve others in some capacity. The depression almost always disappears when that takes place. And I think embracing silence, its one of what I call my ten secrets for success and inner peace.

SD: Can I ask you one more question? I have a quote out of *Staying on the Path*, and it says, "The people get the most respect in this world are those who are the straightest, even though they take the most abuse." What do you mean by that?

WD: I mean that the question I wrote an article for a therapy journal a long time ago that I titled *Who Do You Trust?* and there used to be a TV show a long time ago where there would be a panel where two would be lying and one would be telling the truth, and you would have to find out who you trust? And the question was when you really want information that is reliable, do you go to the person who you know is going to say what will please you, and what will make you feel better, or do you go to the person who will be straight with you regardless of whether or not what they have to say to you will be to your liking? And the fact is that when we really want straight information we don't go to the people pleasers, we don't go to the people who are going to be concerned about whether or not our feelings are going to be hurt, we go to the person who we know isn't afraid to tell you what they think, and how they feel. Those are the people who get the most respect.

RS: You have provided us with some great information. I really appreciate you taking the time to speak with us this morning.

Interview #8 of Ms. Betty _____. 2002. Interviewed by Rick Sheridan. Chico, California, USA. 22 April.

On April 22, 2002 I interviewed Betty. This was the first interview that I conducted entirely by telephone specifically for the PhD project. Betty had discovered my interview site (here) and volunteered to complete the questionnaire by e-mail.

RS: Hello Betty, this is Rick Sheridan, I received your Internet and Technology questionnaire by e-mail, and I wanted to ask you a few questions. Do you have some time right now?

BF: Yes, go ahead...

RS: According to your questionnaire, it seems like you are pretty enthusiastic about using the computer?

BF: I spend a lot of time on the computer, I order my medication online, I check my bank account, I lookup news articles, I e-mail obituaries to people, I play 'Freestyle.' Freestyle is like solitaire for people who think (laugh). With Freestyle you can win every time if you are talented. A lot of times I'll find that the Internet has more on a given thing than the newspaper does. Because they don't have to put it on paper and carry it around to people, I guess. Like with a website, you don't have to put postage on it. I've also learned how to adjust the Internet radio station so that I can listen to a variety of stations.

RS: When did you first start using computers?

BF: It was around June 2000. Someone gave me an old computer and I've been improving since then. It was a little old machine, but soon after I bought a much more powerful eMachine (brand name) for about four hundred dollars. It had a 40 gigabyte hard drive with 256 megs of RAM installed on it to make it faster. Both of which my son said were a waste of time. But I said that I'm not going to pay someone to open this thing up (to upgrade it later). I really could not see the advantage to some of these other computers. Mine will do anything that this old lady will want to do (laugh).

RS: Do you use e-mail very often? To contact relations and friends? Letters to the editor?

BF: Yeah, and when I want to gripe (complain) at someone, so I don't have to stay on the phone and listen to their elevator music while they put me on hold (laugh). I answer a lot of quick surveys on AOL (America On Line — a private Internet service provider), such as who my favorite musician is, what I think about current events in the world. That kind of stuff. You asked about my first e-mail in your survey. I remember that I sent my first e-mail to the lady who was helping me, she was the only one who I had her address.

RS: Have you had any computer or Internet training? Have you gone to any classes? Self-taught?

BF: I'm self-taught except for what other people have been good enough to show me. It seemed like I was on for years before somebody told me that I

could just press the enter key instead of clicking OK. Or like pushing the subtract bar (Window's minimize) to put it down on the tool bar. Now I'm taking a real estate course online. Every two years if you are in real estate, you have to take four hours of ethics and four hours of fair housing. You have 4-5 questions where I just check the box.

RS: Would you say that one of your main frustrations with the computer has been not knowing the shortcuts and easy ways to do things.

BF: Yeah, I think someone should tell you things like pushing the Enter key instead of clicking, how to minimize the screen, and another thing that I've found is that if you push Properties that you can cascade the Windows. People don't tell you about Control/Alt/Delete (PC operating system — used to escape from a frozen screen). I know when I go to (Microsoft) Internet Explorer, there is a little window that you can click on and you can send the web page that you are looking at. That is how I send obituaries and online newspaper articles to friends.

RS: If you did have your choice of training, would you prefer to be in a classroom with others, to have a one-on-one tutor or teach yourself online, which do you think that you would pick?

BF: When I first got it, I had a friend who came in a little bit. I went out and bought these books for idiots, I mean dummies. They are good. I bought myself some greeting card software and learned how to use it. I have a scanner and taught myself how to use it also. Other than that, I'm happy to just learn a few new skills from friends or from a book.

RS: Have you ever noticed any difference in the colors of your computer? Have you ever changed the monitor resolution or changed the colors of your fonts?

BF: Not really. I have made a few simple adjustments, but it does not really matter to me.

RS: What are some of the other difficulties that you have had using the Internet?

BF: Internet, I don't have any problems with.... Every once in awhile I get something on the screen that I don't want. I laugh because my son came by and he used my computer. I don't know how it happened but when he got home one of those bad sites (pornographic) came up and his wife asked him where he got it and he blamed me (laugh). I get a lot of junk e-mail. AOL really has a lot of junk e-mail. Tremendous amount. I'll get maybe two or three dozen (junk e-mails) on AOL. I think that they sell your e-mail address. They say to click here if you don't want anymore of this stuff, but they still keep sending it. I've been trying to quit AOL since September, but they keep telling me that I can have it free for another month, then I forget and the bills keep coming in. I have my own DSL connection so I don't need their own line.

RS: In the advanced skills section of the questionnaire, you mention that you are able to do things like bookmark an Internet site, shortcuts and aliases, and so on

BF: You mean that you go and pull it down from the toolbar and right click the properties, that kind of thing? Or you can go into your programs and pull it out and it will make a shortcut. (She has a basic idea, but further testing is required to determine if she is able to perform these advanced skills).

RS: So, you never really used computers before June of 2000?

BF: Well I did when I worked at the telephone company, but that was just fill in the spaces, click, click, click. To me, that's not computerly (sic). It did not take any real skill and I didn't have any control of the information that I was entering into the spaces.

RS: Yes, I think what you had at the telephone company is that they call a mainframe computer. It probably already had a database.

BF: We just filled in the blanks. Like I said, I don't really consider that to be using a computer *per se*. You really don't have to know anything, just type in data.

RS: Did you ever have any fear about using computers? I know that in some of my classes with the elderly, they are often afraid that they can break something on the computer, and they are pretty intimidated?

BF: No, I just jumped in there. I have decided that anything that I do to it, I can just turn it off and it will empty itself and I can start all over again. That's where that Control/Alt/Delete thing comes in. I think that the only way that you really learn about these things is to keep pushing buttons. The only other thing that I've had trouble with is when I download a screensaver, I can't seem to get it over to the screen. Now I have that three dimensional ball that keeps changing shapes. I downloaded one where a mouse keeps teasing a cat and I would like to put that one on. You have to remember to turn the sound down, once the screen saver comes on you get all of these strange noises.

RS: Do you have any additional equipment — a scanner, digital camera?

BF: I haven't got a digital camera, but I'm going to get one. Yes, I do have a scanner. What I have done is that I have taken my old pictures of my father who has been dead since 1966, and he didn't have any pictures made, but my mother had saved two little driver's license pictures. And I have enlarged them and e-mailed them to other members of my family, which is quite extensive. I'm trying desperately to improve this one picture that is cracked but I'm not that good at that. I've got the Adobe PhotoDelux , but I don't really know how to use many of the features.

RS: This interview has been very helpful. You are more talkative than some of the other elderly computer users who I have interviewed. Sometimes they have one-word answers for everything.

BF: You forget that I worked for the phone company for 32 years, so talk is my middle name (laugh). When it comes to the elderly it depends on who you talk to. If you ask a 20-year-old, they think that anyone over 30 is falling apart. They don't know that what they are doing is just in preparation for what we are doing.

**Interview #9 of Ms. Karen_____. 2002. Interviewed by Rick Sheridan.
Chico, California, USA. 3 June.**

On June 3, 2002, I did an interview with Karen, lecturer at Butte College who also teaches several 'Internet Made Easy' courses for the elderly through Butte College. She also completed the questionnaire that I provided. This gave me a great opportunity to get a perspective from the teaching end, and to help refresh my memories of teaching these two courses for the elderly.

RS: Thanks for filling out the questionnaire and scheduling this follow-up interview. In the questionnaire, you say that the elderly individuals that you teach spend most of their time using e-mail while they are on the Internet?

KO: Let me qualify. This answer is based on students who talk to me or make comments in class. I would say that at least 40% of the students do not say anything, so some are vocal and some are not so vocal. These are just the comments that I get in class. The ones who do speak up are very interested in e-mail, mainly to send things to their friends or relations.

RS: You also mentioned in the questionnaire that many do not trust the computer with their finances....

KO: They would never think of paying bills online, and one of the students was very adamant about giving out the Social Security number (government identification number) so I got the feeling that many of them did not trust the computer to handle their finances.

RS: One of the big challenges that I had when I taught the 'Internet Made Easy' class for the elderly classes was dealing with the slowest students. Some had no previous computer experience, plus they had physical difficulties along with slow comprehension. How did you handle those situations?

KO: I was real fortunate in that I had a TA (teaching assistant). I also had several very slow students, and without the TA I could not have got anything done. Susan Leitner (her supervisor) found the TA from one of her better

students from other classes. It really helped. I guess my feeling was the class was just kind of a survey class, that there is so much to learn about the computer and that they will not be proficient in any one thing unless they spend a great deal of time working on it and I just want them to kind of get an understanding of what the capability is. And then to go home and work on their computer. I guess I never had any direction. Susan said "here are these textbooks, go over them." So in order to get through all that, I could not keep going back and repeating. Some of the students could follow along just fine, and the others were just out of luck. I did have several students who would repeat the course several times. They did not feel like this was a graded situation and they could come and go as they pleased.

RS: How did you deal with your frustration when the students did not understand the material?

KO: I would go home and talk to my husband on and on (laugh). The first time I taught (the course) it upset me. I'd been teaching since 1981 (with younger students). They caught on fast. So the seniors were a new experience for me and it really did exhaust me out. After awhile I kind of got used to it, and I would think about what can I do now that I kind of understand their skill level and try to understand what they want out of the class. Then I would try to direct the class that way. The second semester I handled my frustrations better because I knew what these people expected out of the class.

RS: Do you think that most of these elderly students have their own computer?

KO: I think about half of them do, I think a lot of them have been given a computer by their children and so they decided to take this class so that they could deal with this computer.

RS: We are interested in finding out if any of them are interested in other training options, such as online courses, video training, hiring a tutor, and so on. In the questionnaire, you say that most of them want a teacher in front of them...

KO: Oh yes, I think so. I only know of this one lady who talked about her tutor who would come over (to her house) every week to two, or if she really got in a bind she would call him on the telephone. I don't think that she would have the knowledge to get online help or any other self-study. Another problem for me was that she would think that she was the only student in class and she would go on and on about her questions. What really helped with her was having my TA stand right there and answer her questions, so basically the TA became the private tutor. None of them talked to me about distance learning or being able to pick this up on their own. I really got the sense that they wanted a person in front of them. It would only be the very experienced ones who could eventually pick up information from a video or from online help. When I get the students who I call my 'true beginners' they are bewildered when they go to a web page and there is all of this information coming up, it is almost too much to focus on. A little overwhelming, so I doubt if any of them would be able to figure out how to use online help or any other lessons on the Internet.

RS: I had a real challenge when I started. They (the administration) tried to get me to teach the class in this horrible out-of-date lab that only had these old DOS (command line) computers that didn't even have a mouse. These other teachers had just put up with it, and then they would quit at the end of the term. I got on the telephone right away and called all of the head administrators and told them, 'sorry, I'm not going to be able to do this'. They pulled some strings and got me into a more modern lab. It was challenging for me to teach these elderly students since many of them were not able to process information very rapidly and would quickly forget what they had been taught a few minutes before. The joke that I would tell people is that this was the easiest and hardest class that I ever taught. I think that some of the elderly were scared off because they had started using computers back in the 1980s when many of the computers were very difficult to operate. Is this similar to your experiences?

KO: Yes, definitely. I was teaching an Internet class right after the 9/11 business (attack on the World Trade Center) and I had the students go to www.ups.com to find out more. The headline on the site was that UPS (a private postal service) was going to help people in New York by donating their services to the Red Cross (charity). A lady in the class raised her hand and told everyone not to ever give any money to the Red Cross since they mismanaged it. Then we spent a long time discussing this situation. I couldn't believe that I let myself get into this since it wasted a large part of the lesson time. So, that was a real learning experience. Another time I was telling the class about defaults on the computer. The same lady from the Red Cross argument complains that she does not like that word. She came up with three words that she thought would be better. It was another disrupting experience. A lot of the seniors have grandchildren that can easily get the computer to do what they want. Meanwhile the senior is thinking that they are older, wiser, smarter than their grandchildren, yet they can navigate so well on the computer, that I think, that bothers them.

RS: Did you prepare any handouts or other learning materials for the students?

KO: I typed up everybody's e-mail address and distributed it so that they could communicate back and forth. I showed everybody how to open up a message, how to send a message, how to save messages to folders, how to do an attachment. I also showed them how to get a standard name to come up each time (signature file). It took 3-4 days just to go through all of that. I came up with a list of Internet sites that I thought that they would like, such as health and medical, and others. I showed them how to copy from the web to a disc. I actually got into some Boolean operators, so we talked about how to do a search, how to narrow the search, broaden the search, I gave them a little handout on that. The only handouts I gave them were the Boolean one, another about how, if you were in Word, how to navigate through your document page-by-page, how to select text: a paragraph, line, word.

