The Pennsylvania State University

The Graduate School

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**A STUDY OF OLDER ADULT STUDENTS' SATISFACTION WITH
WEB-BASED DISTANCE LEARNING AT THE NATIONAL OPEN
UNIVERSITY OF TAIWAN**

A Dissertation in

Adult Education

by

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Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

August 2010

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ABSTRACT

The purpose of this study was to investigate the relationships between older learners' demographic characteristics and their satisfaction with distance learning in the Web-based environment at National Open University in Taiwan (NOUT). Increases in the older adult population have had many impacts throughout societies. The major purpose of older adult education, therefore, is to help this population to prepare for life in a successful aging society. Distance education provides flexible ways to deliver learning materials, meet learners' needs, and motivate the older population to continue to pursue educational opportunities across many barriers. In the context of rapidly developing educational technologies in many different countries, including the Taiwan, the Internet provides distance learners with a powerful Web-based learning environment.

A two-part survey was used to collect data in this study: a research-based background survey and a modified version of Distance Education Learning Environment Survey. Six hundred forty-four participants completed the survey. ANOVA analysis method was employed to examine the relationship between older learners' demographic characteristics and their satisfaction with distance learning in a Web-based environment. The findings indicted that gender differences and marital status affect students' learning satisfaction with Web-based distance learning.

However, data did not indicate an effect on satisfaction for age and educational

background. Implications included the need for future research on different types of

interaction and additional factors related to learners, also suggested are specific way

institutions, course designers, and instructors can better support older adults in online

courses.

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Acknowledgements

I would like to take this opportunity to thank all my committee members for helping me throughout the process of my study. I am really lucky because their favor always came when I suffered unpredictable dilemmas in my study and my life at Pennsylvania State University.

I want to express my sincere gratitude to my adviser, Dr. Michael G. Moore, for patiently taking care of me throughout my study. His critical questioning has strengthened the theoretical foundation of this research. I am indebted to my co-adviser, Dr. Melody M. Thompson. She initially helped me develop the topic of my dissertation and always gave me a lot of encouragement when I faced challenges during my doctoral study.

I would like to thank Dr. Edgar Yoder for giving me a lot of helpful directions on statistical analysis and also patiently answering my questions about the quantitative part of this research. I deeply appreciated Dr. Wei-Fan Chen, for his suggestions have always been inspiring and helpful. Dr. Wei-Fan Chen provided not only critical comments for my research but also supported me emotionally.

Finally, I would like to give my great thanks to my parents for providing me with encouragement, financial support, and love. Even though my family suffered several hard situations, my parents still provided a lot of support for my study. Without their

persistent support, I would not have had this opportunity to finish my degree in the

United States.

Chapter 1

Introduction

The purpose of this paper is to explain the concept of aging society and to

analyze older learners demographic characteristics in Web-based learning

environments and to provide instructors with research findings on the relationship

between older learners' demographic characteristics and satisfaction with a lifelong

learning distance course. In the 21st century, it is important for nations to ensure that

their citizens and the work that they perform are informed by knowledge and skills

that enable them to work and compete with others in society. Globalization and new

technological changes have led many governments to improve their citizens' levels of

knowledge and skills in order to ensure that their workers can rapidly evolve to

remain competitive in today's learning society (van Merriënboer et al., 2009, p. 3).

Distance education has played a key role to influence the social changes that are

affecting lifelong learning in the globalization context. The Internet provides learners

with synchronous and asynchronous communications, and with flexible access to a lot

of learning materials. Sahin (2006) mentioned that the "flexibility of learning at a

distance via the Web has great potential for delivery of learning to a variety of

learners. This assists educational institutions to accommodate diverse student

demographic characteristics" (Sahin, 2006). On the other hand, the growth of distance education courses via the Internet has prompted educational research focusing on learners' demographic characteristics and learning satisfaction(Khan, 2005; Koohang & Durante, 2003; Lu, Yu & Liu, 2003; Thurmond et al., 2002). Recently, higher education institutions have been developing more and more Web-based courses around the world, including in Taiwan.

In addition, the big increases in the older adults population have had many impacts throughout societies. The older adult proportion is expected to grow to nearly 20% of the total population, or almost 90 million in number, by the middle of the next century" (MacNeil, 1998, p. 26). In 2050, many developed countries, including the Japan and United State, will have doubled the old-age dependency ratio; several developed countries will have tripled the ratio as well (Isidro, 2004). In fact, the increasing number of people reaching old age has required programs and training to prevent job obsolescence and also increased interest in various well-being programs in society (van Merriënboer et al., 2009).

Aging society is also reflected in the social changes that have impacted the evolution of various social systems in different countries in the world, such as political reformation and educational innovation. Moreover, globalization has affected many educational trends in lifelong learning. Especially with regard to this aspect, it

is very important about educational policy focus on raising and developing a lifelong

learning environment that enables our aging society to face a lot of challenges.

In the previous studies, several instruments have been used to evaluate learners'

satisfaction with the distance learning environment (Chang & Fisher, 2001; Biner,

1994; Kaminski et al., 2000; Smith & Chang, 2008; Thurmond et al., 2002 Walker,

2003). One instrument, the Distance Education Learning Environment Survey

(DELES), was designed by Walker (2003). DELES has good validity and reliability in

each scales. The research collected data from three scales: instructor support, students

interaction and collaboration, and student enjoyment.

Background to the Problem

Many higher educational institutions have begun to evaluate the quality and

student satisfaction of distance courses in order to improve learners' learning via the

Web-based environment. Distance education provides learning and teaching in a

variety of different ways. The Internet has affected the ways in which we learn new

knowledge and skills (Sahin, 2006). In the context of rapidly developing educational

technologies in many different countries, including the Taiwan, the Internet has

become a powerful tool to provide learners with a Web-based learning environment.

The literature indicates that one of the important factors of evaluating the quality of

distance learning is to analyze student demographic characteristics and satisfaction.

However, the relationship among learners' demographic characteristics and

satisfaction is not understood well in Taiwan.

Purpose of the Study

The purpose of this study is to investigate the relationships between older

learners' demographic characteristics and their satisfaction with distance

learning in a Web-based environment at National Open University in Taiwan (NOUT).

Learners' demographic characteristics included age, marital status, educational

background, and gender. Students' satisfaction of distance learning in a Web-based

environment was measured by the Distance Education Learning Environment Survey

(DELES) developed by Walker (2003).

Research Question

The following research questions were formulated to describe the purpose of this

study:

1. What is the relationship between older adults' demographic characteristics and their

satisfaction with three elements—instructor support, student interaction and

collaboration, and enjoyment —of the Web-based learning environment at NOUT?

Are there differences related to the gender variable and older adults'

satisfaction?

1.2. Are there differences related to the age variable and older adults' satisfaction?

1.3. Are there differences related to the marital status variable and older adults'

satisfaction?

1.4. Are there differences related to the educational background variable and older

adults' satisfaction?

Definitions of Terms

Older Adult

The age 65 is often viewed as the marker for older adults. In the United States,

the "full retirement age had been 65 age for many years" (Social Security Online,

2009). However, there is a little difference in age definitions in Taiwan, when the ages

of older adults have been defined and assigned to different range groups. In this study,

older adults are defined as person as age 60 and above. According to labor law of

Ministry of the Interior (MOI), the Taiwanese government defines older adults as

those who have reached the age of 60 or have already worked for 25 years.

Distance Education

Many scholars have pointed out that distance education involves teachers and

students separated by geographic and time factors, and learners are involved in

independent interaction with instructors and other classmates in distance courses

(Keegan, 1996; Moore, 1996). In other words, the most typical distance education

situation is that where the instructors and learners are separated by geographical

distance and involve the use of radio, television, internet networks and multimedia computer programs by instructors and learners at all levels. There are several different ways to deliver learning content in distance education (Gunawardena & McIsaac, 2004).

Web-based Distance learning Environment

"A Web-based learning environment is something that can be created and accessed using the Internet. Such an environment is just like any other learning event in that it distributes information to learners…many of the tools that provide the functionality of Web-based learning use a variety of computer applications along with user interface that allows learners to access the learning materials" (Jolliffe et al., 2001, p. 4).

Learners' Satisfaction

Student satisfaction is one type of affective learning outcome (Smith, 2008; Walker, 2003). In this study, the concepts of instructor support, student interaction and collaboration, and enjoyment are addressed as important elements in learners' satisfaction. The concept of instructor support is defined here to indicate that instructors provide to students in their course services such as guidance and counseling, interactions, academic support, learning materials, services for students with special needs (disabilities), and appropriate learning experiences (Moore, 1996;

Tait, 2000).

Learners' Demographic Characteristics

In this study, demographic characteristics are age, marital status, educational

background, and gender.

Chapter 2

Review of Literature

Introduction

This chapter contains a discussion of the current literature on the concepts aging

society, older adult learning, and distance education in the Web-based learning

environment. The first section begins with a brief review of aging society and older

adult learning. This chapter includes a review of activities relating to distance learning

development at the National Open University in Taiwan. The second section discusses

research on satisfaction and students' socio-demographic characteristics within the

context of Web-based distance learning courses.

Aging society

Successful Aging Society

"Everyone will be old one day, and we all hope that when that time comes, we

will not have to worry about our economic situation, medical care, or psychological

health" (Wu, 2000). Gerontologists define older adults as being age 65 and older. The

range of ages for older adults is "younger old" (aged 65–75), "older-old" (aged

75–85), and "oldest old" (aged 85 and older) (Steinbaugh, 1984). However, there is a

little difference in age definitions in Taiwan when the ages of older adults have been

defined and assigned to different range groups. According to labor law of Ministry of the Interior (MOI), the Taiwanese government defines older adults as those who have reached the ago of 60 or have already worked for 25 years.

There are approximately 70 million or 20% of the population will be 65 years or older in 2030 in the world (Cortner, 2006). "The older adult proportion is expected to grow to nearly 20% of the total population, or almost 90 million in number, by the middle of the next century" (MacNeil, 1998, p. 26).

The big increases in the older adults population have had many impacts throughout societies. In 1999, the United Nations (UN) recommended the elderly as learning models, and as treasures, and suggested that old adults play important roles in societies around the world. Increases in the number of older adult population have become a global issue. The UN (2000) declared the year 1999 as the International Year of Older Persons, and claimed that the notion of moving "toward a society for all ages" was important for all people in the world. In addition, "As the tempo of aging in developing countries is more rapid than in developed countries, developing countries will have less time than the developed countries to adapt to the consequences of population aging" (Isidro, 2004, p 3). In 2050, many developed countries, including the Japan and United State, will have doubled the old-age dependency ratio; several developed countries will have tripled the ratio as well (Isidro, 2004).

It is the fact that the number of older adults is increasing. People are living longer than before in many countries, resulting in an aging society. In general, the term "aging society" means that more than 7% of a country's total population is over the age 65 (Kim & Kim, 2003). The appearance of aging societies around the world has occurred for four reasons: (1) the world-wide population growth rate is only 1.6% per year; (2) the birth rate is declining; (3) life expectancy is increasing in industrialized countries; and (4) older-people ratios are increasing in numbers in the world (Hinrichson, 1994; World Health Education Foundation, 2002). In fact, the increasing number of people reaching old age has required educational programs and training to prevent job obsolescence and also increased interest in various well-being programs in society (van Merriënboer et al., 2009).

Moreover, increases in the elderly population are influencing socioeconomic development around the world. In response to this situation in society, governments are developing well-designed social support systems that include a wide range of lifelong learning opportunities in order to successfully take advantage of this human capital. Specifically, these social support systems relate to older adult education, which includes practical programs such as problem-solving, job-related skills, retirement planning related to leisure, and health care for the body and mind (Wolff, 2000). Lifelong learning provides older adults with access to learning opportunities

during their leisure time (MacNeil, 1998). In addition, these social support systems

not only enable older adults to face various challenges but also to develop new

relationships with other people in the aging society (Mezuk & Rebok, 2008).

Education has been viewed as a main contributor and social support in helping older

adult learners to again use their knowledge and skills to face these new changes

during their life (Aldridge, 2007; Clennell, 1987)

On the other hand, it is an important social value and goal to encourage and

facilitate successful aging in older adults. The major purpose of older adult education,

therefore, is to help this population to prepare for their life in a successful aging

society. However, how do we define the concept of successful aging for older adults?