RS: Did you ever ask the more experienced ones to mentor the beginners?

KO: They did automatically. Because the bright ones were usually sitting next to the ones that needed help. Then I also had my TA who floated around. After the first two sessions, she knew exactly which ones needed the extra help or I'd point them out to her. You asked about their health conditions in your survey. It seemed like several of them had hands that would shake. I know that it's not necessarily that they are nervous or that they have Parkinson's. I tried to show them how to effectively hold onto the mouse. I think that if they had one of those with the track ball it would be easier since they can just click and it does not move. With our mice when they would go to click, it would jump and they were on the wrong icon and they would get a screen that did not match my icon. They would complain out loud. I think that there are problems with their hand-eye coordination, or maybe there is hearing loss, I felt like I had to shout the entire hour and a half session. I'd never had my voice strained like this in all of my teaching experience. Another health-related problem for the seniors was that they could not see the screen very well. Sometimes they couldn't even see their own screen very well. So if we were doing anything with Word, I would try to get them to get a bigger font so that they could see it better.

RS: Yeah, I started asking them to take notes on the materials that we covered. The first couple of classes I really got the impression that they were treating it like pure entertainment, just like if they were going to a classical music concert (laugh). The ones that kept asking the same thing over and over, I'd jump on them and say 'let me see your notes.'

RS: What other classes are you teaching besides the ones for the elderly?

KO: At California State University, I'm teaching the writing proficiency class for the College of Business. I've done it since 1988. At Butte College, I teach a keyboarding class, and a class in Word. I've been teaching at Butte since 1981.

**Interview #10 of Ms. Sue _____. 2002. Interviewed by Rick Sheridan.
London, England. 30 July.**

I interviewed Sue while I was in England (on July 30, 2002). She is a 68-year-old woman who is very new to the Internet. I had originally met her through the course at the CSV/BBC that I had participated in. Sue is retired from the Probation Department. Below that is a write-up of the two CSV/BBC courses that I attended and participated in, along with scans of the actual questionnaire that she completed.

RS: When did you first get interested in computers and the Internet?

SW: I knew that my daughters were always communicating with each other and I would hear friends talk about things that they had bought on the Internet. When we go abroad, my daughters look up all the sites where we want to go, and they book the planes and hotels. One day I should be able to communicate. I would like to be able to do some of these things myself, and while they are around they can help me and show me. I have a partner who actually lives in Lansing, but he is so anti this sort of thing. He does not even have a mobile phone. I can't ask him for any help at all.

RS: What are his fears do you think?

SW: I think it's that he might not succeed. I think that he had one at work and I know how he feels because I went through the same problem. People don't explain the basics to you. When you come out of school now, you have had weeks-months-years of training. But when you are getting on in life and one (computer) is put in front of you on your desk and someone tries to give you a quick training, it's too much to take in. Now that he is at an age where he can retire, I think that he just does not want to bother with it.

RS: I've taught several courses for the elderly in the U.S., and they seem to have a variety of fears. Some are afraid that they can damage the computer...

SW: Yes that is one thing. I know at work that we have this tailor-made package for the probation service. You could get lost or get stuck. Sometimes it seemed like there was no way of working out how to get out of it. But younger people who have been through courses and college are shown all these things. But when somebody says to press this, this and this to do the work and something goes wrong, you just sit there and feel a complete fool really. This is silly, we should have more training. You just have not had that in-depth training to help you. This is why I came here (CSV/BBC) to get a broader view of the word-processing and the Internet.

RS: Have you tried any other courses besides this one?

SW: Well, we are doing the photography at the moment...

RS: Oh, so you are doing two or three of the courses here?

SW: It's really part of the same course. We did the basic word processing and the Internet last week.

RS: So they are modules that you are doing?

SW: There are about four or five different courses and they are three hours a week, so that is six hours per course, so we have done the one and we are half way through the photography one. I'm also trying to see what others I could get on to.

RS: Have you ever done any other training? Have you ever hired an assistant? Have you ever tried any video courses?

SW: Until early on this year, I worked full time so I just had no time for anything. Now I have to find a part-time job so I'm kind of in-between. I'm running out of money. All of my investments have hit rock bottom now and I can't be supported by those like I was planning to do.

RS: Have you ever been aware of the effect of colors on your monitor? Do you ever try to change the font color or background color of the monitor?

SW: At work a couple of us played around with the colors. We tried a variety of colors and decided to go with the more conservative ones. I certainly don't like the bright ones. I'm sure that it can't do the eye any good.

RS: What kind of problems did you have at work with the computers?

SW: Actually we had a lot of problems to begin with. The custom probation software was difficult. We were forever phoning up to get them to come and sort things out.

RS: Was that a database that people were having trouble with?

SW: It was mostly word processing. People would come to work and find the whole system down. We would wait while they checked this and checked that. If something went wrong, we just had to call and they would come, but it took quite a while sometimes.

RS: Did things get better with the probation software later on?

SW: It was always something going wrong, we just got used to it in the end. I'm sure that some of it was user error. When you do typewriting you are in control, if worst comes to worst you can kick it (laugh). But the computer is in control of you if you don't have enough knowledge.

RS: Was your boss pretty sympathetic or did he get angry easily?

SW: The problem was that we had a split team and they were over at the head office.

RS: How about the supervisor there in your office. Did they handle the problems very well? Were they pretty friendly about it?

SW: Yes at ours, they would say: that's it, let's go for tea and we will call it in to the head office.

RS: Was it one of those older command line computers....

Let's see if I can explain that better...

You know the older software programs were almost all text. Did you have the windows to work with? You click the mouse and the window would drop down?

SW: Yes they did update them.

RS: But it was a fairly modern operating system? There are still some pretty primitive programs in a few of these offices, you have to type a long string of letters and numbers to get it to work.

SW: No, they were good at updating them and they were Windows machines. The problem was that we just were not trained. You can imagine

using a machine without proper training. With a short course, they explain all of the details to you pretty well. You can go back over it if you need to.

RS: Did they give you any seminars at the office where they would take a small group of you and show you how to do things on the computer.

SW: No. We had a very brief introduction when we first had new computers. It was largely geared to our special (probation) about how you filled in the forms. There was not a lot of general instruction. One of the problems was that I think that we were short staffed. So the idea of taking time out for training was almost impossible. All we were doing was struggling to keep up.

RS: Just keeping up from day-to-day? Did you figure out any creative ways where you could transfer part of the probation information to Word or something easier?

SW: No, we never did anything like that. My knowledge was very, very basic. We just had to learn to do what we were required to do.

RS: So, what would the basic tasks be? You would open up somebody's records and find out when they got into trouble or something like that?

SW: It was mostly correspondence, reports and then there was the ICMS. I think that was Integrated Computer Management System... A lot of forms, routine kind of stuff.

RS: Was it usually for people who were going to court or for people who were done with their probation?

SW: Yes, right the way through from when they first went to court to when they turned around and started the whole process again. Most of them did not seem to be able to stay out of court for more than a few minutes (laugh). So this was why you had the whole record of their situation.

RS: Have you thought about taking any distance education courses?

SW: No not really, particularly with this I would want to be in a classroom.

RS: What are your fears about distance education?

SW: Well, you are on your own too much. In a classroom someone is there to explain it to you and you learn from everybody else. You can ask questions anytime.

RS: Yes, that is pretty typical. They are not all that interested in distance education until they learn more of the basics. You can do some advanced training that may not be available anywhere else than distance education. That is about all for now, thanks for coming over here to help me with this questionnaire.

Additional CSV-BBC class participant observation:

I had originally met Sue at the BBC headquarters on Queen's Road in England. Jane Frances, who I met at a local travel group, invited me to observe a group of elderly students that she teaches on both Thursday and Friday afternoons. This program is administered through CSV Media (Community Service Volunteers) and provided by their partnership with BBC Southern Counties Radio at the BBC headquarters on Queen's Road.

The course on Thursday had about seven students and the Friday class had about ten students. They were using new PC/IBM computers. Jane was teaching them how to use e-mail and search the Internet for most of the lesson. She asked them to all go to the yahoo.co.uk site to register for a free e-mail account.

Most of the students in both the Thursday and Friday classes were elderly and new to the Internet, so they had a reasonably hard time keeping up with Jane's instruction. She had them create the accounts and then send a message to their 'partner' who was sitting next to them. After this was successfully completed, students were instructed how to create and send an e-mail attachment. This was more of a struggle since there were about twice as many steps involved. Several students appeared to send off e-mails without the desired attachment. Eventually, everyone in both classes appeared to be able to send and receive e-mails.

Jane was very assertive and treated the class like they were part of a military boot camp operation. She would shout at the slowest learners and generally try to get them to keep up through intimidation. Although I've resorted to these tactics in my teaching, I've found that it is more effective to be patient with the slowest students and to motivate them through encouragement.

Eventually, Jane introduced me to the group and asked me to give the students a lesson on using Boolean searching. I used the example of finding a city and county in England, without finding cities by that name all over the world. My example was to use 'Landsonworth and Hertfordshire' as the practice exercise. The students appeared to be interested in this and quickly substituted the names of towns and counties where they were born. Being new to the Internet, some of them struggled with pop-up windows (adverts), and could not easily understand how to get back to the original search results. As with the elderly that I have taught in the United States, this group was enthusiastic, yet somewhat frustrated with the process. I told them about the PhD that I was working on and encouraged them to participate in the questionnaire and interview process. I provided them with my e-mail address. So far, three students expressed interest in being interviewed. I eventually interviewed Sue.

You can see more information about the CSV and their projects at:
<http://www.bbc.co.uk/southerncounties/>

Interview #11 of Ms. Amy 2002. Interviewed by Rick Sheridan. Chico, California, USA. 6 November.

I interviewed Amy on November 6, 2002, by telephone. She is the author of *For Grandmas Who Do Windows*, published by Carnegie Mellon University Press. This book is used by a variety of elderly computer users in the United

States and Canada, both individually and as part of organized courses. Amy also has a very interesting background as a technical writer and librarian.

RS: Hello Amy, this is Rick Sheridan, is now a good time to talk?

AL: Sure, go ahead...

RS: Excellent. I just have a few questions to follow up on the questionnaire that you sent me through e-mail. Anyway, I got a copy of your book through interlibrary loan here at California State University and really enjoyed reading through it. How did you decide to write this book? Did you have friends who told you they needed a book like this? Was there some other motivation for writing it?

AL: I'd had experience writing technical manuals and I was computer literate. I wasn't even planning to write the book, or I had not even really thought about it. A friend of mine asked me to help teach her Windows (PC operating system). She had bought a couple of books, and she is a very bright woman but the books didn't make sense for her. They were just not written for people who were not born in the computer age. They really don't follow from one thought to the next, do you know what I mean?

RS: Yes, and..... (cut off)

AL: So, when I realized what was there I decided to write a book and that's really how it came about. I was a librarian by training, but I had never spent much time actually working as a librarian. I ran a research service, I published an abstracting index to the Middle East. In 1979, I lived in Pittsburgh (USA) and Carnegie-Mellon University was right around the corner from where I lived. I needed a simple sort program (database) and at that time there really were no personal computers. So, I went over to the university to get some help sorting this massive material for my research business and that's how I got involved with computers. I used to connect from my house by modem to the main frame on campus and I would go over and pick up a printout the next morning. It sounds so primitive now (laugh),

but it was pretty advanced at the time. Then the first IBM personal computer came out. That's when I first really got involved. I didn't know how to, but I knew the basics of how a computer was supposed to work.

RS: So you really did get involved with computers early? What were some of your first experiences?

AL: Carnegie Mellon had started using Scribe, which I think is one of the first word processing programs. They hired me to help write manuals to teach their staff how to use this Scribe program, so that's how I got involved in writing. It's just something that evolved, it was not really part of my training, you know what I mean? Also, for my research business I had to write manuals so I learned how to write clearly... I think that the big problem with computer manuals is that they are written by people who have much more technical knowledge (than the average person) and so that they forget that the people using them don't have this knowledge. It seems so simple to them so they don't bother to put it in and it's very confusing to someone who does not quite understand how things go. Which is why my book says 'do this and this will happen and do this and this will happen'. Many writers take for granted that readers understand the basics, and that's why most manuals are not good for lay people...

RS: What kind of feedback did you get after you wrote the book?

AL: I have a son-in-law who is at MIT and I asked him about my book. To him it was ridiculous because to him he automatically knows these things, know what I mean? But most of the people my age or even younger people who work in an office only know how to use the one that they were taught on or that they are using in their office. That's an interesting group of people who need to be taught. They never had computers in school, don't you think that they have the same problems that older people have? Both groups have no concept of the computer. What books do you use for your students?

RS: I often use Course Technology/Thompson Learning textbooks. They are well-illustrated and provide the students with a variety of projects to work on.

AL: I don't really know that company. People are using my book for teaching now. I didn't actually write the book until 1999. This friend had shown me the books she was using and they did not appear to be that great, the books also put out by Microsoft were also a mess, so I really decided to write the book. It took me about a month to write it. What I did was to do every step. I decided that there are many ways to do the same thing. So I picked what I thought was the most effective way and tried to explain how to do it in a step-by-step format.

RS: Let me ask you some other questions about computers and the elderly. Do you think many older people are frightened or intimidated by computers?