In the 1980s, the concept of successful aging was one way to understand the changing

role of older adult people (Rowe & Kahn, 1987). Moreover, Bearon (1996) noted that

many gerontologists have indicated that "quality of life is as important as quantity of

life, or is at least a necessary part of successful aging" (Bearon, 1996). In the 1990s,

Palmore (1995) defined successful aging as combining survival, physical, and life

satisfaction. The concept of successful aging also "refers to reaching one's potential

and arriving at a level of physical, social, and psychological well-being in old age that

is pleasing to both oneself and others" (Gibson, 1995, p. 279). In addition, Fisher

(1995) defined the concept of successful aging as "anticipation or a sense of future,"

and provided five features of achieving successful aging: "interaction with others,

have a sense of purpose, self- acceptance, personal growth, and autonomy" (p. 239).

Older Adult Learning

Olga Knopf (1975) pointed out that older adults are different group with special

needs from children and young adults. With regard to the educational needs of older

adults, Merriam and Lumsden (1985) pointed out that program planners must consider

six educational needs of older adults when they develop lifelong learning courses for

this population: "(1) adjusting to decreasing physical strength and health; (2)

adjusting to retirement and reduced income; (3) adjusting to the death of spouse; (4)

establishing an explicit affiliation with the same age group; (5) adopting and adapting

social roles in a flexible way; and (6) establishing satisfactory physical living

arrangements" (p. 58). On the other hand, the educational institutition plays an

important role in developing a successful aging society. Cody et al. (1999) conducted

a study involving 292 older adults aged 80 years and older who enrolled in a training

program. The researchers noted that "Training older adult learners is important

because of the increasing numbers of this segment of the population" (p. 269).

Learning institutes are developing and providing various resources to support the

older adults' population (Donovan, 2001). Baby boomers have become a major

component of the aging population in many different countries such as Japan, Taiwan,

and the United States. The term "baby-boomer" identifies those people who were born

between 1946 and 1964 (Isidro, 2004).

The successful outcomes of older adults' learning should be examined to

determine whether learners have enjoyed the learning experience and engaged in

interactions (Ginsberg, 2002; John, 1988). "Older people learning feel better about

themselves and their health, tend to lead an active life and are more self-confident.

Older adults' learning activities may cover arts, crafts, IT, languages, genealogy,

cookery, dancing, etc" (Malcolm, 2000). Recently, Rau and Hsu (2005) examined

older adults' learning situations. The experiment involved 24 older learners who were

aged 50-70. The researchers found that older adult participants were able to complete

all the learning tasks in this research (Rau & Hsu, 2005).

Older adults often choose to take advantage of learning activities in order to

ensure their well-being. "Motivation is a process that leads old adult learners into new

experiences, energizes, focuses their attention, and helps guide them towards more

distant goals" (John, 1988, p.19). John (1988) pointed to three major needs of older

adults: "(1) needs to be useful and productive; (2) needs to learn and satisfy curiosity;

and (3) needs to receive warmth and approval" (p.22). In general, the decision to

engage in various learning activities is self-motivated. Moore (1996) mentioned that

older adults usually decided to join the learning courses which can benefit their life.

Moreover, many researchers indicated that older adults take part in educational

activities as a way to improve their physiological function and mental situation.

O'Connor (1987) claimed that older adults usually choose learning programs that

benefit their lives and make them enjoyable will help them face any decrease in

intellect and memory ability, and promote their affective situation in their later life.

In addition, instructors consider older adults' learning motivation, which should

be the case when course instructors plan for the curricular needs of these learners

(Aldridge, 2007; John, 1988; Lumsden, 1985). Kerr (2004) did a qualitative study of

the learning issue in old age. The research involved 564 participants who attended

continuing learning courses in the several older adult learning institutes. The research

indicated that older adult students were strongly interested in attending classes for the

joy of *learning* and pursuing their hobbies and recreational goals. The study also

pointed out that those older adults were more willing to explore new age topics such

as self-understanding. In addition, Merriam and Lumsden (1985) suggested that

instructors should encourage older adults to bring their prior experiences to the

continuing learning courses in order to connect with new learning content and

improve their motivation.

The other important factor that should be of interest to instructors is the concept

of support. Older adult learners tend to have higher motivation and be more satisfied

with learning programs when they have received well-designed support services (Charness et al., 1992). Ng (2008) conducted a study related to older adults learning to participate in educational activities. He found that good support can help older learners to engage in educational courses. Support and encouragement from family members, peers and instructors are extremely important to older adults, too (Ng, 2008). In other words, successful learning support can play a key role in motivating older adults to engage in continuing education courses.

In general, the goal of educational institutes for old learner is to develop a good life. Wolff (2000) claimed that lifelong learning must be promoted in educational reform when policy makers examine the older adult learning system. In addition, Malcolm (2000) conducted a research project in which 300 people over the age of 50 were interviewed at the Employment Studies Institute in the UK. The research indicated that older adult learning institutes can assist this population in achieving better enjoyment in their life, greater self-confidence, and more involvement in social activities, leading them to develop a relationship in their community (Malcolm, 2000).

Finally, no one can avoid aging, but old adults can take advantage of educational activities to gain new knowledge and learn to use new technologies in order to understand changes, and keep their mental functions strong by engaging in socialization (Rowe & Kahn, 1998; Schaie, 1994).

Taiwan as a Learning Society

Since the 1950s, western capitalism has affected Taiwan's development of

industry and foreign trade in order to survive in global competition. Taiwanese policy

makers have presented the economy as a principal goal in national plans. Since the

1980s, the high-tech business has flourished rapidly. During that time, rapid economic

growth has made the government to realize the necessity of paying more attention to

education (Yang, 2001). In 1998, The Ministry of Education (MOE) in Taiwan

published a white paper called "Toward a Learning Society". The white paper focuses

on policies relating to planning and creating a learning society in Taiwan (Chang,

2002). Lin (1998) presented a lifelong learning education policy in Taiwan, which

included continuing education through

post-graduate programs, distance learning programs, and community colleges.

Because of excellent achievements, Taiwan is becoming a developed country.

However, the imbalance between educational developments in the cities and rural

areas has brought many social problems. In order to reform the educational problems

in Taiwan, the government has identified distance learning as a popular way to

enhance citizen development, improve global competition, and narrow the gaps

among people through new developments in technology. The main concern of

distance learning programs in Taiwan is to ensure that everyone is able to take

advantage of distance learning at any age.

In such a context, the government has developed lifelong learning opportunities for citizens to access education; it has established many public libraries, distance learning courses at National Open University (NOUT), the National Science and Technology Program for e-Learning (ELNP), and the Digital Opportunity Center (DOC). The Taiwanese policy makers have identified distance education as an important way to encourage the lifelong learning (Han & Wang, 1999; Huang, 1997). Web-based courses systems related to learning have a leading role within the transitional era, and have been a guide for future development in Taiwan.

According to the ELNP website, the ELNP was officially established in 2002 by the government. The government has invested over four hundred million New Taiwan dollars to develop lifelong learning through a Web-based environment. The main purpose was to do several national-level research projects to explore how to encourage citizens to access educational programs through information community technology. In addition, ELNP integrated many schools and industries to develop various distance learning programs for people to gain new knowledge and skills. There were four goals of ELNP: (1) upgrading the overall competitiveness in the era of knowledge-based economy in Taiwan; (2) stimulating the development of lifelong learning distance programs related industries; (3) bringing forth new waves of

academic research in the science of and technology for lifelong learning; and (4)

increasing societal welfare by distance learning. In 2008, the policy makers changed

the role of ELNP to be a research and academic institute for lifelong learning in the

Web-based learning environment. In the same year, the Taiwanese government

established another national lifelong learning institute called the "Digital Opportunity

Center (DOC)," overseen by the Ministry of Education, to play a practical role in

many communities to assist people to engage learning, and narrow the economic and

knowledge gap between the rural area and cities. According to DOC, 100,000 have

enrolled in these learning institutions (DOC, 2009). The other national-level institute

related to distance learning is the NOUT. The learning courses at NOUT can be put

into two main different categories: general education and specialized courses. In the

specialized programs, people can learn more practical knowledge and skills such as

finance, engineering, and computer skills.

As a result of these many initiatives, it is clear that the educational development

of Taiwan is moving toward a learning society.

Older Adult Learning in Taiwan

Currently, many different countries around the world are providing various

educational programs for their older adult populations through lifelong learning

institutes, because it has been shown that lifelong learning is important to older adult

learners through out their lifetime. Donovan (2001) pointed out that many educational

institutes at the university level established the Association for Lifelong Learning to

improve lifelong learning education around the world.

Looking at Asia, lifelong learning did not involve concern for aging well or for

successful aging in the past. The main purpose of lifelong learning in traditional

Chinese society was to help people to pass the national examination in order to

receive a job or upgrade to higher level positions (Wang, 1997; Xie, 1994). In the

1980s, lifelong learning education included several new concepts such as health issues

related to improving people's mental and physical functions, and issues related to

disability, and involvement in social activities in their life (Beaupre, 1997).

In the present, Taiwan's society is aging at a rate similar to Japan's. According to

the Ministry of Interior (2008) report, 10.51% of the total population is over age 65,

with 1,123,429 males and 1,131,152 females in that age group in Taiwan. Wu (2000)

pointed out that the number of older adults continues growing, and will increase to

13.8% in 2020, and 21.6% in 2036. With such an increase in the elderly population,

the Taiwan government passed the Elderly Welfare Law in 1997, which focuses on

medical issues related to the health care of older adults, lifelong learning, economic

security, and leisure programs (Wu, 2000). In Taiwan society, there are more and more

lifelong learning opportunities for adults and older adults in many different places,

such as learning programs in NOUT, the Digital Open Center (DOC), and various

continuing education courses at the high school and university levels.

On the other hand, Taiwanese citizens, including the older adult population, have

begun to realize that lifelong learning influences people's well-being and accept the

value and quality of educational activities provided by distance education institutes.

For example, the National Open University in Taiwan (NOUT) began to develop

learning programs when national policy started to demand improvements in the

quality of human resources and broadly raised the national level of culture and

education (NOUT, 2003). After that time, distance education in Taiwan gradually

became one of several accepted lifelong learning opportunities for people. According

to the Ministry of Interior (2007), 3.51% of the total enrollment at NOUT was older

adults in 1996. Several factors affected older adults' participation in lifelong learning

courses at NOUT: "augmenting knowledge and skills, pursing personal interests,

enjoying the social aspects associated with university level , and job promotion"

(Hunag, 1997, p.241).

Another example of lifelong learning institutes is in the capital city, Taipei. There

are 71 adult learning centers located in the capital city, and over 15,000 older learners

were in these distance learning organizations in 2008 (Taiwan Ministry of Interior,

2007). Among these adult learning centers, many are private learning institutions. As

Lee (2000) pointed out, many traditional vocational programs do not integrate new

teaching methods with workers' previous experiences, so many older adults cannot

practice and make a link with their own previous experience in workplaces or life.

This shortcoming in public learning institutes and private learning centers has resulted

in the development of more innovative learning programs on effective knowledge for

older adults' learning needs.

Overall, the learning needs of older adults should be an important reason for

Taiwanese policy makers to encourage distance learning, as has occurred in other

developed countries. It is obvious that the Taiwanese government should continue to

develop many resources for older adult populations (Chiu et al., 2005). Integrating

various learning resources into the information network is one of the most important

approaches in the policy of older adults' learning in Taiwan (Ku et al., 2008).

Distance Education

Many scholars have pointed out that distance education involves teachers and

students separated by geographic and time factors, and learners are involved in

independent interaction with instructors and other classmates in distance courses

(Keegan, 1996; Moore, 1996). Moore and Kearsly (1996) mentioned that distance

education opens up many new learning opportunities for many people. In general, the

concept of distance education means that educational activities occur in many

different conditions across geographic borders, different cultures, and economies in the world. Keegan (1996) defined distance education as "the quasi-permanent separation of teacher and learner throughout the length of learning process…and the provision of two-way communication so that the student may benefit from or even initiate dialogue…" (p. 50). In other word, the most typical form of distance education is that where the instructors and learners are separated by geographical distance and involves the use of radio, television, Internet networks and/or multimedia computer programs by instructors and learners at all levels.