AL: Some people are very savvy, but the majority are not. Most people are very frightened by the computer and they don't make as much use of it as they should. That's maybe not a fair statement, but a lot of the elderly only use e-mail or they have just started using the Internet... I have just started writing a series of columns that I'm eventually going to put into a new book. I'm only allowed to use about 400 words, that's kind of hard for a column. In one, I explained how Google works, in another I did a detailed column about cut and paste. I've taken different topics and focused on it. Hopefully this will help people to overcome their fears about computers and the Internet.

RS: What about color use? Do they change the background color of the monitor? Do they alter the color of text or have any other attitudes about it that you are aware of?

AL: People I talk to don't really seem to care either way about color. Or, if they do, they don't seem to ever talk about it, do you know what I mean? You might be interested, there is something called the Radio Information Service which is a radio station. They have them nationally to help the blind read through braille. They liked my book so much that they created a CD. Since my book has no pictures or illustrations they thought that people who are blind or visually impaired could use the information in my book.

RS: Do most of the elderly computer users that you know take classes? What is your opinion about the training options?

AL: A lot of them take classes; a lot of them are very comfortable taking classes. It's funny, they are not really confident enough to just read a book, some people have tutors. The tutors make terrible mistakes... One thing that I've found is that if the people do it for themselves (computer skill) then they understand it, if you do it for them, they really don't understand what it is that you are doing, do you understand what I mean? A senior really has to do it to understand it. If the tutor just does it for them, which they often do, the senior does not really learn. They are not paying enough attention to what you are doing. What I tried to do in the book is to have analogies to help make things easier to be understood. I have got a wonderful response to the book. I don't mean to brag but the feedback has been great.

RS: Sure, to use analogies or metaphors to help make the material more understandable... (cut off)

AL: Yeah, they don't understand that it is just a machine and the dummy books ("Internet for Dummies", and so on) have done more harm in the title. Because it makes people feel that they are stupid. And that is not it at all, it's just a machine and if you know what to do it will work. It's like a car, if you know how to drive that car it's not the car that is smart you know how to run it. It's really just a typewriter with a little more features. It does not understand anything except what you tell it, do you know what I mean? So they (elderly) have much more control than they think that they do. And I think that they are terribly afraid that they are going to break it, and they are afraid to experiment because they don't know they are going to get into. I have a friend, who is a very bright woman, and she asked me 'how do you get to the next line?' Nobody had ever taught her that you have to press enter. Do you see what I'm saying.... She would not bother because she would be afraid....

RS: Yes, in my classes I have to keep showing them how to press Enter to move the cursor down and Delete to bring it back up... Do the elderly that you know go to regular computer classes with all ages or do they usually go to classes specifically for seniors?

AL: I really don't know, but I think if they had a choice they would go to classes specifically for seniors. That way everyone in the class is dealing with the same issues and has the same problems, Do you see what I'm saying.... Do you know about Senior.net? They are a computer organization that organizes computer clubs around the U.S.? There are an enormous number of senior sites on the Internet, I don't know if these sites are popular.

RS: What are the most popular activities? My former students always liked genealogy, investments, and so on

AL: A lot of the seniors like to play games, they play online bridge, they do a lot of medical research. I know that my husband is always on looking at sports sites. He is always looking things up. Also, for people living alone it is a terrific idea. Connecting with the world. I've never gotten involved with the chat rooms.

RS: Yeah, chat rooms can really be a waste of time. You read about people being online 7-8 hours a day. This is often the ones who get involved with the online chats.

AL: I don't know anybody who uses chat rooms; they are people who are out and about and don't have time for that stuff. I get hooked on that game 'spider solitaire' it is addictive. It is amazing what you have at your finger tips. Oh yeah, a lot of people use it for cooking, there are wonderful sites for recipes. There are movie reviews. People make things, you know that you can make things such as invitations

RS: What are some of your other observations about the elderly computer users?

AL: People think that seniors are automatically on their way out. An awful lot of them are not, they are very lively, and very with it, often more with it than a lot of younger people. Sometimes they do have problems with their memories or some other physical limitation.

RS: Students in my classes did not remember materials from one class to the next. It seemed like they just treated the class like entertainment and did

not really try to 'lock in' the skills. For the ones who kept forgetting, I would ask them to take notes....

AL: That's because it's the in-thing to take a computer course, they are not going home and using it. So by the next lesson they have forgotten the material. I use computer reference books a lot. I don't bother to keep a lot of information in my head but I understand what I'm looking for. See what I'm saying? Like attaching something, I don't know the exact steps, so I just look it up. I think people go to class and they and unless they really want to learn, they don't bother. My son's mother-in-law gets excited when she learns just one thing.

RS: I really appreciate your time with this interview, I know that it is getting late where you live. I will e-mail you if I have any follow-up questions.

Full citation of her book:

For Grandmas Who Do Windows, by Amy C. Lowenstein Carnegie Mellon University Press; ISBN: 0887483461; (December 31, 2000).

Interview #12 of Mr. Frank _____. 2002. Interviewed by Rick Sheridan. Chico, California, USA. 21 November.

On November 21, 2002 I interviewed Frank by telephone. Frank is a 66-year-old who has been using computers for about 10 years (I have included my personal observations at the end).

RS: Hello Frank, this is Rick Sheridan. I received your e-mail and was wondering if now would be a good time to do our interview that we talked about by e-mail?

FH: Sure, now would be a good time...

RS: Excellent. Tell me a little about your experience with computers and the Internet. When did you get started? What kinds of computers have you owned?

FH: I started out with a 286 around 1992, and I graduated up because it got old and slow, so I got a 386, and was still confused and went to a 486 and was more confused (laugh). On these 286 and 386, I used the DOS shell at first and then went into the Windows program, and was really confused at first with Windows 3.1, and then they went to Windows 95 and 98. Now I'm using Windows Millennium.

RS: Really? You know, I had much more of a problem with the old DOS command line operating system than with Windows. In fact, I became a Macintosh user because they were so much easier to use at that time.

FH: Oh yeah, I had problems with DOS, and found Windows to be easier. I have never had anything but an IBM/PC type of computer or the IBM clone type of machine. The way I was told, I was better off with the PC because you could get more programs to work with the IBM/PC clones. There was that kind of difference.

RS: That is probably true; Macintosh has made some marketing mistakes over the years. One of them was to only allow Macintosh, or Claris, software to be developed. This really limited their market share.

FH: As I told you in the e-mail, I'm 66 years of age, it (the computer) is a toy for me, its an adult toy. Otherwise I've heard some people my age, or even younger, say that I don't have one, I don't want one, they are too confusing. And I said (to them) that it is a learning thing and it lets you do something different. So that is the reason that I got one. I just did not want to get left behind in the technology.

RS: How about your experiences with the Internet?

FH: I've been on the Internet quite a while, I started out with AOL (a private network that allows access to the Internet here in the USA), and played with it for a long time. Only within the last year, I have got a wide band (cable modem). It is faster and it does not kick you offline if you have to answer the telephone. I can go to the shops and come back and it is still online. I don't worry because I can pickup where I left off. Now I get Internet access through a local company that also sells television antennas. Some people

seem to use a satellite network to connect. I'm not for sure how that works, but nevertheless, I use the cable access. (Editors note: Unlike some countries, here in the U.S. the telephone connection is free but you have to pay a monthly fee through a service provider for access to the Internet).

RS: Which sites do you like to visit?

FH: I get in there and visit quite a few of them. I like Google quite a bit as a search engine. I also use Excite and MSN search engines.

RS: How about the browser that you use.

FH: I'm trying to remember, oh yeah, I think that it's Netscape. The one that they have out right now.

RS: How about hobbies, investments sites or any other thing while you are online?

FH: OK, I look at real estate sites, cars for sale, and general stuff. It's great for just doing a lot of little search work. You can just go to it, you don't have to worry about encyclopedias or going to the library, you have it right there at your fingertips. My wife gets into recipe sites. She reads a lot there along with medical terminology sites. She goes in and checks to see what it is all about.

RS: Have you ever tried any advanced skills, such as web page design, changing preferences, or anything like that?

FH: No sir, I have not. I'm not really computer literate. I'm at the basic stage; I have not got into the web designing stage, or this multi-tasking where you are working with more than one search window at once. One thing that I have had trouble with, I can't understand why my computer freezes up. A lot of times I have lost my sound on this computer and I have asked friends about it. They tell me that my sound board is built in to the motherboard. And, I'm going to have to replace the whole thing. Another person told me that I should use a restore to see if the sound card went offline. I'm trying to figure out a way to go in there and see if the soundcard is defective.

RS: Yeah, I know with the Macintosh operating system you can restore the default settings by zapping the pram. It sets everything back to the way it was when you first bought it.

FH: I have a restore program that will do the same thing. I also have a CD writer program. I'm supposed to be able to write items to the disc, but I have not learned how to do that yet. I am wanting to be able to back up my programs on disc. I want to just be able to insert a disc and backup my programs and files. Some of these programs I use and some of them I don't. I really don't even know why they are on here and I don't really know what they are supposed to do.

RS: Compared to some of the elderly people who I interview, you sound pretty skilled. I often talk to people who are not able to do as much as you are.

FH: Another thing that I have just recently got into, I bought a digital camera. It's a 4 mega pixel camera, and we are trying our hand at taking pictures, putting them into the computer and printing them out. That is something else that is new and different. I think that you can erase the card and start over again... With the darkroom, you know they have practically eliminated it. You know, the whole process of taking the camera and film and going back to the darkroom. Now you just do it with the digital camera. It is sure more convenient.

RS: Have you taken any computer or Internet training courses?

FH: No sir, that is something that have never really done. Well, I did take one, but the instructor on Monday morning she started the class and the rest of the week we just read the book and did whatever the book said. You talk about somebody being confused, because I did not have anybody in my age group in that class. They were all young teenagers and maybe the first year of college. They were just not in my group of people who would say 'let's get together, I'll come over to the house and sit down and study the lesson'. So I dropped that class because I was not getting anything out of it. I'm planning to go to another class here in Oklahoma City and try to learn how to

straighten up files. Like I say, I just don't want to stop learning, to step back and say 'oh well' because there is just too much to learn. If I try, I'm going to learn something. I'm a retired veteran out of the Air Force and I would like to be able to learn how to use the Internet to keep up with the veteran's issues. I try to visit some of their sites but would like to be able to do more.

RS: Have you ever hired an instructor for any one-on-one training?

FH: I've had friends come in and show me what they have learned I guess that is a type of tutoring I guess you could say. I've never had an instructor as a special tutor who came in once a week to go over the lessons.

RS: How about using books and manuals?

FH: I've had to use manuals. A lot of times I would do what the book said and I would have to ask a friend how this was supposed to work. We would sit down and try to figure everything out. One thing I'm trying to figure out now is why my computer freezes up, why I'm getting all of those pop ups (adverts) that lock up my computer.

RS: There are software programs to stop the pop ups.

So, what kind of things would be on your 'wish list?' What would you like to buy or at least learn how to use?

FH: Tax programs, genealogy programs, I would like to get a diary. My first computer had a little diary where you could keep up with things that you have learned. Since then I have never seen another one....

RS: You know that there are many shareware programs. Some are really pretty good. You can go to Shareware.com and type in 'diary.' I know there are several free and inexpensive diaries that are available.

FH: I looked, but they were just not the things that I wanted. One of the things that I would like to see is where you could go into a computer shop and have a program that they could load up on the computer and you could see what it is before you buy it. You know, you can go in and listen to a regular CD to see what kind of music it is and what you are getting. I bought one program that did not do what I needed it to do. If I could have tried it first it would have been much better.

RS: Have you ever tried changing the screen or font colors, either on your Internet browser or in a word processing program?

FH: Now, I have gone in and changed colors on the fonts, and I can change the color on the screen, but I have never really done a lot of things with graphics. Like the paintbrush program where you draw a picture. That is something I have never tried that. I can do some of the simple, basic things, but as far as doing a lot of changes, I really can't. I have got it set up on this computer where it goes in and defragments the hard drive (routine maintenance on the PC) once a week. I found that in there and it was simple to setup. You just go step-by-step and it works automatically.

RS: How about e-mail, do you send out and receive very much?

FH: Yes, some. To my step-son and daughter-in-law, they don't have a computer at home so I e-mail her at work. But yes I do send out e-mail. I got in touch with you. I found your site for elderly computer users where you were wanting to interview people. I had forgot all about it until you wrote me back when you came back from England.

RS: Do you have any other technology in your house, such as a VCR, health device or anything complex or challenging?

FH: Yes, I have a VCR and a DVD unit. The DVD will replace all the tapes, they will go the way of the old 78 RPM records (laugh). Of course, I have a microwave oven that is programmable. These new TV's need to be programmed in so they get the kind of stations you want them to get.

RS: Excellent, any other observations?

FH: You asked about the mouse in your questionnaire. I prefer the track ball. It is easier for me to slide the ball around. If you are in a confined space you don't have to worry about trying to reposition the mouse. I learned to use the mouse a long time ago, but when I got a hold of the track ball, I thought it was the greatest thing... I've gone through the baby steps in learning how to use a computer where I could walk a little bit. Now I'm at the stage, you know, I can get out there, like a young person learning to use a bicycle. I'm not as far advanced as I would like to be. I ask myself what I want a computer for.

The first answer is to learn something. Instead of sitting by and watching TV. To not let technology get too far away from me. There are so many things that a person can do with a computer. I am always curious as to what I can do with the computer.

RS: When other benefits have you got from the Internet?

FH: When I was single I would get into the chatrooms and play around. Because, you know, you are so anonymous you can say almost anything you want and get away with it. One time I went into a chatroom that was supposed to be for older people, I was 61 at the time. What was funny was that I turned the figures around and said I was 16. They told me to get out of the chatroom that I was not supposed to be there. I just had fun making up a lot of stupid stories. When they found out I was really 61 instead of 16, they thought I was being kind of facetious.