Many researchers have discussed distance learning programs in academics. However, Moore is one of the scholars who not only explains the concept of distance education but also developed a systems view for instructors as they work to practice distance education in their educational programs. There are six key factors which are involved in the systems view model: sources, design, deliver, interaction, and learning environment (Moore, 1996). In this model, each factor contains different components, such as the concept of interacting, which included "instructors, tutors, counselor, administrative, and students" (p. 9). In such a system view context, Moore and Kearsley (2005) suggest that practitioners need to understand the systems view of distance education and the various relationships among different factors such as social activities, culture, national education policy, and support systems.

Older Adults and Distance Education

In regard to older adults in distance education programs, the enrollments for non-vocational courses are increasing among the older adult population (Moore, 1996). Clennell (1987) conducted a research project involved 2,826 people over the age of 60 at Open University in 1984. He found that older adults "enjoy their studies and felt a sense of achievement; and their academic performance was good…these findings were a challenge to a general notion of physical and intellectual of decline" (p. 2). Furlong (1989) found that older adult learners who engaged in distance lifelong learning programs increased their experience of medical/health breakthroughs, felt mentally alert, and increased their perceptions of social relationship. Moore (1996) suggested that this population often decide to join in learning activities when they retire. Chu (2009) indicated that if older adult learners could spend more time on Internet practice, then they would prefer to engage the Internet-based learning environments. It is accepted concept that distance education can assist older adult learners to participate in educational opportunities in order to deal with their life changes or gain well-being in life. Distance education helps this population to overcome several barriers to traditional formal education, such as scheduling and location.

In other words, distance education has opened the door for more older adult to

attain their life goals through in formation technology. Githens (2007) indicated that

"distance education can play a role in helping older adults become integrated with the

rest of society. As demographic and cultural changes affect the place of older adults in

society, distance learning programs become increasingly appealing to older adults"

(p.329). The growth of information community technology, which is most often used

in Web-based instruction, has transformed learning activities and allowed

development of new methods of distance learning. Cody et al. (1999) stated that the

Internet provides many benefits for older adults, such as the ability to enroll in

distance learning courses and thereby engage in lifelong education.

In reference to the improvement in technologies, Garrison and Shale (1987)

mentioned two essential elements to be considered in distance education: " two-way

communication between (among) teacher and student for the purpose of facilitating

and supporting the educational process, and the use technology to mediate necessary

two-way communication" (p. 11). Trentin (2004) indicated that " for elderly people,

the targeted use of online learning is not only an opportunity for personal

development, but also offers the possibility of networking, social activities"(p. 29)

Rau and Hsu (2005) pointed out that more and more Web-based distance learning

programs are now available specifically for older adults to fulfill their needs for new

knowledge and social activities: "Through appropriate training and learning, older

users can enjoy using the Web" (Rau & Hsu, 2005, p.20).

Appropriate Support in a Key Factor in Older Adults' Success in Web-based Program

A well-designed study guide and orientation are important element in successful

distance learning for older adults in the Web-based environment. Study guides and

orientation help learners to access distance programs, and ensure they can enjoy the

learning process (Moore, 2005). Moore (1996) pointed out that "there is no medium

better than the study guide for communicating the instructors' goals and objectives…"

(p. 79). Smith (2003) mentioned that a short course orientation with online practice in

students' first term "could improve their performance as well as enhance the learning

experience" (p.260). Rau and Hsu (2005) explored older adults' learning in

Web-based programs. There were 24 participants aged from 50 to 70 in this study.

These researchers found that older adults can enjoy using information communication

technology to learn after appropriate training, such as basic guidance in using the

keyboard and mouse. Furthermore, the distance course instructors should consider

learners' prior knowledge and experience. Saba and Shearer (1994) indicated that

considering students' prior knowledge of the content can increase the extent of

dialogue in distance learning courses.

Web-based distance learning environment

Clearly, instructional technology changes have influenced many educational

activities, especially in the field of distance education. Saba (2003) mentioned that major changes in the context of global development and technological innovation have directed attention to distance education in the United States. In distance education, the basic use of information communication technologies innovation is to assist both instructors and students to engage in interactive educational opportunities across many barriers. In regard to distance learning technology, people now have many choices in accessing educational resources. Hence, Moore (1996) indicated that an important issue is "how do you select the best medium or mixture of media for specific course or program?" (p. 95). In reference to this concern, Moore (1996) suggested considering the strengths and weaknesses of the different media in relation to program objectives.

Today, "e-learning," "education via the internet," or "Web-based education" are the most commonly used terms to describe the teaching and learning in distance learning institutes. Khan (2005) defined Web-based instruction as a hypermedia-based instructional environment that takes advantage of the Web to create an interactive learning environment. However, these many different names of distance education reflect the same essential nature. Moore (2003) notes that "people are proposing new names for this older wine in new bottles, such as e-learning, asynchronous learning, distributed learning, flexible learning, open learning, and so on" (p. 74). As a

consequence of the growing influence of technology, people must accept that life

changes as fast as technology.

Collaboration in Web-based Environment

In regard to the web-based learning environment, Moore (2002) indicated two major

features to identify how people may gain knowledge through this distance learning

form: " collaborative learning and social construction" (p. 63). The concept of

collaboration is regarded as a major factor contributing to successful Web-based

distance learning activities (Ng, 2008). Web-based learning environments not only

encourage active participation in the distance learning process, but also allows learner

to collaborate and create knowledge. In today's Web-based learning environments,

instructors enrich their teaching with technological tools, like using e-mail to deliver

new course information immediately and using Web-based discussion forums to allow

learners to contribute their ideas and thoughts to a course. Moore (2002) pointed out

that distance learners have reported that they are satisfied with the kind of courses that

engage them in team work and collaborative learning. Coombs (2007) stated that

"Web 2.0 is transforming the Web into a space that allows anyone to create and share

information online--a space for collaboration, conversation, and interaction; a space

that is highly dynamic, flexible, and adaptable" (p. 2).

The most common distance learning tools in Web 2.0 environment relate to

social construction, such as Wikis and Second Life. The main concept behind social

construction is allowing people to connect, easily and deeply, with others and also to

create positive learning from the interaction. In this a new Web-based learning

environment, the technology supports significant levels of conversation for course

interactions among learners, and among instructors and learners. Moreover, Web 2.0

tools help distance learning instructors deliver materials through a novel environment

that motivates learners to engage more deeply in the course subject. For example,

instructors can design a virtual class in Second Life which allows learners to feel that

learning is fun as well as serious as. "Conversations that take place in social

networking contexts are inherently social, and often revolve around shared activities

and interests" (Horizon, 2007, p.12). Furthermore, learners have more autonomy to

control their distance learning situation, such as their learning speed, where to learn

and contributions to learning at anytime. Such changes in technology suggest that

instructors must realize that the conditions and expectations for online learning

communities are also changing (Beaudoin, 1990).

In sum, the Web-based distance learning environment has become more and

more popular and many adaptive learning environments have been proposed to offer

learners courses that consider their aptitudes and learning outcomes (Tseng et al.,

2007). There is no better educational form than distance education to provide various

learning activities for most people to learn anytime and anywhere such as home,

public libraries, and companies (Moore, 1996).

Distance education in National Open University in Taiwan

Generally, an open university meets individual learning needs and widens

learning opportunities in the higher education system (Keegan & Rumble, 1982). An

open university provides "open admission to adult students and, through flexible

policies and a variety of delivery mechanisms, notably distance education, provides

access to and success in university education to those previously denied such

opportunity" (Paul, 1993, p. 115).

The Open University in the United Kingdom developed a successful distance

learning model of distance education for other countries to use in learning how to

establish and maintain a well-designed distance learning system. Miller (1995)

pointed out that educational reform related to open universities began at the Open

University in the United Kingdom in 1970. The Open University of the United

Kingdom integrates adult learning and distance education for people to access

advanced education. OUUK takes advantage of the distance education approach for

people who wish to engage in educational activities but who have no opportunities to

obtain a traditional formal education.

In 1986, Taiwan established the National Open University in Taiwan (NOUT) to

meet the citizens' needs for lifelong learning. Distance education was not used at the

university level before the government established the NOUT (Chen, 2002). During

the 1980s, broadcast radio and television were still the major media to deliver course

contents in NOUT. Now the major mission of NOUT is to implement lifelong

learning education in order to upgrade-cultural standards and the quality of manpower

to deal with challenges in the knowledge society.

NOUT provides higher level programs. Institutional policy requires students to

take at least eight course credits in each semester. Students can gain a bachelor's

degree after they finish 128 course credits. People over age 20 can enroll in distance

courses, and students over age 65 can have totally free tuition. According to the

NOUT website, there were several important events related to online older adult

learners: beginning in 1997, students could enroll in courses without an entrance

exam, and in 2006 NOUT completed the transfer from one-way broadcast media

content to Web-based programs.

The three main purposes of NOUT are, first, to deliver good quality learning

experiences. NOUT encourages citizens to learn, particularly adults in rural areas,

disadvantaged people, people who don't have time to engage in formal education, and

older adults. NOUT offers various higher education and training programs for these

populations in Taiwan. A second purpose is to increase the variety of learning

programs available to students. In the past, NOUT only developed three academic

departments; now the university has increased the number of departments and

programs to allow people to engage in lifelong learning.

The third purpose is to develop certificate and degree programs. In the past, NOUT

only offered undergraduate degree programs. NOUT began to provide graduate

degree courses in 1994. It was an important milestone for NOUT that encouraged

more people to access higher education opportunities.

In the past, NOUT delivered course content through one-way media: radio,

videotape, and television channels such as the Educational Broadcasting Station (EBS)

and Chinese Television System (CTS).By 2006, NOUT had transferred all the

one-way content to a web-based learning system. People can now access the learning

materials through the Internet and have more interactions with instructors and other

classmates by using the information community technologies.

In the NOUT system, the students have face to face opportunities with

instructors and other classmates once a month. Moreover, NOUT established 13 local

learning centers in many counties. The local learning centers play an important role in

providing students with many educational services, such as a help center and

academic advising. Most of the learning centers were established in local national

universities or high schools in order to enable learners to take advantage of

educational resources. When learners attend the local learning centers, they not only

meet faculty to get academic advising but also can use audio-visual resources such as

video tapes or DVDs, or use the schools' library resources.

Advances in information community technology have significantly affected the

learning setting for educational programs and training courses. Although Pan pointed

out in 1991 that NOUT did not encourage people to engage in learning and did not

encourage self-motivation when they studied in NOUT through traditional delivery

methods, the delivery system in NOUT has continued to adopt advanced technologies

for students. NOUT has transferred most learning content into the web-based learning

system, and students can now use the Internet and multimedia to access learning

programs and gain knowledge and skills at any time and anywhere. In addition, the

course instructors can conduct computer conference interaction in real time or

asynchronously by email and discussion board.

Taiwan has become an aging society. The percentage of older adults who

enrolled in courses at NOUT was 3.51% of total enrollment in 1996. NOUT has

provided a new learning environment among Taiwan's higher education options.

However, very few studies have discussed and explored learner satisfaction with the

Web-based learning environment at NOUT since the university established Web-based

learning courses. Moore (1996) mentioned that "measures of satisfaction are useful in

predicting student course selections and assessing the effectiveness of instructional

design or teaching strategies" (p. 166). In addition, students often continue choosing

distance learning courses after they successfully finish one on-line course and are

satisfied (Moore, 1996). Hence, this study was important in investigating older adults'

satisfaction with Web-based lifelong learning courses at NOUT.

Learners' satisfaction in Web-base learning environment

Many researchers have discussed the concept of student satisfaction in light of

the increased development of Web-based distance learning by educational institutions

(Biner, 1993; Biner, Dean, & Mellinger, 1994; Hilgenberg & Tolone, 2000; Moore,

2002; Smith & Chang, 2008; Tallman, 1994; Thurmond et al., 2002). Biner, Dean, and

Mellinger (1994) claimed that student satisfaction should be studied and improved by

all instructors so that learners can learn better in a distance learning course. In fact,

instructors face a complex task in designing, developing, and evaluating distance

learning courses, which include many different factors (Moore & Kearsly, 1996;

Pearson & Trinidad, 2005; Thurmond et al., 2002; Trinidad, Aldridge, & Fraser, 2005).

For this reason, program planners must consider several factors as they provide their

learners with effective distance learning activities.

In reference to learner satisfaction, Moore (2002) identified that "satisfaction is

strongly linked to the learners' sense that the distant instructor has a social presence.

Satisfaction is also linked to the provision of feedback from instructors" (p. 61). In

many studies, learners' satisfaction is the dependent variable in distance learning

research (Chen & Willits, 1998; Marks, Sibley & Arbaugh, 2005; Stein et al., 2005).

Student satisfaction is one kind of affective learning outcome (Smith, 2008; Walker,

2003). Biner, Dean, and Mellinger (1994) indicated that learners' satisfaction is a key

criterion in judging the success or effectiveness of a distance learning course. Biner,

Dean, and Mellinger (1994) conducted a study with 177 distance learners and found

seven factors related to distance learners' satisfaction: "(1) instructor, (2) the

technology, (3) course management, media, (4) at-site personnel, (5) the promptness

of material delivery, (6) support services, (7) out of class communication with the

instructor" (p. 69). Tallman (1994) administered the Student Satisfaction

Questionnaire to 311 students to explore several questions relating to satisfaction with

instructional and student-support services in distance education. He found that the

educational environment is an important factor contributing to learners' satisfaction

that motivates them to continue joining distance learning activities. Moreover, he

found that "high quality support services will encourage student satisfaction" (p. 52).

Moore (1989) mentioned that a "learner support system is of critical importance"

(p.10). Allen et al. (2002) reviewed literature search comparing learners' satisfaction,

and concluded that distance learning will keep growing as an educational option

because learners face many limitations and have difficulty accessing learning in the traditional learning classroom. Dunlap and Ludwig-Hardman (2003) pointed out that online students' satisfaction with a distance learning experience is directly related to learner support services.

Moore and Kearsley (2005) noted that learners might interact with instructors in various forms of student support. For their study, Yukselturk and Yildirim (2008) invited 30 participants who had enrolled in an online Information Technologies Certificate Program at the Middle East Technical University in Ankara. They indicated that high-quality institutional support services also result in greater student satisfaction within the distance learning environment. Sun et al. (2009) claimed that groups receiving more support from the instructors would enjoy greater satisfaction with online experiences. Koohang and Durante (2003) noted that distance learners have more positive attitudes toward Web-based learning when their learning experiences include a support system and interaction. Moore and Kearsley (2005) indicated that "most students enjoy interaction with their instructor and fellow students not only for instructional reasons but for the emotional support that comes from such social contact" (p.182).

In distance education, learning activities usually involve sharing thoughts and information, and personal interactions between learners (Palloff & Pratt, 1999).

According to Hillman, Willis, and Gunawardena (1994), learner-interaction was a

critical variable in Web-based learning satisfaction. Arbaugh (2000a) identified

several critical factors that influence Web-based learning such as flexibility for

students and faculty, and ease of and emphasis on interaction. He also found that

significant satisfaction learning variables were associated with interaction. Arbaugh

(2000a) claimed that one of the best teaching styles for distance learning courses is

interactive. Smith and Chang (2008) noted that concerns about satisfaction with

distance learning can be addressed better if researchers understand how students

perceive interaction in virtual classrooms. Bray et al. (2008) invited 424 students who

had enrolled in an online distance university in Japan to participate in a research

project on student satisfaction. Bray et al. claimed that student interaction is a critical

issue "while learners clearly wished for more interaction with other students in order

to clarify understanding or reduce the sense of isolation" (p. 13).

The other important concept relating to students' satisfaction with Web-based

learning is collaboration. Moore (2002) noted that "learners move from feeling like

outsiders to feeling like insiders in the collaborative group contributes directly to

feelings of satisfaction" (p. 61). Collaborative grouping is one way in which

instructors may promote students' creativity and learners' satisfaction in the online

learning environment (Sun et al., 2009, p. 195). Daradoumis and Marquès (2000)

stated that "collaborative learning promotes affective and social benefits in distance

education. It also increases positive attitudes and social inter-actions among students"

(p. 76). Many studies have pointed out that collaborative learning can benefit distance

learners' learning efficiency and satisfaction with the online course (Bruffee, 1999;

Brush & So, 2008; Moore, 2002; Stein & Wanstreet, 2003; Thompson & Ku, 2006).

Sun et al. (2009) investigated the relationship between collaboration factors and

satisfaction among 46 graduate students. These researchers found that learners were

more satisfied with the on-line collaborative learning environment when they had

clearer communication among peers and engaged in better group practices. Moreover,

study findings led to recommendations that may benefit instructors as they seek to

improve students' collaboration experiences.

In reference to the concept of lifelong learning in distance courses, it is important

for educational institutions to consider that collaborative learning is a critical factor

needed to support lifelong learners (Koper, 2006; van Rosmalen et al., 2009). Koper

(2006) identified learning collaboration as a social network that can facilitate people's

learning of different kinds of knowledge. Instructors in educational institutes need to

consider two principles: "(1) people with the intent to learn and the willingness to

share their knowledge in the specified domain; (2) the learning methods that are

created and shared in order to exchange knowledge and experience or to develop

competences in the domain" (van Rosmalen et al., 2009, p. 1).

Moore (1996) mentioned that learners' satisfaction is a good indicator of the effectiveness of a distance learning course and can guide instructors in designing a distance course for a particular group such as older adults. Frey (2002) explored the effects of controlling for learners' input when quantifying the relationship between learning environment variables and learner satisfaction by using the Input-Environment-Outcome model. The finding showed that learners' satisfaction was not mainly influenced by learners characteristics, and was impacted by the distance learning environment (Frey, 2002). In this study, Frey (2002) provided three factors relating to student satisfaction in distance learning. The first was Web-based programs. She found that a high percentage of participants were satisfied with Web-based learning courses in comparison to people who were dissatisfied. Second, was that distance education can deliver content in various ways. The third factor was team work. Frey (2002) indicated that the desire "to work with teams/groups was the second strongest predictor of student satisfaction" (p.181).

Zhang (2005) got similar findings by testing four hypotheses in the Learning By Asking system. Zhang (2005) claimed that learners' satisfaction can be improved when "a multimedia-based e-learning environment offers more learner-content interaction" (p. 159). Moreover, the study showed that learners had significantly

better achievement and higher level of satisfaction than students involved in a less

interactive learning group in the traditional classroom setting.

Demographic characteristics

This study explored important demographic characteristics such as age, marital

status, educational background, and gender in order to ascertain how these impact

older adults' satisfaction with lifelong learning courses within the Web-based learning

environment at the NOUT. Many researchers have discussed the role of student

demographic characteristics in distance learning programs (Clennell, 1987; Litchfield,

Oakland,& Anderson, 2002; Moore, 1996; Rau & Hsu, 2005; Sahin, 2006; Walker,

2003). Moore (1996) suggests that many factors can affect the success of learners in

distance learning programs, such as educational background. Thompson (1998) noted

that "certain demographic variables, perhaps not in and of themselves but rather as the

markers of an accompanying set of generalized characteristics, are related to student

success and/or satisfaction" (p.14). Tsay (1999) conducted a study which involved

1500 students at NOUT. The finding indicated that there were significant differences

between current and inactive NOUT students' characteristics on age, gender, duration

of studying at NOUT, academic major, internal motivation, self-directed learning

readiness. The results indicate mean differences among genders and ages. Barrett &

Lally (1999) did a research to explore the gender differences in the online discussion

forum and found that the types of participation was different between male and female such as men's contributions to discussions were more numerous and longer than women, and that the contributions made by men tended to include greater levels of social exchange. In addition, they found that women were more interactive than men, i.e. their messages included implicit or explicit references to previous contributions. Kramarae (2001) & Price (2006) mentioned that women and men interact in somewhat different ways in classes. Moreover, Wheeler (2002) did a pilot study to explore the gender differences issues in distance education. He found that women preferred to receive more practice and academic support than males, and males preferred to receive more social support than females in the distance leaning environment. Ho (2005) conducted a research through the Blackboard distance learning environment in the College of Education at Oklahoma State University. Ho (2005) reported that the male group tended to have more positive perceptions of Internet-based learning than the female group.

Sahin (2006) conducted a study with 279 distance learners at a Midwestern University. In this research, Sahin (2006) explored two research questions related to distance learning in the Web-based environment. First, he explored the relationship between students' demographic characteristics and their learning style preferences. Second, he examined the relationship between students' demographic characteristics

and their satisfaction. In reference to the second research question, Sahin (2006)

found a significant relationship between older learners' demographic characteristics

and gender and age. In this study, findings indicated that males were more positive

about distance learning than were females. In addition, students over age 21 were

significantly more positive about the Web-based learning environment than students

aged 18–21.

In reference to marital factor, Clennell (1987) mentioned that marital status was

one of the predicators of participation in social activities in their later life. People who

were single or divorced were more likely to join continuing learning activities than

people who were married. Married people had more responsibility for family issues.

However, Web-based distance learning provides more flexible learning and more

accessible educational resources. For this reason, I wish to determine whether marital

status has a significant effect on older adults' learning in the distance learning

environment at NOUT.

In regard to distance learners' educational background, it is accepted that people

who have higher education levels may be more likely to join in continuing education

activities. Moore (1996) claimed that "one of the best predictor of success in distance

education is the educational background of the student. In general, the more formal

education a person has, the more likely he or she is to complete a distance education

course or program" (p. 161).

Research studies indicate that gender may also be an important factor affecting participation in education. In many traditional cultures, men usually have more access to higher-level educational activities. Huang (1997) explored the key factors in lifelong education participation at NOUT. She found that the enrollment rates were higher among women.

Gender issues related to women's learning opportunities have been important factors in Taiwan education history and culture. When we examine the gender factor among older adults who joined lifelong learning programs in Taiwanese society, it's important to know that Taiwan has been influenced by Japan in some aspects of its cultural and social development. Taiwan was under Japanese control from 1895 until the restoration of Taiwan to China in 1945 (Yang, 2001). In the Japanese traditional culture, men had more access to higher education opportunities than women. In such a context, I will explore whether there are more women participating in lifelong learning courses at NOUT.

Chapter 3

Methodology

Introduction

This chapter provides details on research methodology and analysis. It is organized

into five sections: (1) research design, (2) population and sampling, (3) survey

instrument, (4) data collection procedure, and (5) data analysis. This study examines

the relationships between older learners' demographic characteristics and their

satisfaction with distance learning in the Web-based environment at NOUT.

Research design

In this descriptive study approach, I used a cross-sectional survey that includes

two different sections to collect data from the older adults at NOUT. This study

examined learners' satisfaction within Web-based distance courses. The following

research questions were formulated to describe the purpose of this study:

1. What is the relationship between older adults' demographic characteristics and their

satisfaction with three elements－instructor support, student interaction and

collaboration, and enjoyment－in the Web-based learning environment at NOUT?

    1.1 Are there differences related to the gender variable and older adults'

       satisfaction?

    1.2. Are there differences related to the age variable and older adults' satisfaction?

1.3. Are there differences related to the marital status variable and older adults'

satisfaction?

1.4. Are there differences related to the educational background variable and older

adults' satisfaction?

A survey can allow researchers to gain information from a large sample of the

population quickly and does not cost a lot for data collection. The primary purpose of

this study was to identify the factors relating to older adults' satisfaction with the

Web-based learning environment at the NOUT.

According to Moore (1996), "One important consideration to keep in mind when

analyzing the results of student satisfaction surveys is that there is typically no

significant relationship between these attitudes and actual achievement" (p. 166). In

regard to this concept, I did not explore older adults' accomplishments, such as their

academic grades, to discuss their satisfaction with distance learning courses at NOUT.

The study used a questionnaire to gather data from older adults who enrolled in

distance courses from four main learning centers at NOUT. The older adult population

is defined as those people over age 60 in Taiwan. Some other countries use a

definition of older adult was age 65, but Taiwanese people can enter retirement when

they work for 15 years and are over age 60, according to the Labor law of Council of

Labor Affairs (CLA). The survey was designed in two parts. The first part collected

demographic information which includes four variables: age, marital status,

educational background, and gender. The second part of the survey was an adaptation

of the study adopted the Distance Education Learning Environment Survey (DELES;

Walker, 2003), which measured the dependent variables for older adults' satisfaction

within the Web-based learning environment at NOUT.