RS: Is that how you met your wife?

FH: No, we did not meet on the Internet. I found her, she was a lonely widow and I was a lonely divorcee. My wife and I have been married three years now.

RS: So, she likes visiting the recipe and cooking sites? Does she do anything else on the Internet?

FH: She gets on there and sends e-mail to her daughter-in-law and their children. The way I see it that in the future that kids are going to be carrying notebook computers with them to school. I see no way of getting around it. They will have lessons on CD that will be numbered different so that the students will have to do their own work. They won't have to worry about going out and buying encyclopedias, they will have it right there to do their research. I have several encyclopedia programs that I can put on my computer if I need to research something. I have sent a few pictures of the grandson who is two years old. We have sent them both through e-mail and printed out. You ask about the printer that I use. I have a three-in-one printer that is also a fax machine and a scanner. It's a Lexmark (brand). It does a real good job of printing pictures.

RS: What are your predictions for the Internet and the new technologies?

FH: I don't see any end to it. A few years ago people had CB radios, and those are gone now, but I think computers are here to stay. There is all kinds of stuff to explore on the Internet, people have to take the sour with the sweet. What's kind of funny, you sent me these questions and I started to write them out in pencil. Then I realized that I could just print out the whole file and it would be much easier. I guess I'm still thinking the old way (laugh).

RS: Do you have any plans to upgrade or change your current computer?

FH: I'm thinking now that I want to have a computer built. So I can get everything to my specification. I would just get somebody to help me go down and pick out the components- the motherboard, processor, sound cards and I would put everything that I want in to it. Maybe that way it won't be outdated so quickly.

RS: That is about all of the questions that I have for now I really appreciate your time and efforts.

FH: Rick, it's been a pleasure talking with you, thanks for calling me, and I hope that I have helped you out in some way or another. I'll let you get back to what you are doing, and call me again if you have any questions.

Author's observations- Frank was a very enthusiastic and cooperative interview participant. Despite his self-deprecating sense of humor, Frank was more optimistic about his own ability to master computers and the Internet than many of the previous interviewees. Although he does not have a college education, Frank appears to be a quick learner and has more of a natural aptitude for technology-related devices than many of the other elderly computer users.

Interview #13 of Ms. Rosaleen _____. 2002. Interviewed by Rick Sheridan. Chico, California, USA. 15 November.

On November 15, 2002, I had a telephone interview with Rosaleen who was

at her home in Ottawa, Canada. Rosaleen is 81-years-old, has six children, fifteen grandchildren, six great grandsons, a degree in Psychology and experience in journalism. She is currently very busy with several projects and limited the interview time (my personal comments at the end).

RS: Hi Rosaleen, this is Rick Sheridan. Is now a good time to do our interview?

RD: Yes, now is alright. Your PhD idea sounds interesting. What are you planning to do? Are you going to set-up some equipment that is going to help people who are losing their sight and that sort of thing? I was reading in your e-mail that you were also interested in teaching seniors how to exercise so their muscles don't atrophy?

RS: Yes, that's part of my project. My plans are to interview a large number of older computer and Internet users to find out about some of the things that are on the questionnaire that I sent you by e-mail. My personal interest in this is to develop some innovative and effective learning materials that could be used in courses or individually. I'm also interested in finding out about adaptive equipment and how it might help those who need it. Another thing that I want to consider is the physical condition of the person using the computer. In many of my classes I really believe that a person's level of fitness can make a difference in how well they are able to concentrate on the material. From what I have read, scientific studies back up the fact that exercise increases oxygen flow to the brain. Anyway, let's start by going over a few of the answers from your questionnaire. Tell me a little more about your computer experience. It sounds like you do web design and even run an advice column....

RD: I've built a lot of websites. I have (designed) a doctor's website and some other sites that I am working on right now. I have a great granny thing that I run all the time. I give people advice, they think that it's great and tell me how helpful it is. It is part of the SCIP Program. I think that stands for

Seniors Computer Information Program that is out of Winnipeg. We used to post both the questions and the answers, but it got so big.

RS: So, it is a site for people who have computer problems...

RD: No, it has nothing to do with computers. It's all about people who can't get along with their mother-in-laws (laugh) or their children. It's supposed to be about intergenerational problems. How to get along with people and how to deal with situations. Maybe some woman gets married to some perfectly wonderful man, and then suddenly realizes that his mother is an ogre or else your son has got married to this perfectly wonderful woman and then discovered that she was an ogre. There is going to be a book one of these days, if I ever get around to it. I'm kind of interested in what you are doing. Some people when they get older, their hands seem to shake and that makes it very hard to deal with the mouse and if you are looking for some way to improve the system.....

RS: Yes, I am interested in looking at different adaptive technology equipment to see if there is an easier mouse available. Sometimes, it depends on the person. Some people get used to the typical mouse and don't want to learn to use another device. Others never get comfortable with a normal mouse and want to look at other options. I have seen or heard about a variety of options, such as touch-screen, an optical mouse that is very accurate, along with some of the other variations.

RD: I know there is a mouse that is some kind of big thing with a ball on top of it, I don't know if that makes it any easier. Some of them seem to have a terrible, terrible time just trying to get that little arrow into the spot. There may be another way of doing it, maybe some kind of machine where you can do it with your voice, that may help.

RS: Yes, I tried the mouse that you are talking about one summer on a job that I worked on. It took several weeks to get used to, but by the end of the summer I was comfortable with it. As a teacher, I have to constantly remember that someone who has a hard time with the mouse is not necessarily a slow learner.

RD: Eyesight is a big thing. That's one thing that I will be dealing with, because I have some kind of degenerating condition, and eventually I won't be able to see. When that happens, I will have to get a computer that will respond to my voice. Is that one of the kinds of things that you will setup as part of your PhD project?

RS: Perhaps. I know that voice recognition software is getting better every year. I bought my sister a voice activated word processing program about four years ago. Even back then, it was pretty effective and could compose words at least as fast as she would be able to type them.

RD: Although you could go on typing forever if you were blind, you would want to have it read back to you. One of my machines will read to me, which is very convenient for some things. Do you ever have a machine that will read to you? My program just lets me type and then it reads back to me. It's great if you have to make a speech. You can write it out and listen to what it will sound like.

RS: That sounds interesting. I have not experimented with sound very much but it might be a way to really help the elderly computer users to get more out of their computers. You use more than one computer, which one do you like the best?

RD: The little laptop I just use in case I have to take the machine and work somewhere else. It is kind of handy to have two computers so that when I'm doing research I can zap around on one and it does not tie up the other one.

RS: Well, what other things do you do on the Internet?

RD: I do a lot of genealogy on the Internet. My ancestors are from Scotland and Germany, and I am interested in that kind of thing.

RS: You do a lot of web design work. I looked at several of your sites and was impressed. Do you have any advice for others who are designing sites?

RD: As you notice, I don't use a lot of flashy stuff on my web pages that I design. I don't recommend that anyone use Flash because it is distracting. Normally I don't put much ornament on the sites that I build.

RS: I understand that you are pretty busy and do not have much time for this interview. Do you have any final comments about computers and the Internet?

RD: I enjoy using the computer. I feel very strongly that something else is going to happen. The computer is just one more stage. I've been through so many stages in my lifetime. I can remember when they first put erasers on pencils (laugh) and I can remember when fountain pens first came out — we used to dip the pen in ink before that. Changes are happening at an accelerated rate these days. There is an acceleration of acceleration, so therefore something will come along and the whole Internet will become obsolete. Meanwhile, have fun.

My personal observations: Rosaleen was a feisty and energetic woman who sounded younger than her 81 years. As you can tell, she is involved in many different projects and does not plan to retire anytime soon. Her *Ask Great Granny* site (link below) has practical thoughts about coping with problems from the differences in attitudes and life styles between the generations. It has lots of objective advice and Rosaleen is not afraid to take a controversial stance on various family and social issues. She is different from many of the other elderly people who I have interviewed in that she has used computers for many years and does not appear to let age slow her down. Rosaleen could serve as a role model for those who have suffered age-related setbacks and are ready to give up on computers and the Internet.

Interview #14 of Dr. Wayne _____. 2003. Interviewed by Rick Sheridan. Chico, California, USA. 10 January.

On January 10, 2003, I interviewed Marjorie, a 78-year-old occupational therapist living in southern California (I have included my personal observations at the end).

RS: Hi Marjorie, This is Rick Sheridan, we have communicated by e-mail and I'm interested in doing the interview, is now a good time?

MH: Sure, I put the time aside for you.

RS: That's great, I appreciate it. Anyway, I did a printout of the questionnaire that you filled out and I have highlighted several of the questions that I wanted to go over in more detail. It seems like you are pretty familiar with the computer compared to some of the other elderly people that I have interviewed or worked with. How long have you been using computers?

MH: I haven't been on the Internet that long, almost two years now, but I had the computer for five years.

RS: Did you use the computer before that? I noticed on the questionnaire that you were an occupational therapist. Did you ever use computers when you were working in that field?

MH: I retired in 1984 and there were some people working with the disabled using computers, myself I didn't. They were just trying to see if there was some way that we could manage the time that we spent writing progress notes, and were trying to put progress notes on computers using punch cards. Originally that is what we were working on. We were never able to work anything out at that time, I don't know if they have now or not.

RS: One thing that was interesting on your questionnaire was that you had taken several correspondence courses at the University of Wisconsin. I actually took some classes at UW for a couple of semesters after I had done my master's degree. So, what did you think of these correspondence courses? Were they helpful?

MH: Yes, that was back in the late 40s, early 50s. When you would send in a lesson they would send you another. I think that there would be two floating so that you could be sending one and getting a new one at the same time.

RS: Were they graded by professors, lecturers or teaching assistants?

MH: Yes, they were graded by actual professors. The one that I had trouble with was the English composition. What happened was they switched the people who were reading them during the course so it made it difficult.

RS: Have you ever taken an Internet distance education course? I noticed

that you were one of the few people I've interviewed who was even interested in distance education on the Internet.

MH: No courses so far, I just use the online help where they answer simple questions that I send them by e-mail.

RS: In the questionnaire you indicated that you have used a variety of common technology like a microwave oven and garage door opener. Have you used anything more advanced like a 'smart home' that controls the functions of your house?

MH: No, just a thermostat (laugh).

RS: How did you first get into computers?

MH: I was ready to buy a word processor and my grand nephew said you must have a computer, you will love it and it will open up a whole new world for your. He was in his 30s and very good with computers. He helped me select a used one from the *Pennysaver* (advertising newsletter). He set me up and gave me a lesson and then said that you can learn the rest by reading what it says on the computer and figure it out (laugh) and then he left me. I've been teaching myself ever since.

RS: Have you done any formal computer training? Any courses?

MH: Yes, I went to a course at a community high school (grammar school). I had to take the bus there, and then walk, you know. And then I was learning more than I could use, or at least that I was interested in at the time. But they have many, many good courses that they are offering, but it is just hard for me to get out.

RS: Was the course for all age groups or mainly for retired people?

MH: The course was offered on the community level and I would say that almost everybody was over 45, there were 1 or 2 younger women, but the rest of us were older. I'm 78 now.

RS: What fears about computing have you had? What is your attitude now?

MH: I was afraid that it was going to jump out at me, that it had a life of its own. I had hoped that I was going to be able to get through life without ever needing to learn this (computers), but I lived longer and so here I am (laugh).

I really think it is a very good thing and I have thoroughly enjoyed exploring questions that I have had all of my life and now on the computer I am getting those answers.

RS: Do you have a favorite search engine or ways to search?

MH: I have a lot of medical questions and I get them from the National Institute of Health and from the encyclopedia.

RS: Do you use an encyclopedia from a CD Rom or do you use one online?

MH: The CD is already on the computer, it was already installed when I got the computer. It was fortunate because my first computer was not big (powerful) enough to handle the Internet so my instructor sold me this one, very inexpensively, and it already had the encyclopedia on it.

RS: I noticed in the questionnaire that you have some adaptive technology. You changed the mouse and tried to adjust the angle or something?

MH: Yes, I made an ergonomic adjustment to my first mouse by building up the palm curve, which made it possible to use the mouse comfortably for long periods. I just put some Styrofoam on it and I taped it down. My new *Atech* cordless mouse hasn't needed the adjustment and has the excellent scrolling features of up/down, and left/right. Also, when I had my heart surgery, my doctor said that I should have my leg up for 15 minutes out of every hour for the rest of my life on a surface higher than my heart. I have a high-back recliner chair so I can put my feet up, I don't know how many people you know who do that?

RS: How about e-mail, do you send very much?

MH: Not a lot, mainly just to family or when I write in to these organizations to get more information. I'm not a big communicator, just on issues.

RS: That is different than many of the elderly that I interview. Most of them send several e-mails every day to friends and family and get involved in other online chatting.

MH: Yeah, that does not really interest me.

RS: How about sound, do you ever adjust the levels on your computer?

MH: Not much, my niece did send me an e-mail that had a little song on it. I sure don't like that shrill sound when the machine comes on and it's dialing to get online. That sound bothers me terribly and nobody has been able to tell me how I can shut it off. I have put a couple of books around it to muffle it a little.

MH: I wanted to ask you one question, why did you consider England to do your PhD? I kept looking for an English accent in your voice and I could not detect it.

RS: There are several reasons. My mother is English and she met my father while he was doing his PhD at the University of London in the 1950s. Our family traveled to England several times and we lived over there for one semester while I was a teenager.

RS: What kind of advice would you offer to other elderly computer users? Did you have any problems or challenges that other's could avoid?

MH: I was told that the most important thing about learning to use a machine was first to learn to turn it off. I have been left stranded many times because the screen was covered by an ad that left no control X (close command) available. I had been told that I could turn off the computer to remove the ad but I might lose whatever I had on. Just by hitting the wrong button I could lose all my work in progress. No one explained to me then about the cookie's memory and the history button. That kind of information should be among the first ten things to learn prior to starting on the web. My nephew insisted that I get a computer rather than a word processor and I am glad he did since there are so many other things on a computer besides word processing. These are some tips that might help others.

RS: I appreciate all of the information that you have shared tonight and with the questionnaire that you sent me earlier. Best wishes with all of your computer projects. Feel free to e-mail me if you have any additional questions or comments.

My observations: Marjorie was a very enthusiastic participant in the interview process. She had originally contacted me last summer, but I was busy with two interviews at the time. Although she is not as technologically savvy as some of the previous interviewees, Marjorie is able to perform basic word processing and Internet research which is all that she needs at this moment. She experiences several of the technological challenges faced by many of the others, such as a late start in life with computers, a lack of the understanding of technology terms and other factors. Her career as an occupational therapist probably helped her to develop an attention to details that is helpful for computer operation.

B2. Text of the original questionnaire

As mentioned previously, the author spent several hours developing a detailed questionnaire for the subject group. After trying a rigid interview format based exactly on these questions, the author then began giving out the questionnaire and following it up with a more spontaneous interview format, based on the interests and replies of the interviewees. This proved to be much more effective and the subject group elaborated on many of the topics where they had previously provided a simple one-word answer. Here is the original questionnaire.

Questionnaire:

Please answer the questions below. Any additional comments that you want to make are appreciated. I am trying to determine your interest and aptitude in computers and technology, especially as it applies to the Internet. This research will be used as part of my PhD project and to improve the learning materials for teaching Internet skills to the elderly. Please type in your answers and e-mail them to me along with your telephone number and the

best time to call. (Otherwise, hand write your answers and mail them to me).
Thank you for participating in this research.

1. What machines do you possess that you would call technology? (Check them off with an x) How confident do you feel operating these machines? Rate them from 1-10 on how confident you feel using them (10= confident, 1= not confident):

- * Telephone
- * Mobile phone
- * Clock radio
- * Pocket calculator
- * Typewriter
- * CD player
- * TV and remote
- * Programmable climate control
- * Health-related assistance devices
- * Computer- word processing
- * Computer- Internet
- * Computer- and so on
- * Any others?

Please list any other items that you own that relate to communication:

2. Do you own your own computer?

- * Yes
- * No
- * Soon Perhaps
- * Never (too expensive, not necessary, and so on)

3. If you own a computer, what do you use it for? Please check all that apply:

- * To play games

- * To send emails
- * To explore the Internet and email
- * To word process letters, and so on
- * To do financial calculations with a spreadsheet
- * For graphics, digital photography, and so on
- * Communicate with relatives by email
- * Personal diary
- * Genealogy
- * Tax matters or investments
- * Other financial matters

ANY OTHER USES OR COMMENTS:

4. If you don't have a computer at home, what are the reasons?

- * The cost
- * Lack of available space
- * You don't like the appearance of the thing
- * Any others _____

ANY OTHER COMMENTS:

5. Do you have any fears about working on a computer* Rate the following statements as applicable to you in a scale of 1 (not applicable) through 10 (yes, absolutely).

I am too old for all this. (Rate from 1 to 10) _____

It's too expensive _____

There is too much to learn _____

Everybody else is better than me _____

It might break and be expensive to repair. _____

ANY OTHER COMMENTS:

6. Which of the following locations would you prefer for computer use *

- * Your living room
- * A separate study area
- * A friend's house
- * The classroom environment
- * other_____

7. How would you like your tutor or teacher to help you with your learning?
(Check several and give the answer in percentages. For example: face-to-face 60%, email 20%, telephone 20%:

- * By working in your own environment with occasional visits from a tutor
- * Working in a classroom with others working on similar projects and a tutor available
- * Working in a classroom with an Internet site that has support materials.
- * I would be interested in trying distance education courses.

8. What balance of tutorial/training support do you think you would need?
(Face-to-face, e-mail support, telephone help?)

9. What minimum size would you like the letters on screen to be, (please realize that larger letters will require more page scrolling?).

10. Has the color of your monitor or the text ever affected you in a good or bad way?

11. What is your opinion about the appropriate balance of text and image
(example: mostly text is OK, I prefer a lot of graphics, and so on?)

12. Which of the following do you find difficult to use (Add your comments if possible):

- * The mouse
- * The keyboard
- * The software
- * The printer
- * The scanner
- * Any other component

ANY COMMENTS:

13. Advanced skills — do you know what these do on a computer?

- * Creating an alias
- * Changing Preferences
- * Bookmarks or favorite sites
- * Multiple search engines

ANY COMMENTS:

14. Internet Skills:

Can you use the email programs on your computer?

If so, how did you learn how to use it?

Who did you send your first email to?

What difficulties did you find using emails?

What is the benefit for you in using email?

Can you use the Internet for research and reference?

If so, how did you learn*

What was your first enquiry?

What difficulties did you find using the Internet?

What is the benefit for you in using the Internet?

Would you be interested in taking a distance education course, or would you only really want to learn in a classroom setting?

ANY FINAL COMMENTS:

Your name:

Previous or current occupation:

=====

B3. Teacher interviews

This section contains the findings from a questionnaire sent to five individuals who teach computer and Internet skills to the elderly. This was sent and received during July of 2006. This process allowed the author to assess the attitudes and methodology of a broad cross-section of those who teach the Internet to the elderly. Many of the replies here supported the author's independent observations and previous interviews with the subject group members. The author included the exact questionnaire first, so the reader can more easily determine how the teacher responded. First is the questionnaire that I mailed to the five teachers, along with their replies.

Teacher Questionnaire:

In your opinion, what are the main reasons that the elderly want to learn computers/Internet?

- * To play games
- * To send emails
- * To explore the Internet
- * To word process letters, and so on
- * To do financial calculations with a spreadsheet
- * For graphics, digital photography, and so on.
- * Genealogy
- * Tax matters or investments

Other_____

What are the main reasons why the elderly resist using computers?

A fear of technology.

It's too expensive

There is too much to learn

Everybody else is better than me

Other_____

How would the elderly prefer to learn, if they had several choices?

- * By working in their own home with occasional visits from a tutor
- * Working in a classroom with others working on similar projects and a tutor available
- * Working with training manuals, videos, online courses, and so on.

Other_____

Below are the conclusions from my Ph.D. thesis. This is based on my interviews with 20 elderly computer users, along with my two years experience in teaching an "Internet Made Easy for Seniors" through a local

community college. Please comment on any that you see as being either very accurate, or very inaccurate.

1. They all preferred the one-on-one tutoring to any other form of instruction. Most were willing to attend a course, read a computer manual, or experiment with other ways to learn how to use computers, but they all appeared to prefer individualized tutoring whenever possible.

2. They all have been influenced from their friends who also use computers. Everyone the author interviewed mentioned that a friend had either encouraged them to learn computers, explained what was possible (and fun) to do on a computer, helped them decide which computer to purchase, or other related interaction.

3. Most of them use e-mail as the primary thing that they do while online. Although most of them enjoy exploring the Internet and trying out many different sites (explained in more detail later), they all appear to use e-mail as a daily or weekly way to communicate with friends and family. Most were also very interested in using e-mail to attach and send photographs.

4. There are several categories of Internet sites that appeal to most of the interviewees. These included: genealogy, investments, health research, news and weather sites, and so on.

5. They all have other forms of technology that they have had to learn before experiencing computers, such as health monitoring devices, home burglar alarm systems, television programming devices, and so on. This has influenced the way they approached learning computers.

6. There were many reasons that the elderly subject group feared or avoided using computers. Practically all of them have had great difficulty learning to use the computer's mouse. This was one area of frustration that appeared often in the interviews. Other challenges included the fear of damaging the equipment, and fear of embarrassment while with peers or in a classroom. Some of the other typical frustrations mentioned throughout the interviews were: adverts popping up on the Internet, the difficulty in distinguishing

quality sites from biased or non-referenced sites, and the slow access speed of many of their computers.

7. Most of the interviewees in this study preferred to read printed materials as opposed to on-screen reading.

Numbering incorrect – maybe question left out?

8. Many of them are interested in researching their own health information, but often are unable to locate exactly what they are looking for, or are unsure of the quality of the site accessed. Most of them rely on their physician for advice, and several of the subject group members share their online research with their physician.

9. Generally, the elderly were good students, who attended class regularly and were self-motivated. Despite the difficulties mentioned above, most of them were enthusiastic students.

10. Any other tips, insights or other comments you would like to add_____?

11. What is your association with the elderly? What is your teaching experience?

Thank you for participating in this research!

Rick Sheridan

Telephone: (916) 716-1608

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Teacher interview #1 of Sophia_____. 2006. Interviewed by Rick Sheridan. Sacramento, California, USA. 5 July.

Interview #1 with Sophia K_____

In your opinion, what are the main reasons that the elderly want to learn computers/Internet? (She used a * to indicate her answers for several of the questionnaire topics below).

- * To play games
- *Correspond with relatives
- * To send emails
- * To explore the Internet
- * To word process letters, and so on.
- * To do financial calculations with a spreadsheet
- * Sending pictures
- * For graphics, digital photography, and so on (lesser degree)
- * Genealogy
- * Tax matters or investments

(Her comments): What it's used for probably depends on class background. In my experience all seniors seem to use it for email, sometimes with multiple accounts, and most send family photos back and forth. Some look up health information, some play online card games (Majong, bridge), some do genealogy and some do online dating/chat.

What are the main reasons why the elderly resist using computers?

*Don't see the value in using it. No reason to use it, I'm retired. Too much to learn, too complicated

How would the elderly prefer to learn, if they had several choices?

* By working in their own home with occasional visits from a tutor (this is done, often by younger relatives, and works as long as they have reliable access to the relative.)

*** * Working in a classroom with others working on similar projects and a tutor available.

* Working with training manuals, videos, online courses, and so on. For this option: printed paper book manuals only, with specific instructions related to their exact task — i.e. step by step instructions with pictures that show each little step on how to do something with their specific webmail client or software that looks exactly the same as theirs does.

Below are the conclusions from my Ph.D. thesis. This is based on my interviews with several elderly computer users, along with my two years experience in teaching an “Internet Made Easy for Seniors” through a local community college. Please comment on any that you see as being either very accurate, or very inaccurate.

1. They all preferred the one-on-one tutoring to any other form of instruction. Most were willing to attend a course, read a computer manual, or experiment with other ways to learn how to use computers, but they all appeared to prefer individualized tutoring whenever possible. (Her comments): Yes, accurate. They'd like someone to sit by them doing their own thing, who was very interruptible and would wait while they do it.

2. They all have been influenced from their friends who also use computers. Everyone the author interviewed mentioned that a friend had either encouraged them to learn computers, explained what was possible (and fun) to do on a computer, helped them decide which computer to purchase, or other related interaction. (Her comments): Yes, accurate. Need to hear from peers that the computer is relevant to them.

3. Most of them use e-mail as the primary thing that they do while online. (Her comments): *Yes. Although most of them enjoy exploring the Internet and trying out many different sites (explained in more detail later), they all appear to use e-mail as a daily or weekly way to communicate with friends and family *yes . Most to attach and send photographs. *yes

4. There are several categories of Internet sites that appeal to most of the interviewees. These included: genealogy, investments, health research, news and weather sites, and so on. (Her answer): Not as accurate - the sites that seemed popular were reference sites like the online phone book, travel information, information on their home country or native language (for immigrants), and sites with entertainment like jokes.

5. They all have other forms of technology that they have had to learn before experiencing computers, such as health monitoring devices, home burglar alarm systems, television programming devices, and so on. This has influenced the way they approached learning computers. (Her answer): I'm not aware of this. Some had worked with computers during their work life, but many had not.

6. There were many reasons that the elderly subject group feared or avoided using computers. Practically all of them have had great difficulty learning to use the computer's mouse. (Her answer): Yes, and this was alleviated by the roller wheel mouse, or an adapted mouse for persons with physical handicaps. Cascading menus — such as the windows start menu — were the hardest to navigate, desktop shortcuts were preferred. This was one area of frustration that appeared often in the interviews.

Other challenges included the fear of damaging the equipment, *yes and fear of embarrassment while with peers (possibly, some preferred to watch a friend learn, than to 'drive' the computer themselves) or in a classroom. Some of the other typical frustrations mentioned throughout the interviews were: adverts popping up on the Internet (or anything unexpected, ads that impersonate computer functions — also dialogue, warning or error messages from software that are not explicitly covered in instructional materials), the difficulty in distinguishing quality sites from biased or non-referenced sites (not experienced) , and the slow access speed of many of

their computers (yes, poor troubleshooting skills if minor problems, such as a printer not printing because it is out of paper, are experiences.)

7. Most of the interviewees in this study preferred to read printed materials as opposed to on-screen reading. (Her answer): Yes, many would print out all their emails.