Population and Sampling

In this study, the population was older adult learners over age 60 and registered

as students at NOUT in the spring semester of 2010. According to the Registrar's

Office at NOUT, the total enrollment at NOUT was approximately 20,000, and the

older adult learner population was 7.7% of the total enrollment. In this study, 805

(56%) of the older adult population were male students, and 633(44%) were female.

The study adopted a simple random sampling plan to select sample participants from

among the total population of older adult learners at NOUT. The sample size for this

study was determined to be at least 1000 older adult learners who enrolled in lifelong

learning courses at NOUT.

The proposed study sample represented 70% of the total older student population.

Ravid (2005) pointed out that "the level of statistical significance is greatly affected

by the sample size" (p.102). The thirteen learning centers at NOUT can be separated

into four geographical areas in Taiwan: north, central, south, and east area. The names

of the main learning centers are: (1) Taipei, (2) Taichung, (3) Kaohsiung, and (4)

Hualien—these four geographical areas in Taiwan. The older adult learner population

included 386 students at the Taipei Learning Center, 307 students at the Taichung

Center, 233 students at the Kaohsiung Center, and 190 students at the Hualien Center.

The eastern region has the lowest population in Taiwan. Using the guideline of a 1%

margin of error and a confidence of 95%, and using a proportional random sample

based on these enrollment numbers for the four main learning centers, the sample

numbers are: Taipei, 317; Taichung, 253; Kaohsiung, 190; and Hualien, 154.

Survey Instrument

The study used a questionnaire to collect data from older adult learners at NOUT.

I used adopt a two-part survey in this study: a research-based background survey to

collect demographic information and the Distance Education Learning Environment

Survey, which was used to investigate distance learners' satisfaction in the Web-based

environment. The first part of this survey included four variables: age, marital status,

educational background, and gender. These demographic characteristics were used as

explanatory variables in the regression analysis. In regard to age, the variable has four

scales: 60-64, 65-69, 70-74, and over age 75.

The Taiwanese government requires the Ten-Year(k-9) Consecutive

Compulsory Education for the nation. For this reason, the educational background

variable was defined on a four- level scale: senior high school, vocational high school,

undergraduate level, and graduate school.

In the second part of the survey, I adopted a modified version of DELES that

included 22 items in three categories: student support, student interaction and

collaboration, and enjoyment. The DELES was developed by Walker (2003) to

examine learners involved in Web-based distance education. The original survey was

tested with 680 post-secondary students enrolled in distance education classes in 12

different countries around the world, including Australia, Mexico, the Philippines,

Singapore, Scotland, and the United States (Walker, 2003). The DELES involves a

5-point Likert-type set of ordered alternatives: never, seldom, sometimes, often, and

always. Yoder (2008) noted that "Likert scales are relatively easy to develop and

frequently used to measure attitudes or opinions" (p.10).

In earlier research, Sahin (2006) examined the relationship between Web-based

courses and students' satisfaction by using DELES. Sahin found a high effect of

satisfaction among distance education courses based on student support and student

interaction and collaboration. In the version of the survey used in this study, the

variable of student support is reflected in Q1 through Q8, the variable of student

interaction and collaboration is reflected in Q9 through Q14, and the variable of

enjoyment is from Q15 item to Q 22. DELES was created after a review of previously

developed instruments and the literature related to online leaning environments and

student satisfaction (Walker, 2005).

In addition, the DELES has good validity and reliability. Reliability is the

concept used to describe the consistency and stability of the research instrument

(Nitko& Brookhart, 2007). A high coefficient indicates high reliability. The range of

coefficient is from 0 to 1. Walker (2003) pointed out that "the internal consistency

reliability (Cronbach alpha coefficient) ranged from 0.75 to 0.94 for the six DELES

scales" (p. 90). The Cronbach alpha coefficient is considered by researchers to present

a good reliability estimates (Ravid, 2005). The measurement can present the

psychometric information to evaluate the level of satisfaction of individuals. The scale

of learners' satisfaction had an alpha of 0.95, which can be considered excellent

(Walker, 2003). In this research, the study used Cronbach's α coefficients to present

the reliability analysis.

In reference to validity, Ravid (2005) indicated three basic types of validity**:**

content validity, criterion-related validity, and construct validity. In the DELES,

Walker (2003) has "addressed verification of content validity of these scales through a

review by a fourteen person panel of distance education researchers and practitioners"

(p.84). Moreover, Walker (2003) adopted one kind of factor analysis called

Kaiser-Meyer-Olkin (KMO) to indicate that the construct validity of this survey was

good. The KMO calculation for this study represented 0.91, which is considered good.

This study adopted a modified Chinese version of DELES (see Appendix A) that includes a total of 22 items. The modified DELES has three components: eight items for student support, six items for student interaction and collaboration, and eight items for enjoyment.

Data Collection Procedure

Data collection began after obtaining permission from the Institutional Review Board at the Pennsylvania State University. NOUT provides four face-to-face meetings at learning centers for students enrolled in all on-line courses each semester. The study sought a direct administration system for the data collection at NOUT in order to get a higher response rate. In this study, directors and instructors at the learning centers administered the questionnaire to the participants at the beginning of a face-to-face session. In order to enable directors and teachers to clearly understand the research project, the researcher had direct contact with them. The researcher sent a cover letter and the survey questionnaire to these four learning centers. The cover letter included a brief statement regarding the purpose and procedure of the research, and described some human protection issues such as possible benefit, confidentiality, and the right to withdraw. These teachers and directors explained the research and gave the survey to the participants. This survey took about 15 minutes to complete.

Participants placed the completed survey into an envelope; teachers turned in the

envelope to the directors. Directors sent these envelopes directly to the researcher.

Data analysis

The data analysis consisted of a demographic analysis of respondents, and an

analysis of the modified Chinese version of the DELES questionnaire, including

reliability analysis. According to Mertler and Vannata (2002), "the first step in nearly

any data situation is to describe or summarize the data" (p. 7).

Johnson and Christensen (2000) noted that researchers arrange the data into an

interpretable form such as graphical display and calculate numerical indexes such as

averages in order to describe data characteristics. In this study, participants'

demographic characteristics are described using descriptive statistics such as

percentiles within tables and mean. Field (2000) claimed that ANOVA can tell people

"how these independent variables interact with each other and what effects these

interactions have on the dependent variable" (p. 243). Wagner (2007) pointed out that

" ANOVA involves a statistical test for significance of differences between mean

scores of at least two groups across one or more than one variable" (p.81). According

to Ravid (2005), "the ANOVA test is used to compare the means of two or more

independent samples and to test whether the differences between the means are

statistically significant" (p.135). This study analyzed the collected and coded data by

using the Statistical Package Social Sciences (SPSS) for Windows software

application. ANOVA was used to examine the research questions. The students'

satisfaction with the Web-based learning environment was measured using the

modified DELES with 22 items.

To answer the research questions, this study investigated the relationship

between older adults' demographic characteristics and their satisfaction with three

elements—student support, student interaction and collaboration, and enjoyment—in

the Web-based learning environment at NOUT. The researcher conducted factorial

ANOVA to examine differences in learners' satisfaction according to demographic

characteristics. The various demographic characteristics of participants were the

independent variables, and older adults' satisfaction was the dependent variable. In

addition, the most commonly used correlation coefficient analysis is the Pearson

correlation coefficient analysis (Ravid, 2005). The researcher explored the correlation

coefficient between these subscales of student satisfaction. Ravid (2005) noted that

correlation coefficients between .00 and 1.00 are divided into three parts: .00

and .35, .35 and .65, .65 and 1.00. The coefficients between .65 and 1.00 would be

defined as high.

Chapter 4

Results of the Research

Introduction

The purpose of this study was to investigate whether a significant relationship

existed between older learners' demographic characteristics and their satisfaction with

distance learning in a Web-based environment at National Open University in Taiwan

(NOUT). In this chapter, the study results were summarized for each research

question.

Demographic Characteristics of the Sample

In this research, 920 surveys were distributed and 711 returned. The incomplete

surveys totaled 67 out of 711. A total of 644 participants completed all survey

questions. In this study, the first part of the survey provided information about the

demographic characteristics of the participants at NOUT. The purpose of this section

is to understand participants' demographic characteristics. The data analysis consisted

of 644 participants within Web-based learning courses at NOUT.

Gender

In this survey questionnaire, gender was the first question in the first part of the

survey. Figure 4-1 presents the percentage of participants' gender. A total of 644 older

adults completed the survey in this study. As shown in Figure 4-1, participants were

predominantly female (n = 458, 71.1%). There were 186 males in this study. The

gender distribution of this sample may be considered representative for the population

at NOUT.
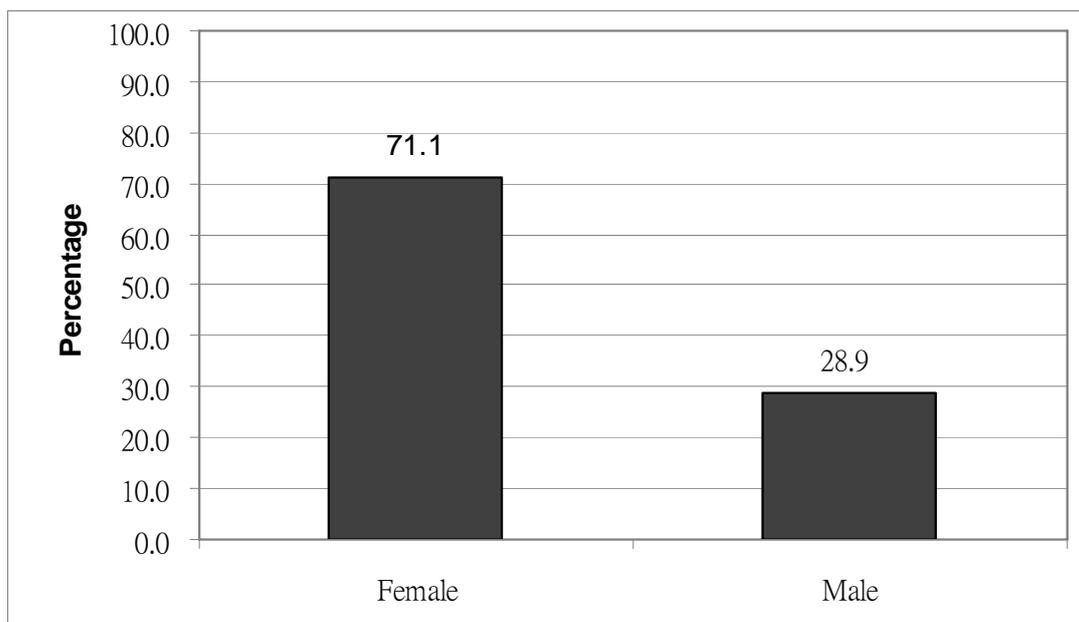
Figure 4- 1 Participants' Gender by Percentage

Age

Figure 4-2 presents an age distribution of the participants by percentage. Age

was grouped into four categories: 60-64 years old, 65-69 years old, 70-74 years old,

and 75 years old and older. As shown in Figure 4-2., the largest group was between 60

and 64 years old (n = 320, 49.7%), and the smallest group was 75 years old and older

(n= 43, 6.7%).
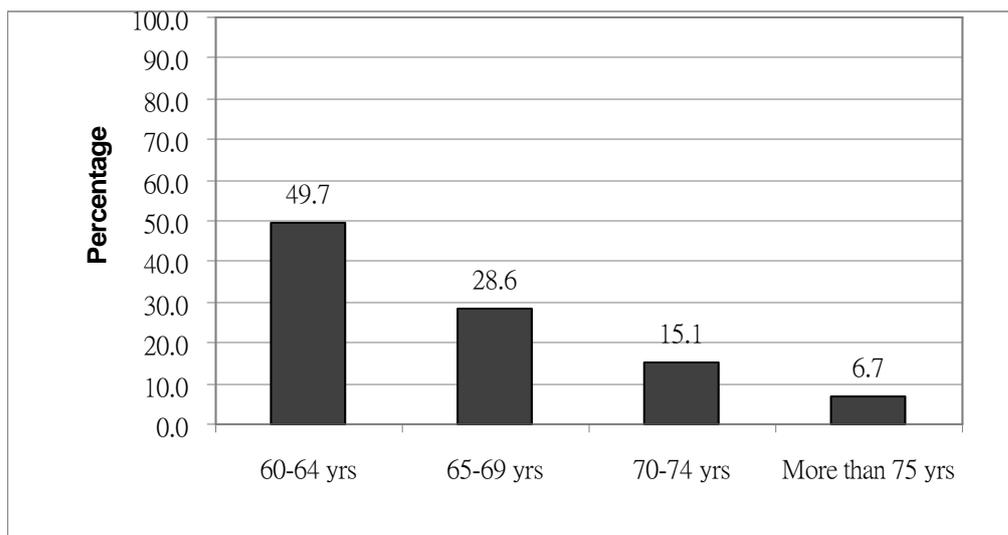
Figure 4- 2. The Age Distribution of the Participants by Percentage