Many sites are inaccessible as the text point size is hard coded in style sheets and is not modifiable using the text size view command in windows explorer. Many sites are not formatted to be seen at 600x840, for example, let alone windows large sizes, which can make them hard to use. As well, seniors may have vision problems and be reluctant to use reading glasses, making simply formatted sites (no background graphics, with a simpler cleaner look more like the printed page) preferred. For an example of a usable site I developed see: www.seniors.vcn.bc.ca/ldwelcome

Check numbering

8. Many of them are interested in researching their own health information, but often are unable to locate exactly what they are looking for, or are unsure of the quality of the site accessed. Most of them rely on their physician for advice, and several of the subject group members share their online research with their physician.

(Online health info is often in inaccessible language or presented in formats where the print is too small when printed out - such as PDF or small print html. In one instance, in order to get readable information to a woman with a particular health condition, I had to copy text from a PDF document and reformat it in a larger size in order to print it so she could read it. Few people would have been able to do that on her own.

9. Generally, the elderly were good students, who attended class regularly and were self-motivated. (Committing to a regular class time is a challenge for retired people who are resistant to fixed schedules). A one-session class with pre-registration (and a fee paid at registration) had better

results.) Despite the difficulties mentioned above, most of them were enthusiastic students. (Yes, once they were there)

10. Any other tips, insights or other comments you would like to add____ Please see interspersed in responses. _____?

11. What is your association with the elderly? What is your teaching experience?

I taught classes, managed a drop-in computer lab (where I provided tutoring) for 2 years — this lab was resident in a seniors recreation centre and computer access was restricted to those 55+. The centre was the same as the website I gave. I observed persons from 55-90 using the computers. Working class neighborhood, Internet access was free, some of the courses had user fees, tutoring was generally provided by myself or a volunteer on an *ad hoc* basis. After having observed the barriers most websites present, I got into designing senior-friendly websites for a number of seniors organizations.

One more thing, I have 12 years of IT professional experience, with a background in computer training, currently I do mostly technical writing and database design.

Teacher interview #2 of Christine_____. 2006. Interviewed by Rick Sheridan. Sacramento, California, USA. 5 July.

In your opinion, what are the main reasons that the elderly want to learn computers/Internet? (She used a * to indicate the answers below).

* To play games

- * To send emails
- * To explore the Internet
- * To word process letters, and so on.
- * To do financial calculations with a spreadsheet
- * For graphics, digital photography, and so on.
- * Genealogy
- * Tax matters or investments
- Other _____

What are the main reasons why the elderly resist using computers?

Lack of skill in using the mouse and fear of doing something wrong. Other classes they had taken did not start out basic enough which led to frustration and feelings of inadequacy.

How would the elderly prefer to learn, if they had several choices?

- * By working in their own home with occasional visits from a tutor
- * Working in a classroom with others working on similar projects and a tutor available
- * Working with training manuals, videos, online courses, and so on.
- Other- Working in a peer group class setting with the option of additional one on one instruction

Any other tips, insights or other comments you would like to add?

(Her comments): When Jeanne and I began our senior computer classes we used a very basic approach because we kept hearing from patrons that they had paid for computer classes elsewhere but they were not basic enough and they felt lost in the class. In our introduction to computers we discussed the parts of the computer and how it worked, even passing around mice, disks, and keyboards. We explained the difference between the web and

Internet. Jeanne used a lot of examples of her grandmother and how she progressed with computer skills. We also enlisted a help of one of our more “senior” male computer technicians to be present during the class. Many of the male class participants felt more comfortable taking with him. We assured the class that there were no stupid questions and we even rewarded questions with candy to make it more fun. Handouts with definitions of computer terms and of our PowerPoint were also given to the class. We also taught in a 3-part manner, using a lecture type/PowerPoint introduction one day, followed by a hands on class no more than 2 days later, and then followed that up with one-on-one instruction time done by appointment within a few days of the hands-on class. The lecture type of program was given in a non-tech environment with coffee and cookies. We felt that they would be intimidated right off the bat if we immediately sat them in front of a computer. We provided time after the class for attendees to talk with us individually and ask questions. To make learning the mouse more fun we used solitaire as practice for the mouse. We had many appreciative seniors tell us that they liked being taught in a class with their peers and that they also were grateful for the one-on-one instruction time.

Teacher interview #1 of Patricia_____. 2006. Interviewed by Rick Sheridan. Sacramento, California, USA. 5 July.

In your opinion, what are the main reasons that the elderly want to learn computers/Internet? (She used a ✓)

- * To play games
- * To send emails ✓
- * To explore the Internet ✓
- * To word process letters, and so on. ✓
- * To do financial calculations with a spreadsheet

- * For graphics, digital photography, and so on. ✓
- * Genealogy ✓
- * Tax matters or investments

(Her comments): Also, games are played more in the intercity centers where are labs are at. The students don't seem to want to go any further with the PC. I have found that the student learning ability and desire is based on the social economical situation as well as their education.

Most women will do the checked items. Men will want to do sports/investments

Both will want to learn how to order shop/make reservations on line.

What are the main reasons why the elderly resist using computers?

- A fear of technology. ✓
- It's too expensive ✓
- There is too much to learn ✓
- Everybody else is better than me ✓
- Other

They believe everything skill and operation of the software has to be memorized in a short period of time.

They believe you need to understand "how a PC works" before you can operate the PC

PCs are not in their native language and the students will not try to learn English, a interpreter is requested for the class. Again, intercity labs

How would the elderly prefer to learn, if they had several choices?

- * By working in their own home with occasional visits from a tutor
- * Working in a classroom with others working on similar projects and a tutor available
- * Working with training manuals, videos, online courses, and so on.

Other:

Most students, I have found would prefer to be taught one-on-one. They believe that if they make a mistake, there is no one in the room to judge them.

One-on-one tutoring doesn't allow the students to explore the PC. No one can teach anyone how to operate the PC. We only take the fear away from them. My Basic I program is designed to cover in 12 weeks a little; MS Word, Internet & E-mail. The instructors show them how to function in each area but the students are only following directions. They do not understand the process on "how to reach the end result."

The manuals available to purchase, Computer for Dummies and others have done nothing except confuse the students. The language used is too technical and does not give explanations in normal language, more technical lingo.

EX: POP-UPS – they actually go down
Using HELP in the software programs

In most learning pedagogy environments the students are not expected to ask "WHY". Adult learners want to know "WHY" and they need to feel "comfortable" to ask that question. If they feel the instructor is not on their "learning level" they become intimidated and just shake their head, and leave the class feeling "stupid"

Below are the conclusions from my Ph.D. thesis. This is based on my interviews with several elderly computer users, along with my two years experience in teaching an “Internet Made Easy for Seniors” through a local community college. Please comment on any that you see as being either very accurate, or very inaccurate.

1. They all preferred the one-on-one tutoring to any other form of instruction. Most were willing to attend a course, read a computer manual, or experiment with other ways to learn how to use computers, but they all appeared to prefer individualized tutoring whenever possible.

(Her comments): I agree but after the tutoring - what is the computer usage by the student and do they advance and take other classes and become proficient with the PC? Most do not because they are not confident to do anything else. Why, because they don't want to break the PC or do something they shouldn't. The fear is not taken away with tutoring. Also, tutoring is usually done in an hour and ½ of that time is taken up with questions and the other is learning 4 to 5 skills. Too much information, too fast

2. They all have been influenced from their friends who also use computers. Everyone the author interviewed mentioned that a friend had either encouraged them to learn computers, explained what was possible (and fun) to do on a computer, helped them decide which computer to purchase, or other related interaction.

(Her comments): Yes, and usually the friend is a person who doesn't have that much knowledge. A student of mine listened to her niece and bought a \$1200.00 laptop and all it did was sit because she was afraid to use it. When she came to class, I let her use her laptop but in the 9 weeks she

never relaxed enough to use it comfortably. She left the class and I am sure, her niece has a new laptop.

(Her comments): Grown children will give the old PC to their parents and tell them to learn. The children or grandchildren will sit at the keyboard and show them how to use e-mail: the child will set up the account and go through the steps of sending the e-mail. The parent is lost and doesn't want to feel stupid in front of them. The student will tell them they will practice and never touch it again.

3. Most of them use e-mail as the primary thing that they do while online. Although most of them enjoy exploring the Internet and trying out many different sites (explained in more detail later), they all appear to use e-mail as a daily or weekly way to communicate with friends and family. Most were also very interested in using e-mail to attach and send photographs.

(Her comments): I agree

4. There are several categories of Internet sites that appeal to most of the interviewees. These included: genealogy, investments, health research, news and weather sites, and so on.

(Her comments): I agree – depending on the sex of the student and again intercity holds another set of issues.

5. They all have other forms of technology that they have had to learn before experiencing computers, such as health monitoring devices, home burglar alarm systems, television programming devices, and so on. This has influenced the way they approached learning computers.

(Her comments): I agree to an extent except: I have students that will not use an ATM machine and still go into the bank every Friday. They will not submit their taxes on line and forget giving their credit card number on line. It is too complicated for them. Fear of the unknown about the information in cyber space and currently all the hacked information that has been stolen, doesn't help their comfort level.

6. There were many reasons that the elderly subject group feared or avoided using computers. Practically all of them have had great difficulty learning to use the computer's mouse. This was one area of frustration that appeared often in the interviews. Other challenges included the fear of damaging the equipment, and fear of embarrassment while with peers or in a classroom. Some of the other typical frustrations mentioned throughout the interviews were: adverts popping up on the Internet, the difficulty in distinguishing quality sites from biased or non-referenced sites, and the slow access speed of many of their computers.

(Her comments): I whole-heartedly agree

7. Most of the interviewees in this study preferred to read printed materials as opposed to on-screen reading.

(Her comments): Yes, the screen is too small or too far away and the lighting in the room is a factor, ceiling light, throws shadows, and usually not bright enough. As age goes higher and higher the eyes get less and less.

8. Many of them are interested in researching their own health information, but often are unable to locate exactly what they are looking for, or are unsure of the quality of the site accessed. Most of them rely on their physician for advice, and several of the subject group members share their online research with their physician.

(Her comments): My students will ask relatives to look it up, it is only the students that have stuck with the classes and PRACTICE and make mistakes, then about 1 ½, they will succeed. I have students who want classes for 52 weeks, and then they practice at least ½ hr. each day. It is hard on my schedule but it is worth it when they can show me something!!!

9. Generally, the elderly were good students, who attended class regularly and were self-motivated. Despite the difficulties mentioned above, most of them were enthusiastic students.

(Her comments): You didn't mention their age except 60 something but are they a young 60 something. The oldest student I have is 95 and she still tries but is not succeeding, like SHE WANTS TOO.

10. Any other tips, insights or other comments you would like to add_____?

(Her comments): Get a bigger sampling, in various social economical and educational levels. Understand the issues facing students of different cultures as they age. Also, it is very hard to come up with stats on learning as we age. Until, you are that age and have lived the lives some of my students or any student with medical and mental issues, everyone is unique and is a stat of his/her own.

(Her comments): I don't know if you were able to watch how the seniors had to figure out Medicare D in the beginning of the year. It was terrible for the students here, even with computer knowledge. Too medically and insurance technical.

I am going to have my class review your project and I will post their thoughts and ideas. The timing is perfect; we are just beginning the Internet.

Teacher interview #4 of Andy_____. 2006. Interviewed by Rick Sheridan. Sacramento, California, USA. 12 July.

In your opinion, what are the main reasons that the elderly want to learn computers/Internet?

- * To play games
- * To send emails
- * To explore the Internet
- * To word process letters, and so on.
- * To do financial calculations with a spreadsheet
- * For graphics, digital photography, and so on.
- * Genealogy
- * Tax matters or investments

Other_____

What are the main reasons why the elderly resist using computers?

A fear of technology.

It's too expensive

There is too much to learn

Everybody else is better than me

Other_____

How would the elderly prefer to learn, if they had several choices?

- * By working in their own home with occasional visits from a tutor
- * Working in a classroom with others working on similar projects and a tutor available
- * Working with training manuals, videos, online courses, and so on.

Other_____

Below are the conclusions from my Ph.D. thesis. This is based on my interviews with several elderly computer users, along with my two years experience in teaching an “Internet Made Easy for Seniors” through a local community college. Please comment on any that you see as being either very accurate, or very inaccurate.

1. They all preferred the one-on-one tutoring to any other form of instruction. Most were willing to attend a course, read a computer manual, or experiment with other ways to learn how to use computers, but they all appeared to prefer individualized tutoring whenever possible.

(His comments): My experience, after three years, is that they prefer being in a group situation where they can learn from others in the class as well as the instructor. Use of a projector showing what is on the instructor’s screen has increased understanding a thousand percent.

2. They all have been influenced from their friends who also use computers. Everyone the author interviewed mentioned that a friend had either encouraged them to learn computers, explained what was possible (and fun) to do on a computer, helped them decide which computer to purchase, or other related interaction.

Response: True

3. Most of them use e-mail as the primary thing that they do while online. Although most of them enjoy exploring the Internet and trying out many different sites (explained in more detail later), they all appear to use e-mail as a daily or weekly way to communicate with friends and family. Most were also very interested in using e-mail to attach and send photographs.

Response: Very true.

4. There are several categories of Internet sites that appeal to most of the interviewees. These included: genealogy, investments, health research, news and weather sites, and so on.

Response: True

5. They all have other forms of technology that they have had to learn before experiencing computers, such as health monitoring devices, home burglar alarm systems, television programming devices, and so on. This has influenced the way they approached learning computers.

Response: True

6. There were many reasons that the elderly subject group feared or avoided using computers. Practically all of them have had great difficulty learning to use the computer's mouse. This was one area of frustration that appeared often in the interviews. Other challenges included the fear of damaging the equipment, and fear of embarrassment while with peers or in a classroom. Some of the other typical frustrations mentioned throughout the interviews were: adverts popping up on the Internet, the difficulty in distinguishing quality sites from biased or non-referenced sites, and the slow access speed of many of their computers.

Response: Mouse control was not an issue. We spend three classes (4.5 hours) getting them use to using the mouse. The other issues you mention are minor.

7. Most of the interviewees in this study preferred to read printed materials as opposed to on-screen reading.

Response: About 50-50.

8. No comment.

9. Many of them are interested in researching their own health information, but often are unable to locate exactly what they are looking for, or are unsure of the quality of the site accessed. Most of them rely on their physician for advice, and several of the subject group members share their online research with their physician.

Response: I'm seeing evidence that senior users are using the Internet more and more to research health issues.

10. Generally, the elderly were good students, who attended class regularly and were self-motivated. Despite the difficulties mentioned above, most of them were enthusiastic students.

Response: Very true.

11. Any other tips, insights or other comments you would like to add_____?

Response: Using the projector greatly aids understanding in conjunction with hands on application of the subject matter just taught.

12. What is your association with the elderly? What is your teaching experience?

Response: I teach four computer courses to the elderly at a senior centre in North Providence, RI. 1) basic 12 week computer introductory course , 2) advanced MS Word, 3) MS Excel and 4) a genealogy course using the computer to collect and organize data. I have no formal training in teaching. I have been teaching these courses for about three years.

Teacher interview #5 of Ed_____. 2006. Interviewed by Rick Sheridan. Sacramento, California, USA. 14 July.

In your opinion, what are the main reasons that the elderly want to learn computers/Internet?

* To send emails

* To explore the Internet

* Genealogy

Other__ Health Info _____

What are the main reasons why the elderly resist using computers?

A fear of technology.

There is too much to learn

Everybody else is better than me

How would the elderly prefer to learn, if they had several choices?

* By working in their own home with occasional visits from a tutor

* Working in a classroom with others working on similar projects and a tutor available

Below are the conclusions from my Ph.D. thesis. This is based on my interviews with several elderly computer users, along with my two years experience in teaching an “Internet Made Easy for Seniors” through a local community college. Please comment on any that you see as being either very accurate, or very inaccurate.

1. They all preferred the one-on-one tutoring to any other form of instruction. Most were willing to attend a course, read a computer manual, or experiment with other ways to learn how to use computers, but they all appeared to prefer individualized tutoring whenever possible. — Very Accurate

2. They all have been influenced from their friends who also use computers. Everyone the author interviewed mentioned that a friend had either encouraged them to learn computers, explained what was possible (and fun)

to do on a computer, helped them decide which computer to purchase, or other related interaction. — Very Accurate

3. Most of them use e-mail as the primary thing that they do while online. Although most of them enjoy exploring the Internet and trying out many different sites (explained in more detail later), they all appear to use e-mail as a daily or weekly way to communicate with friends and family. Most were also very interested in using e-mail to attach and send photographs.

— Depends, most appear to only use email to communicate and start out not wanting to do it at all, preferring Phone and Letters to email, but end up using it more often as they become more comfortable.

4. There are several categories of Internet sites that appeal to most of the interviewees. These included: genealogy, investments, health research, news and weather sites, and so on. — Very accurate except investments

5. They all have other forms of technology that they have had to learn before experiencing computers, such as health monitoring devices, home burglar alarm systems, television programming devices, and so on. This has influenced the way they approached learning computers. — Very Inaccurate - they tend to not even know how to use a VCR except to push the tape in. If something changes, such as an input change, they get confused often.

6. There were many reasons that the elderly subject group feared or avoided using computers. Practically all of them have had great difficulty learning to use the computer's mouse. This was one area of frustration that appeared often in the interviews. Other challenges included the fear of damaging the equipment, and fear of embarrassment while with peers or in a classroom. Some of the other typical frustrations mentioned throughout the interviews were: adverts popping up on the Internet, the difficulty in distinguishing quality sites from biased or non-referenced sites, and the slow access speed

of many of their computers. — Very Accurate - but most of my students do not have the "other typical frustrations" as they have not used a computer before.

7. Most of the interviewees in this study preferred to read printed materials as opposed to on-screen reading. — Very Accurate

8. Many of them are interested in researching their own health information, but often are unable to locate exactly what they are looking for, or are unsure of the quality of the site accessed. Most of them rely on their physician for advice, and several of the subject group members share their online research with their physician. — Very Accurate

9. Generally, the elderly were good students, who attended class regularly and were self-motivated. Despite the difficulties mentioned above, most of them were enthusiastic students. — Very Accurate - can't be more correct!

10. Any other tips, insights or other comments you would like to add:
— Self confidence is the biggest thing to instill in a Senior student _____?

12. What is your association with the elderly? Any teaching experience?
—I teach all of the Senior classes at our local library, including Word, Internet, Email, and Excel. I do have a large variety of ages (50-85), past teachers have had even older (95). I teach roughly 75% of the monthly 28 classes offered here (includes non-senior classes).

APPENDIX C:

TESTIMONIALS FROM STUDENTS AND OTHERS

This section has several comments made by students and others about the author's teaching and online course along with a recent article that the author wrote recently for a refereed journal about teaching distance education from the perspective of a teacher. Also included are the candidate's declaration and other general information.

Hi Rick, I just wanted to let you know how important the Internet class I took from you early in June has been in our lives. As I told you the day our assignment was to "research a health issue" my husband had just been diagnosed with prostate cancer the night before so that would be the topic I'd research. With your help that day, and all I'd learned from you already, I was able to really dig into things and find many treatment options and the necessary information to weigh them one against the other. Anyway, your class and this computer are worth their weight in gold right now! Thank you so much for such a great class, I hope you continue to teach it for a long, long, time, Rick.

Arlene Armes

Elderly student

--

Dear Mr. Sheridan,

Thank you for letting me know about this course! I am planning on using it to help train my volunteers and information research assistants.

Thanks again!

Maria Praetzellis

National Brain Tumor Foundation

<http://www.braintumor.org>

(800) 934-CURE

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Hi, my name is Laura Fitzgibbon and I am a school librarian. I will be giving computer classes to seniors in our community. While I was searching for interesting web sites, I found your web site! It's wonderful, and by this Tuesday, 30 seniors that live in the Catskills in NY will have the address for this site. You've done an outstanding job! I should just give them your web address and tell them that other sites recommended are already linked to your site (because they were)! It's too bad that it didn't come up in the 1st page of results on Google.

Thank you for making a great resource!

Sincerely, Laura Fitzgibbon

--

Dear Rick Sheridan,

I am a computer novice and I am always looking for tutorials online. I have a list of hundreds of sites. No more. I only need one and that's yours. Absolutely the single best, most comprehensive, accurate, easiest to use, read and understand. I used to give out a list of good reference sources. Now I only need one. Great job and very much needed. Thanks Dave B

Elderly student

--

Dear Rick,

This was one of the best classes that I've ever taken, and the first online!

Thanks, Jennifer Pixley Purtle, RN

--

Dear Rick,

The experience with my first on line class was interesting. The Modules were well organized and guided the student in learning about the Internet and how to do effective medical research in a systematic approach. The Materials section was wonderful, it included so many good suggestions on doing medical research that it made what would seem to be an overwhelming task much more manageable. The sample essays were very helpful in getting a better understanding of what the course was about and what other students found valuable. The course did take more time than I had anticipated. However, the techniques I have learned in this course will help me professionally when I seek employment as a Health Educator or perhaps as a Health Care instructor.

By Julie McCabe

--

Rick: Your COMPUTERS MADE EASY (for senior citizens) is just great. Have sent both your page and URL along to about 20 people. One fact that most people don't have is substantial info about MACS. Most of the over 60 group in our Association are Mac owners. The Mac User Clubs here in the Tampa Bay Area (In Florida) are slanted towards the younger professional users. You earned every penny of your grant money.

Frank Bandini
Elderly student

--

Rick is a very committed instructor. The assignments that he requires for students provide a foundation for continuing study in the department and an asset to their future careers. He is very committed to teaching students to apply the knowledge learned in the classroom by helping local community agencies.

Dr. Armeda Ferrini, Department Chair
California State University, Chico.

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For the last eight years, Rick has taught here at Butte College in the Business Computer Information Systems Department. During the Spring of 2000, Rick received Butte College's Excellence of Service award. This award is presented every year by the Butte College President for significant contributions to students, the college and the community. Rick is organized, hard working and fun to be around.

Ann Eggen,
Math Instructor, Butte College.

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APPENDIX D:

FULL TEXT OF AN ARTICLE BY THE AUTHOR ON DISTANCE LEARNING

Sheridan, R.D. 2006. Reducing the online instructor's workload. Boulder, USA.: *Educause Quarterly*. August, 2006.

Teaching an online course can be exciting, yet time-consuming to the point of infringing on an instructor's other responsibilities and personal time. Faculty typically put many hours into designing and administering an online course, especially the first semester it is offered. I've heard many horror stories about the massive time faculty spent designing a new class only to practically start over when they discovered the need for a few changes in the content or format. Fortunately, there are ways to cut back on the time put into developing and teaching online courses. After teaching both an online and a hybrid course, I have discovered several ways to deliver high-quality content while reducing the typical workload requirements.

My first online teaching experience was with a blended class at California State University, Chico (CSUC), a social science course called Introduction to the Information Highway that I taught in 1999. The class met once a week and the students used my web site to complete some of the required work. I have also taught an entirely online Internet Healthcare Research class through the College of Marin Extension for the past five years. This class allows students to start at any time and work through the four modules at their own pace. The course also has performance objectives, case studies, and a reference section. Students who complete the course receive re-licensure credit from the California Board of Registered Nurses.

Pros and Cons of Online

Most instructors are already familiar with the many advantages and disadvantages of online learning, but it's worth going over a few of them here. Online courses are self-paced; students can speed up or slow down as needed. They can skip over material they already know and focus on topics they most want or need to learn. Geographical barriers are eliminated. For example, most of my Internet Healthcare Research students did not live in the area. They also appreciated the flexibility of the online format, since many of them had day jobs and family commitments. In addition, I have found that it is easier for some people to communicate through writing. In the hybrid class at CSUC, at least one shy student preferred sending e-mails or posting materials on the discussion forum to speaking face-to-face with an instructor or another student.

Despite the obvious advantages of online education, several disadvantages stand out. Often, both students and instructor must master a technological learning curve. Some students may be at the very beginning stages of understanding how to use the Internet, and the requirements of operating the online course may frustrate or overwhelm them. With online training, students have little or no direct contact with the instructor or support personnel. This makes it more difficult for a student with questions or one who does not understand part of the training to seek and obtain help.

In some cases, online students do not have the incentives and pressures of classroom-based students; they can become lazy and unfocused. I had several students who quietly dropped out of one of my online classes and later contacted me to ask for an extension. Online drop-outs are more difficult for an instructor to notice than in a classroom situation where daily attendance and participation indicate a student's involvement.

Occasionally, bandwidth or browser limitations restrict student participation. Some students simply can't afford a fast Internet connection, and they can get frustrated with the slow browsing experience. Finally, students sometimes complain about on-screen readability.

Managing Time for an Online Course

One way I learned to save time both for me and for students was by setting up a "What's New" section at the beginning of the online course. In the past, I added content to whatever section seemed appropriate. Students either complained about not finding the new material or they simply did not respond adequately to the new assignments or lecture notes. Indicating what has been added at the beginning of the site makes it much easier for students to focus on the new material, and it also provides me with a quick reminder at the start of class about what needs to be covered in the discussion.

To make these courses easy to administer, I set up a discussion forum where students can post questions, comments, difficulties, and advice for other students. This encourages teamwork on some of the projects and allows students to "blow off steam" when they get frustrated. Another technique I use is to post a reference section that has more than 150 links to health-related sites, an explanation of basic and advanced Internet research techniques, a bibliography, and case studies, along with other resources. As students work through the modules, they see an occasional link to the reference section for additional information. This structure prevents the individual modules from becoming cluttered with too much general reference material while allowing me to quickly add related materials as they become available.

I have used the design structure of the Internet Healthcare Research class as a template for several other online courses. Although the content is much

different, I use the same structure of four modules plus reference section. I simply add lecture notes and other resources into the template and modify the content to match the new performance objectives. This way, all the links and anchors work, and the course can be loaded easily to any available server.

The following tips will help those new to online education manage the time they invest in their online class:

Automate parts of the course whenever possible. Whether you use online development tools such as WebCT or Blackboard or design the course yourself with an HTML editor such as Dreamweaver, take advantage of automation features. For example, WebCT has a variety of tools to create frequently asked question (FAQ) sections, self-correcting quizzes, and other time-saving devices.

Create a “What’s New” section to let your students focus on new assignments or learning materials without having to review the entire course. This also minimizes the amount of e-mail questions you will receive regarding assignments. Also, with WebCT or Blackboard you may find it quicker, easier, and more effective to design the course in Dreamweaver (or another HTML program) and “pull” it into WebCT/Blackboard. These programs often have templates that let you do a global update, which means you can update several pages throughout your site with one correction. Dreamweaver also offers more design flexibility than is currently available in WebCT or Blackboard.

Organize a group of instructors and students on your campus who are experienced in online course design and delivery to help support faculty when they encounter technical or content difficulties with online instruction.

At CSUC, an informal group called Technology in Learning—known as TILT—meets monthly to discuss online methodology.