Marital status

Students in the study reported their marital status in this survey. Figure 4-3

provides information related to the marital status of the participants. Most of these

older adults were married with a spouse (376; 58%). The three marital status

categories were married, single (never married), and divorced or widow or widower.
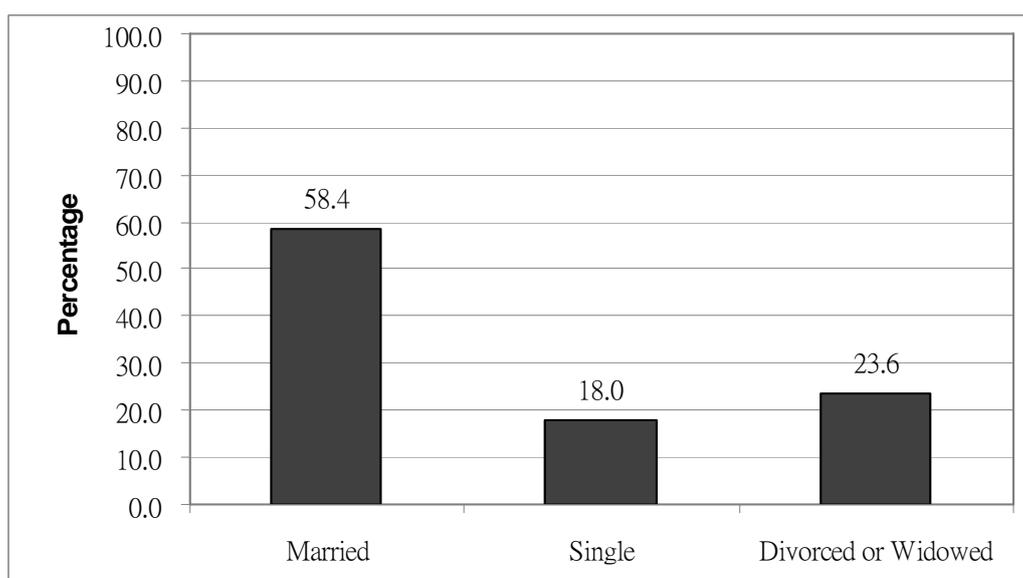
Figure 4- 3. Marital Status Distribution of the Participants by Percentage

As shown in Figure 4-3, the smallest group was single (never married): n=116, 18%.

Educational background

The survey also measured students' educational background. Figure 4-4 indicates an educational level distribution of the respondents. The largest group of the participants had a postsecondary degree (Vocational school), 301 (46.7%). Second, there were 203 (31.5%) participants who has completed college (Bachelor's level) and the smallest group included 140 participants who had a senior high school degree. The distribution of this sample could be considered representative for the population at NOUT.
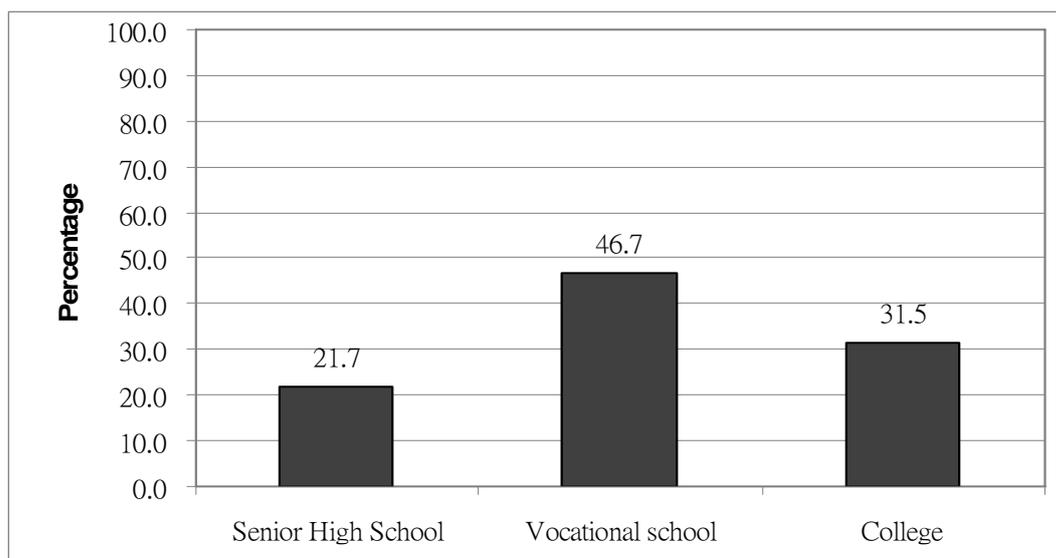
Figure 4- 4. Educational Background Distribution of the Participants

In summary, most of the participants were female (71.1%), were 60-64 years old (49.7 %) and married (58.4 %). Most of the respondents had at least a high school educational background (69.4 %).

Statistical Analysis

Reliability analysis

In this study, the reliability was measured by using Cronbach's alpha coefficient. Ravid (2005) pointed out that "the reliability level of .50 to .60s is acceptable" (p.169). Table 4-1 indicates the values of the reliability coefficients, which ranged from .89 to .92. The values indicate that components of the survey had good statistical reliability. The reliability values for instructor support, student interaction and collaboration, and enjoyment were similar to the original reliability values in DELES. In this study, the value for instructor support was .89, for student interaction and collaboration was .89, and for enjoyment was .92.

Table 4- 1 Cronbach's α Coefficients of Full Scale and Subscales

Subscale	Item	αReliability
Instructor Support	15、5、3、11、22、7、13、12	.89
Interaction & Collaboration	6、14、10、19、1、17	.89
Enjoyment	9、20、8、18、4、16、2、21	.92
Full Scale	-	.91

Factor analysis

Principal component factor analysis was conducted to determine the factor

structures for the measures of the survey instrument. The survey questionnaire had

three components: instructor support, student interaction & collaboration, and

enjoyment. As shown in Table 4-2., all the items had a factor loading above .55, and

resulted in three components that explained 64.95% of the variance. Instructor support

included 8 items: 15、5、3、11、22、7、13、12. Student interaction & collaboration

had 6 items: 6、14、10、19、1、17. Enjoyment had 8 items: 9、20、8、18、4、16、

2、21.

Table 4- 2 Results of Factor Analysis

Factor	Item No.	Factor Loading	Eigenvalue	Variance Explained (%)
Enjoyment	4	.90	7.80	35.44
	18	.89		
	8	.87		
	16	.87		
	20	.85		
	21	.78		
	9	.75		
	2	.55		
Instructor Support	22	.84	3.82	17.35
	5	.82		
	3	.81		
	15	.76		
	11	.76		
	12	.70		
	13	.66		
	7	.61		

Interaction and Collaboration	19	.87	2.67	12.16
	10	.86		
	1	.80		
	6	.77		
	14	.71		
	17	.71		
Total				**64.95**

Extraction Method: Principle Component Analysis; Rotation Method: Varimax; KMO=.91; Bartlett's Test of Sphericity: χ^2_{231} = 9884.105, p<.001

Correlation analysis

In this study, the Person r correlation coefficient was adopted to examine the correlation between these components. According to Ravid (2005), the correlation was statistically significant at an alpha level of .01. In Table 4-3, the result of correlation analysis indicates a statistically significant relationship among each component of the survey: instructor support, student interaction and collaboration, and enjoyment. As shown in Table 4-3, all components of the distance learning environment survey were significantly and positively correlated with each other. In this correlation analysis, correlation coefficient (r) between instructor support and student interaction/collaboration is .398, correlation coefficient (r) between instructor support and enjoyment is .297, and r between student interaction and collaboration and enjoyment is .260.

Table 4- 3 Pearson's Product-Moment Correlation Coefficient between Three Subscales

Variable	Pearson's r			Mean	SD	Minimum	Maximum
	(1)	(2)	(3)				
Instructor Support (1)	1.00	-	-	3.8	.7	1	5
Interaction & Collaboration (2)	0.40**	1.00	-	2.8	.9	1	5
Enjoyment (3)	0.30**	0.26**	1.00	3.4	.9	1	5

**: *p<.01; n=644*

Results of analysis of variance (ANOVA)

To compare demographic characteristics with learners' satisfaction, the ANOVA was used to analyze if there was a significant difference. As shown in Table 4-4, the results of the ANOVA for gender indicated there was a statistically significant difference between female and male respondents regarding student satisfaction (F= 6.030, *p*= .014). In this research, males had higher learning satisfaction scores than females at NOUT.

Table 4- 4 ANOVA Comparisons of Overall Satisfaction According to Gender

Descriptive Statistics				ANOVA					
Gender	n	Mean	SD	Sources	Sum of Squares	df	Mean square	F	p
Female	458	3.3	.6	**Between Groups**	2.28	1	.28	6.03	.014
Male	186	3.5	.6	**Within Groups**	242.51	642	.38		
				Total	244.79	643			

Response scale: 1=never, 2= seldom, 3=sometimes, 4=often, 5=always

In the Figure 4-5., the information indicates that the male group had higher

scores on distance learning satisfaction than female group. This result supports

findings by Koohang (2004). In a study of 154 students who had enrolled on the

online distance program, Koohang found that gender and prior experience with the

Internet were significant factors in Web-based distance leaning.
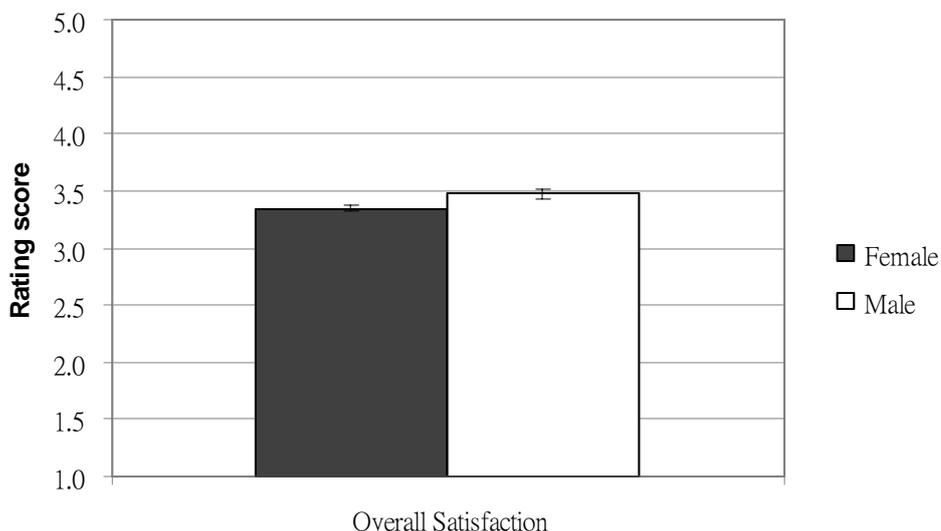
Error bar indicates ± 1 standard error

Figure 4- 5 Distribution of Satisfaction Rating by Gender Groups

The results of the ANOVA for age in Table 4-5 compared the different age

groups with learners' satisfaction. There was no statistically significant difference

according to age (F= 1.67, p= .172) in this research. This result contradicted those

from Clennell (1987) and Chang (2003). Positive reasons for this contradiction are

discussed in Chapter 5.

Table 4- 5 ANOVA Comparisons of Overall Satisfaction According to Age Groups

Descriptive Statistics				ANOVA					
Age	n	Mean	SD	Sources	Sum of Squares	df	Mean square	F	p
60-64 yrs	320	3.4	.6	Between Groups	1.90	3	.63	1.67	.172
65-69 yrs	184	3.4	.6	Within Groups	242.89	640	.38		
70-74 yrs	97	3.3	.6	Total	244.79	643			
More than 75 yrs	43	3.6	.7						

Response scale: 1=never, 2= seldom, 3=sometimes, 4=often, 5=always

Table 4-6 indicates that there was a significant difference in students' satisfaction when examined by marital status (F= 15.58, $p<$ .001). Scheffe's post hoc comparisons (p< .05) revealed that the single group is significantly higher in overall satisfaction than the married group and the divorced or widowed group.

Table 4- 6 ANOVA Comparisons of Overall Satisfaction According to Marital Status

Descriptive Statistics				ANOVA					
Marital Status	n	Mean	SD	Sources	Sum of Squares	df	Mean square	F	p
Married	376	3.4	0.6	Between Groups	11.35	2	5.67	15.58	<.001*
Single	116	3.6	0.6	Within Groups	233.44	641	0.36		
Divorced	152	3.2	0.6	Total	244.79	643			

Response scale: 1=never, 2= seldom, 3=sometimes, 4=often, 5=always

These results are consistent with those from Clennell (1987), who found that people who were single or divorced were more likely to join continuing learning activities than people who were married.
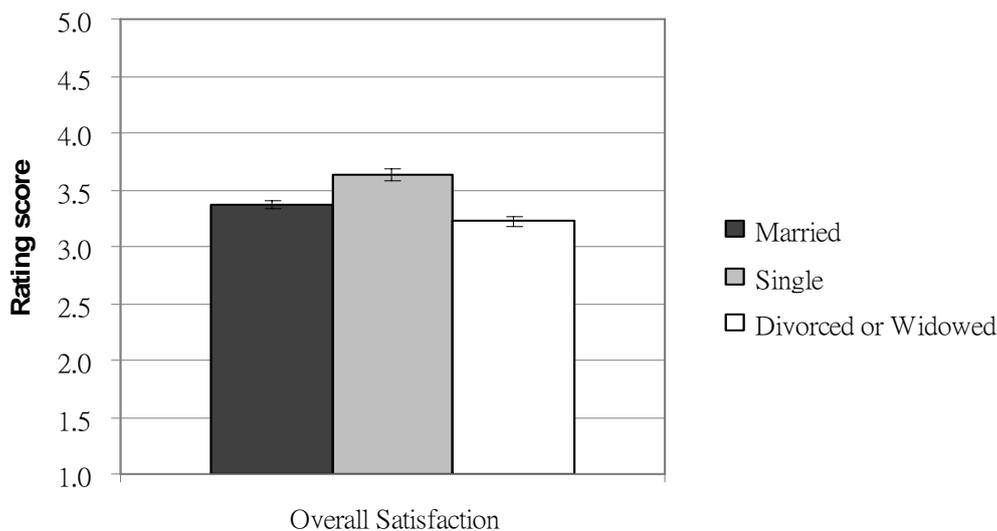
Error bar indicates ± 1 standard error

Figure 4- 6. Distribution of Satisfaction Rating by Marital Status

As shown in table 4-7., the two-way ANOVA indicated that gender and marital status were significant main effect of the older adults' satisfaction in the Web-based course at NOUT. Moreover, married status had a lightly higher influence than gender in explaining old learners' satisfaction.

Table 4- 7. Two-way ANOVA Gender, Marital Status, and Their Interaction Effects on Overall Satisfaction Rating

ANOVA						
Sources	Sum of Squares	df	Mean square	F	p	Partial η^2
Gender (G)	1.82	1	1.82	5.03	.025	.008
Marital Status (M)	11.24	2	5.62	15.52	<.001	.046
G×M Interaction	.45	2	.23	.62	.54	.002
Error	231.03	638	.36			
Total	7612.91	644				

Regarding differences in educational background, there were no statistically significant differences in students' overall satisfaction according to Table 4-8 (F= .10, p=.90).

Table 4- 8.   ANOVA Comparisons of Overall Satisfaction According to Educational Level

Descriptive Statistics				ANOVA					
Education Level	n	Mean	SD	Sources	Sum of Squares	df	Mean square	F	p
Senior High	140	3.4	.6	Between Groups	.08	2	.04	.10	.90
Vocational school	301	3.4	.6	Within Groups	244.71	641	.38		
College	203	3.4	.6	Total	244.79	643			

According to the result of Homogeneity of Variances in Table 4-9., the research adopted the Games-Howell post hoc comparisons to analyze the different gender groups with enjoyment, the different age groups with student interaction and collaboration, and different marital status groups with instructor support in this study.

The results contradicted those from Clennell (1987) and Chang (2003). Positive

reasons for this contradiction are discussed in Chapter 5.

Table 4- 9. Test of Homogeneity of Variances

Variable	Instructor Support		Interaction & Collaboration		Enjoyment	
	Levene's Statistic	p	Levene's Statistic	p	Levene's Statistic	p
Gender	3.05	.08	.02	.89	10.89	<.01
Age	.99	.40	5.47	<.01	.62	.60
Marital Status	5.63	<.01	.18	.83	.42	.66
Education	.64	.53	.68	.51	.94	.39

The results of the ANOVA for age group in Table 4-10 compared the different

age groups with instructor support, student interaction & collaboration, and enjoyment.

There was no statistically significant difference according to age groups (F= 1.03,

p= .38; F= .996, p= .40; F= 1.91, p= .13).

Table 4- 10. ANOVA Comparisons of Instructor Support Rating According to Age Groups

Descriptive Statistics				ANOVA					
Age	n	Mean	SD	Sources	Sum of Squares	df	Mean square	F	p
60-64 yrs	320	3.7	.7	Between Groups	1.72	3	.57	1.03	.38
65-69 yrs	184	3.8	.7	Within Groups	355.89	640	.56		
70-74 yrs	97	3.8	.8	Total	357.61	643			
More than 75 yrs	43	3.9	.8						

Table 4-10. (continued) ANOVA Comparisons of Interaction & Collaboration Rating According to Age Groups

Descriptive Statistics				ANOVA					
Age	n	Mean	SD	Sources	Sum of Squares	df	Mean square	F	p
60-64 yrs	320	2.8	.9	Between Groups	1.79	3	.60	.996	.40
65-69 yrs	184	2.8	.7	Within Groups	485.02	640	.76		
70-74 yrs	97	2.7	.8	Total	486.81	643			
More than 75 yrs	43	2.9	.0						

Table 4-10. (continued) ANOVA Comparisons of Enjoyment Rating According to Age Groups

Descriptive Statistics				ANOVA					
Age	n	Mean	SD	Sources	Sum of Squares	df	Mean square	F	p
60-64 yrs	320	3.5	.9	Between Groups	4.59	3	1.53	1.91	.13
65-69 yrs	184	3.4	.9	Within Groups	514.09	640	.80		
70-74 yrs	97	3.3	.8	Total	518.68	643			
More than 75 yrs	43	3.7	.8						

As shown in Table 4-11., there was statistically significant difference among

instructor support and enjoyment (F= 3.92, *p*= .048; F= 13.34, *p*< .001) according to

gender.

Table 4- 11 ANOVA Comparisons of Instructor Support Rating According to Gender

Descriptive Statistics				ANOVA					
Gender	n	Mean	SD	Sources	Sum of Squares	df	Mean square	F	p
Female	458	3.7	.8	Between Groups	2.17	1	2.17	3.92	.048
Male	186	3.9	.7	Within Groups	355.44	642	.55		
				Total	357.61	643			

Table 4-11. (continued) ANOVA Comparisons of Interaction & Collaboration Rating According to Gender

Descriptive Statistics				ANOVA					
Gender	n	Mean	SD	Sources	Sum of Squares	df	Mean square	F	p
Female	458	2.8	.9	Between Groups	.043	1	.04	.057	.811
Male	186	2.8	.9	Within Groups	486.76	642	.76		
				Total	486.81	643			

Table 4-11. (continued) ANOVA Comparisons of Enjoyment Rating According to Gender

Descriptive Statistics				ANOVA					
Gender	n	Mean	SD	Sources	Sum of Squares	df	Mean square	F	p
Female	458	3.4	.9	Between Groups	8.02	1	8.02	13.34	<.001
Male	186	3.6	.7	Within Groups	510.66	642	.80		
				Total	518.68	643			

In the Figure 4-7, the information indicated that the male group had higher scores on instructor support and enjoyment than female group. This result was consistent with research by Chang (2003), Ho (2005), and Sahin (2006), and will be discussed further in Chapter 5.
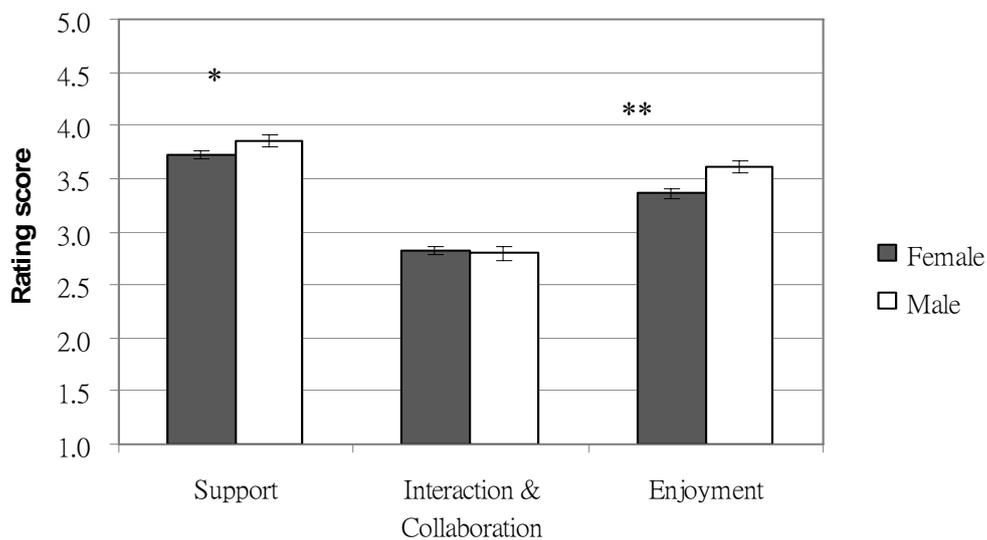
Error bar indicates ± 1 standard error

*: $p<.05$; **: $p<.01$

Figure 4- 7 Comparisons of Instructor Support, Student Interaction & Collaboration, and Enjoyment According to Gender

Table 4-12 indicates that there was no significant difference according to

different educational background levels (F= .84, *p*= .43; F= .27, *p*= .76; F= .81, *p*= .45)

in this research.

Table 4- 12 ANOVA Comparisons of Instructor Support Rating According to Education Level

Descriptive Statistics				ANOVA					
Education Level	n	Mean	SD	Sources	Sum of Squares	df	Mean square	F	p
Senior high school	140	3.7	.7	Between Groups	.93	2	.47	.84	.43
Vocational high school	301	3.8	.7	Within Groups	356.68	641	.56		
College	203	3.8	.8	Total	357.61	643			

Table 4-12. (continued) ANOVA Comparisons of Interaction & Collaboration Rating According to Education Level

Descriptive Statistics				ANOVA					
Education Level	n	Mean	SD	Sources	Sum of Squares	df	Mean square	F	p
Senior high school	140	2.9	.8	Between Groups	.42	2	.21	.27	.76
Vocational high school	301	2.8	.9	Within Groups	486.40	641	.76		
College	203	2.8	.9	Total	486.81	643			

Table 4-12. (continued) ANOVA Comparisons of Enjoyment Rating According to Education Level

Descriptive Statistics				ANOVA					
Education Level	n	Mean	SD	Sources	Sum of Squares	df	Mean square	F	p
Senior high school	140	3.4	.8	Between Groups	1.310	2	.66	.81	.45
Vocational high school	301	3.4	.9	Within Groups	517.37	641	.81		
College	203	3.5	.9	Total	518.68	643			

As presented in Table 4-13., there was a statistically significant difference among instructor support and enjoyment (F= 32.93, *p*< .001; F= 5.27, *p*= .005) according to marital status.