Be aware of the assessment workload per student when you first design course assignments. Typically, instructors spend enormous amounts of time developing a new course, and then find that they have set themselves up for huge online grading commitments. This does not always translate into higher-quality content and can result in instructor burnout. High-enrollment courses especially may need to use fewer personalized grading assignments or high-tech features. Technology does not bring economies of scale, unless the opportunities for interaction with individual students are managed effectively.¹ The instructor's assessment workload can be reduced by substituting peer, computer, or self-assessment options. Group assignments often require less teacher assessment than do individual assignments.²

Determine what kind of technical support you have available. Some universities, such as CSUC, have a rapid-response technical support staff that will react immediately to support issues. Other universities' support staff are much less able or willing to respond quickly. If your university falls into the latter category, developing faculty and student contacts is very important to the success of your online course. In addition, consider having administrative or other non-technical departmental staff handle the administrative aspects of the course. Another option would be to encourage more experienced students to support new students and relieve the instructors of some menial tasks.

Communicate with students early in the semester about how to best use the course, along with any expected difficulties with the technology. Let students know that it may take one to two days for you to personally respond to e-mail questions that they send. Post any new e-mail questions or general problems on the FAQ and "What's New" sections to minimize repetitive e-

mail questions from others in the class. Encourage continuous feedback from students so that you can keep the course responsive to their needs and maintain high morale throughout the semester.

Conclusion

Teaching online has been an exciting and productive experience that has offered teaching options I would not have had otherwise. Following the initial investment into developing the course and after the first semester of trial-and-error, a well-designed and well-managed online course could save an instructor a quarter of the time normally devoted to teaching in a traditional classroom.

While reducing faculty workload is a worthwhile goal, of course, it is only one factor in assessing online instruction. Faculty time savings must be weighed against other considerations. It is important to develop an effective evaluation system for determining student satisfaction with the online experience and whether students learned the necessary materials at the same level as their traditional-classroom peers. Those factors ultimately decide the success of online courses for faculty, not time saved.

Article endnotes

1. T. Bates, "Third Generation Distance Education: The Challenge of New Technology," *Research in Distance Education*, Vol. 3, No. 2, 1991, pp. 10–15.
2. L. Maguire, "Faculty Participation in Online Distance Education: Barriers and Motivators," *Online Journal of Distance Learning Administration*, Vol. VIII, No. I, Spring 2005.

GLOSSARY OF TERMS USED

Some of the terms and concepts from this thesis need to be clarified and expanded. The author has tried to include appropriate terms from the fields of communications, education and computers, especially those terms that relate directly to this thesis content. The author has tried in these glossary definitions to encompass both British and American connotations and has indicated several difference in meaning. Citations/references are provided at the end.

Education-related terms

Adult: For the purpose of this study, adult is anyone who is 18 years of age or older. The terms 'adults' and 'elderly' naturally overlap in some circumstances.

Andragogy: Similar to self-directed learning where learners need to know the reason they are learning something; learn through experience; see learning as problem-solving; and, learn most readily when they can immediately apply what they learn. They are self-directed in their learning, and the term andragogy will be used interchangeably with the concept of self-directed learning.

Assistive technology: Any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with limitations or disabilities.

Body language: Non-verbal communication is defined by anything consisting of eye contact, facial expressions, and patterns of touch,

gestures, spatial arrangements, tones of voice, expressive movement, and other cultural differences.

Brainstorming: A group of individuals generate ideas on a topic by adding their input, and creating new ideas based on the contributions of others.

Case study: Often case studies are drawn from real life and are used as a model to illustrate a general principle or problem solving strategy. These case studies are primarily aimed at the examining and testing out general principles or for the analysis and evaluation of the situation. Some of the advantages of case studies include the generally higher level of students' involvement than with a lecture.

Cognitive: Mental operations that involve perceptions, judgments, memory, and reasoning.

Collaborative Learning: Two or more learners interacting as a group to develop a consensual answer that may or may not reflect an absolute or recorded truth but rather what the group agrees upon to be a rational and reasonable answer.

Constructivism: A philosophy of learning drawn from the work of Dewey, Piaget, and Vygotsky in which learners actively engage in learning experience that have meaning and relevance to them; acquire knowledge through interacting with content and others; and negotiate meaning through this interaction.

Context: Situated information and/or environment that have specific characteristics that may not be transferable to other contexts.

Control: The degree to which an end user (learner or instructor) can make decisions, choices, or changes within a learning context having to do with communication, activities, or interface interaction.

Cooperative Learning: Learners work together in a common effort (typically with assigned roles) to achieve a common learning objective.

Curriculum: A set of courses, modules, or other organized learning experiences that constitute a complete, cohesive, and coherent program of study.

Disability: a health problem or condition that currently keeps an individual from participating fully in work, school or other activities.

Discovery Learning: A learner initiated and instructor- and/or- technology-supported process through which the learner explores, queries, and browses to determine answers.

Distance education: The process of extending learning, or delivering instructional resource-sharing opportunities, to locations away from a classroom, building or site, to another classroom, building or site by using video, audio, computer, multimedia communications, or some combination of these with other traditional delivery methods. Typically, the Internet is the most commonly used device for delivery of distance education materials.

E-learning: this term is frequently applied to a wide variety of training and educational programs which are delivered through a network, via the Internet, by CD-ROM, by satellite, by personal digital assistants, by wireless devices or through the telephone. This term will overlap somewhat with distance education and online learning.

Empirical research: the process of developing systematized knowledge gained from observations that are formulated to support insights and generalizations about the phenomena under study.

Elderly: For the purpose of this study, the author has limited the definition of the elderly to 'those individuals over the age of 65. This is a standardized definition in many areas of the United States. The terms 'adults' and 'elderly' naturally overlap in some circumstances.

Fishbone map: is a type of diagram that is used to explore the many aspects or effects of a complex topic, helping the students to organize their thoughts in a simple, visual way. The use of color helps make a fishbone map clearer and easier to interpret. Fishbone maps are similar to concept maps described in the body of this thesis.

Flowchart diagrams: they visually display a series of instructions used to complete a process or project. The arrows represent the direction of flow; circles are for starting or stopping. Diamonds are decision points. Rectangles and squares are steps at which processing takes place.

Hybrid Approach: a technique developed by the author of this study which encourages the subject group to combine elements from various teaching and learning methods to create a personalized strategy for learning, based on their specific interests, aptitudes and the availability of the local learning resources. This method combines elements of Knowles' self-directed learning and Gardner's theory of multiple intelligence, while creating a new and more effective hybrid method of teaching and learning. This method allows a flexible adoption to the changing needs of the subject group and encourages a best practices approach to teaching.

Internet: is a worldwide system of computer networks, where users at any one computer can get information from any other computer. The Internet is a public, cooperative, and self-sustaining facility accessible to hundreds of millions of people worldwide.

Jargon: Speech or writing having unusual or pretentious vocabulary convoluted phrasing, and vague meaning. This includes the specialized or technical language of a trade, profession, or similar group.

Journaling: The use of a notebook, diary or similar device to help the learner capture ideas over a period of time. The author of this study encouraged his students and the interviewees to use a journal to record their learning progress and any related questions they had.

Joysticks: A joystick may be used as an alternate to the mouse. They allow users to move a rod back-and-forth instead of a mouse ball.

Keyboard alternative: Alternative keyboards may be different from standard keyboards in size, shape, layout, or function. They offer individuals with special needs greater efficiency, control, and comfort.

Learning: The acquisition of knowledge or skill acquired by experience, instruction, or study information which results in new or improved skills, knowledge, behaviors, and/or attitudes. A learner is anyone who accesses or uses resources to gather information, acquire skills, or construct knowledge.

Learning Strategies: Procedures, routines, memory devices that a learner uses to remember and recall information, e.g., outlining, note-taking or study groups.

Module: Groups of readings, activities, tasks, and assignments that are organized around a central topic or theme.

Motivational learning prompt: devices used to potentially increase the effectiveness of learning styles and techniques. Examples include memory skill building, time management, priority learning, aptitude testing and multiple intelligence research.

Professor: There is some difference in the British and American definitions. In the U.S., professor refers to any long-term university lecturer who has passed the tenure process.

Programmed Learning: Based on the work of B.F. Skinner, learners are given a limited amount of information and proceed at their own pace from one content chunk to the next as they respond to prompts. Correct answers are rewarded; incorrect answers are corrected with immediate feedback.

Role play: A teaching strategy in which learners act out characters in order to try out behaviors, practice interactions, and communicate for a desired outcome, and/or solve a problem.

Screen enlargement programs: These devices magnify a portion of the screen and help users with limited vision. Some screen enlargement programs offer text-to-speech reading for disabled users.

Self-assessment: A process by which the learner determines their personal level of knowledge and skills through testing or feedback from others.

Self-directed: The learner determines such things as content, process for learning, and outcomes. This concept is explained in much detail in other sections of this thesis.

Self-paced Instruction: The learner determines how quickly to complete tasks, activities, or a course of study.

Seniors: a very common term for anyone in the U.S. who is over 65 years old.

Social Learning: Occurs in a learning experience where participants observe and adopt the behaviors and attitudes of other group members.

Symbol: is a design, drawing or other emblem which represents a concept generally understood by people viewing it. Examples of symbols include road signs, or no smoking signs. Symbols supplement language and can often be helpful learning tools for students.

Synchronous Learning: An online learning situation in which all participants are present at the same time and interact with each other.

Teaching: Directed by an expert or more knowledgeable peer, teaching intends to increase or improve knowledge, skills, attitudes, and/or behaviors in a person to accomplish a variety of goals.

Touch screens: This is a device placed on the computer monitor that allows a user to make a selection by a touch of the screen.

Training: A process that aims to improve knowledge, skills, attitudes, and/or behaviors in a person to accomplish a specific job task or goal. Training is often focused on business needs and driven by time-critical business skills and knowledge, and its goal is often to improve performance. Training, teaching and instruction are three similar terms that are used somewhat interchangeably in this study.

Triangulation: is the application and combination of several research methodologies in the study of the same phenomenon. By combining multiple observations, theories, methods, and empirical materials, researchers can hope to overcome the weakness or biases that come from single method or single-theory studies.

Additional computer and Internet terminology

Bandwidth: A way to measure a network's transmission speed, how much data a network can transfer in a given amount of time.

Bookmark: A way to save an Internet address in your web browser, so it can be accessed later.

Byte, Kilobyte, Megabyte, Gigabyte: These are typical measurements of your computer or file size. Here is a comparison:

1000* Bytes = 1 Kilobyte (KB)

1000* Kilobytes = 1 Megabyte (MB)

1000* Megabytes = 1 Gigabyte (GB)

*This number is actually 1024, but don't worry about it.

Computer Based Training: Training or instruction where a computer provides motivation and feedback in place of a live instructor. CBT can be delivered via CD-ROM or the Internet.

Database: A software program that collects information in an organized way so that it may be searched by various categories. Examples include: library catalogues, search engines or financial data.

Download: The transfer a file or files from a remote computer to the user's computer.

FAQ: Abbreviation for Frequently Asked Questions. A document posted on the web that contains common questions and answers for a particular website or topic.

File: Any individual document of information or image that you save in your computer. Like text, a photo can be saved as a file, or a piece of music or video can be saved as a file.

Folder: This is a way to keep your computer files organized. One folder can hold many files.

FTP (File Transfer Protocol): A software program that allows you to transfer files between two computers that are connected to the Internet.

Hardware: the physical components that make up a computer system, such as: CPU, monitor, disk drives, keyboard, mouse, printer.

HTML: Abbreviation for Hypertext Markup Language: The code used on text files that allow them to appear as formatted web pages on the Internet.

HTTP: Abbreviation for Hyper Text Transfer Protocol. Often this is the initial sequence of letters in a web address.

Hyperlink: part of the web page that links to another place in the same page or to an entirely different page. Hyperlinks are underlined text in a different color and the cursor changes to a hand when the mouse pointer is placed over the link.

Internet: A global network connecting millions of computers. Users are linked into exchanges of data, news and opinions. The Internet is decentralized by design. Each Internet computer, called a host, is independent. Its operators can choose which Internet services to use and which local services to make available to the global Internet community. Remarkably, this anarchy by design works exceedingly well.

Memory: Term usually referring to the short or long-term storage capacity of a computer.

Operating system: Every computer needs a set of programs called the operating system to run the system and make all the other programs work. Your word processor, database or spreadsheet programs can't operate unless the operating system is present. Windows and Macintosh are the two main operating systems. The Windows versions are known as 95, 98, 98SE, 2004, NT, ME, and XP. Macintosh has versions up to OSX (10). When you buy a new computer, the operating system usually comes already installed.

Search engine: A tool which allows users to browse the Internet and find specific sites. Google and Yahoo are examples of search engines.

Software: This is the term used to describe the instructions needed to make the computer work, and is a set of computer files that are used to perform various actions on the computer. You may have a set of instructions for word processing, for example.

Shareware: Copyrighted software that is available for personal use for a small fee, and often downloadable from the Internet.

Spreadsheet: This allows data and formulas to be typed in, edited, calculated, and printed out. They are often used for budgeting and forecasting.

Storage device: Any device upon which a computer may store data in permanent form. Data is not lost from a storage device when the electricity to a computer is turned off, as is the case with electronic memory. This could include the hard drive, a Zip disc or a floppy disc.

URL: This is short for Uniform Resource Locator. A string of characters used to uniquely identify a page of information on the WWW. This information is used by browser software to find other sites on the Internet.

Virus: A computer virus is something created by humans to damage your computer. It replicates and attaches itself to your computer files and folders, and (usually) causes some kind of damage to your computer.

Voice recognition: This allows the user to speak to the computer instead of using a keyboard to input data or control the computer functions.

Word processing: A software program that will accept, edit, organize, and print out text.

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