Table 4- 13 ANOVA Comparisons of Instructor Support Rating According to Marital Status

Descriptive Statistics				ANOVA					
Marital Status	n	Mean	SD	Sources	Sum of Squares	df	Mean square	F	p
Married	376	3.7	.7	Between Groups	31.38	2	15.69	32.93	<.001
Single	116	4.2	.6	Within Groups	326.26	641	.51		
Divorced or Widowed	152	3.6	.8	Total	357.63	643			

*Games-Howell post hoc comparisons (p< .05) revealed that the single group is higher than the married group and the divorced or widowed group

Table 4-13. (continued) ANOVA Comparisons of Interaction & Collaboration Rating According to Marital Status

Descriptive Statistics				ANOVA					
Marital Status	n	Mean	SD	Sources	Sum of Squares	df	Mean square	F	p
Married	376	2.8	.9	Between Groups	2.38	2	1.19	1.57	.21
Single	116	2.9	.9	Within Groups	484.40	641	.76		
Divorced or Widowed	152	2.7	.8	Total	486.78	643			

Table 4-13. (continued) ANOVA Comparisons of Enjoyment Rating According to Marital Status

Descriptive Statistics				ANOVA					
Marital Status	n	Mean	SD	Sources	Sum of Squares	df	Mean square	F	p
Married	376	3.4	.9	Between Groups	8.40	2	4.20	5.27	.005
Single	116	3.6	1.0	Within Groups	510.28	641	.80		
Divorced or Widowed	152	3.3	.9	Total	518.68	643			

Figure 4-8 indicates that the single group had higher scores on instructor support and enjoyment than the married group and the divorced or widowed group at NOUT.
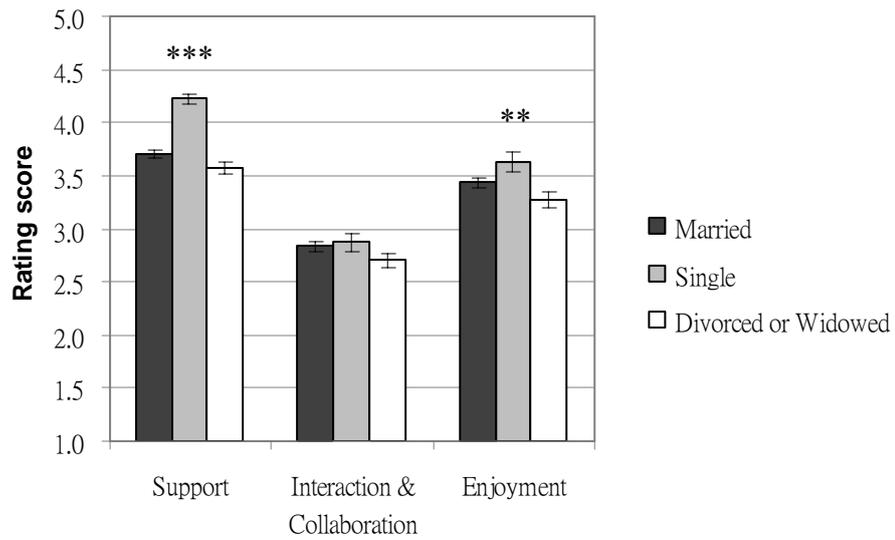
Error bar indicates ± 1 standard error

**: $p<.01$; ***: $p<.001$

Figure 4- 8 Comparisons of Instructor Support, Student Interaction & Collaboration, and Enjoyment According to Marital Status

Chapter 5

Summary, Discussion, Implications, and Limitations

Introduction

This chapter provides a summary of the study findings; notes the statistical results related to the research questions; discusses the implications of the findings; and offers recommendations for future study. Also presented here are the limitations of the study.

Summary of the Study

The major purpose of this study was to explore the relationship between older learners' demographic characteristics and their satisfaction with distance learning in the Web-based environment at NOUT.

Research Question

The following questions guided this study:

What is the relationship between older adults' demographic characteristics and their satisfaction with three elements—instructor support, student interaction and collaboration, and enjoyment —of the Web-based learning environment at NOUT?

1.1.Are there differences related to the gender variable and older adults' satisfaction?

1.2. Are there differences related to the age variable and older adults' satisfaction?

1.3. Are there differences related to the marital status variable and older adults'

satisfaction?

1.4. Are there differences related to the educational background variable and older

adults' satisfaction?

Targeted Population and Sample

In this study, the population included older adult learners over age 60 who were

registered as students at NOUT in the spring semester 2010. For this study, 920

surveys were distributed in four main learning centers: (1) Taipei, (2) Taichung, (3)

Kaohsiung, and (4) Hualien.

Research Procedures

After receiving approval to conduct the study from the Institutional Review

Board (IRB) at the Pennsylvania State University, the following data collection

procedures began. The researcher contacted instructors at the four learning centers at

NOUT and sent a cover letter, informed consent, and survey questionnaire to them.

Instructors gave the survey questionnaire to participants at the beginning of the

face-to-face section. After completing it, participants placed the survey into an

envelope; the teachers sent these envelopes directly to the researcher.

Summary of the Demographic Findings

The sample population was 644 participants over age 60 and enrolled in online courses at NOUT. In this study, the gender and educational background distributions for the sample resembled the population at NOUT. According to Registrar Office's report (2009) at NOUT, there were more female students (68.7%) than male students (31.3) enrolled in Web-based learning courses at NOUT. Also, 56% of the students had completed high school and 36.5 % had college-level degrees.

Figures 4.1–4.4 (chapter 4) showed that the largest group of learners were ages 60–64 (49.7%). The data showed that 68% of older learners had a high school education and 71% were female; only 18% had never married. In addition, findings showed that 58.4% of the older adults were married and 23.6% were divorced or widowed.

Summary of the Statistical Analysis

This study examined the relationship between older learners' demographic characteristics and their satisfaction with distance learning in the Web-based environment at NOUT. The satisfaction elements included instructor support, student interaction and collaboration, and enjoyment. As shown in the ANOVA tables in chapter 4, there were significant differences related to gender and marital status variables for distance learning satisfaction with the Web-based distance learning environment at NOUT. With regard to gender, male students had higher scores on

learning satisfaction for Web-based distance learning at NOUT than did females. In addition, the single group had higher scores on distance learning satisfaction than the married group and the divorced or widowed group at NOUT.

The ANOVA results shown in Tables 4.5 and 4.8 revealed no significant differences related to age and educational background. As shown in Table 4.10, there was a statistically significant difference in instructor support and enjoyment according to gender in this research. In addition, the ANOVA result in Table 4.12 indicates a statistically significant difference related to instructor support and enjoyment based on marital status.

Discussion

Discussion of Findings

This research examined the relationship between older learners' demographic characteristics and their satisfaction with distance learning in the Web-based environment at National Open University in Taiwan (NOUT). The findings offered several insights related to Web-based distance learning at NOUT.

First, gender and married status had a significant main effect for older adults' satisfaction in Web-based courses at NOUT. Results indicated that the male group had higher scores on distance learning satisfaction than the female group.

Moreover, the results from the ANOVA analysis indicated that the male group

had higher scores than the female group for instructor support and enjoyment at

NOUT. This result was consistent with research by Chang (2003), Ho (2005), and

Sahin (2006). These researches reported that, in distance learning courses, males

exhibit a more positive attitude toward the Web-based learning environment. This

result may be related to experience with technology. With regard to gender and higher

education in Taiwan, higher percentages of male students select an academic major

related to science or information technology. According to the Ministry of Education

(2004), there were 63,499 males in academic majors related to science and technology

fields in college-level education in Taiwan. However, only 17,879 females chose an

academic major related to science and technology subjects. For this reason, male

students had more learning opportunities and experiences involving computing and

the Internet in Taiwan. Koohang and Durante (2003) noted that distance learners have

more positive attitudes toward and satisfaction with Web-based learning when they

have more learning experiences related to distance learning. Similarly, Koohang

(2004), in a study of 154 students who had enrolled on the online distance program,

found that gender and prior experience with the Internet were significant factors in

Web-based distance leaning.

　　　With regard to marital status, results showed that single distance learners

experienced more positive satisfaction than people who were married or divorced. In

addition, the single group had higher scores than the married group and divorced or

widowed group on instructor support and enjoyment. These results are consistent with

those from Clennell (1987), who stated that people who were single or divorced were

more likely to join continuing learning activities than people who were married.

Previous research (Chang, 2003; Chen, 2004) on distance learning at NOUT revealed

that distance learners who had fewer family responsibilities tended to have a more

positive attitude toward and greater learning satisfaction with distance learning than

learners with more family responsibilities. Kramarae (2001) pointed out that time may

be a more precious commodity than money for some adult learners who have to

greater family care responsibilities when they consider participation in distance

learning activities: "Most single women say that they have more freedom than other

women do" (Kramarae, 2001, p. 33). This factor may be particularly important for

older women in Taiwan. According to the Taiwan Ministry of the Interior (2010),

40.2% of the older Taiwanese adult population have family responsibilities relating to

care-taking of grandchildren.

The results revealed no statistically significant difference in learners' satisfaction

according to educational background level and age. With regard to educational

background, results contradicted those from Clennell (1987) and Chang (2003). One

possible explanation is that most older adult participants in this study had at least a

senior high school-level education . In Clennell's (1987) research, the scale of

educational background was from no formal qualifications to university degree. In

Chang's (2003) research, the scale of educational background included participants

who had never attended a formal school. In this study, most participants had a high

school degree and there were no significant differences in educational background

among participants.

With regard to age, the results showed no statistically significant difference in

learners' satisfaction according to age group. This result contradicted those from

several previous studies such as Ho (2005) and Sahin (2006). One possible

explanation is that the age range was not sufficiently wide in this research. For

example, Ho (2005) surveyed 48 distance learners whose age range was from less

than 25 years old to over 54 years old.

Implications and Recommendations for Future Study

The present study appears to be one of the first to look at Web-based distance

learning and older adults' learning satisfaction. The Taiwanese context was an

excellent one for this study, especially in light of the fact that an evaluation

post-NOUT's transfer of its one-way broadcast media content into Web-based

programs in 2006 had not been conducted.

Implications

Based on study results, several implications for instructional purposes may be drawn.

The research suggested that NOUT or other distance learning institutes in Taiwan should develop a flexible and easily accessible Web-based learning environment for older adults in order to fit their needs and increase the satisfaction of learners who might have less computer experience related to online distance courses or have more family responsibilities. Thompson (1998) noted that "to appropriately serve distance learners, institutions must offer programs designed for learners with a wide range of characteristics and needs" (p.20).

According to the results from this study, program developers, course designers, and instructors should consider gender and marital status in distance learning courses. Differences in findings related to gender may be due to cultural differences. In many Asian countries such as Taiwan, women face greater family responsibilities, such as caring for grandchildren (Huang, 1997). However, Kramarae (2001) indicated that "online course and programs are sometimes presented as the ideal higher education delivery methods for women who take on most of the responsibilities for childcare and domestic work" (p. 31). In order to fit their needs, instructors should develop a well-designed course orientation and support system for women and other students inexperienced or lacking confidence in the distance learning environment. NOUT

should develop various learning support services for distance learners such as new

student orientation, learning assistants, and study groups in order to meet the diverse

needs of distance students. Moore and Kearsley (2005) pointed out that " A student

support service has to be proactive as well as reactive…Methods have to be

developed for identifying problems early and by intervening to offer support " (p.182).

Rau and Hsu (2005) found that older adults can enjoy using information

communication technology to learn after appropriate orientation training. In addition,

NOUT could provide academic assistant services－either on line or face to face－ for

students who might have less computer experience related to online distance courses

or have more family responsibilities. An assistant can play an important role to

motivate learners and improve their learning (Holliman & Scanlon, 2006). NOUT

could also provide workshop activities to fit students' needs during the course period.

Instructors could organize networking study groups to encourage students to not only

solve the learning problems together but also to have emotional support and social

relationships with peers (Adnan, et al., 2007; Trentin, 2004). Finally, NOUT should

provide administration services in each regional learning centers. Adnan et al. (2007)

mentioned that most of students' administration problems are related to examination

attendance, which could be better facilitated by on-site administration services.

Recommendations for Future Study

Distance learning institutes must find flexible ways to deliver their learning

materials, meet participants' needs, and promote learning satisfaction. Distance

education may motivate the older population to continue to engage in educational

opportunities across many barriers. This study has identified several factors that

influence older students' satisfaction with online course.

Based on study results, the following recommendations for future research are

suggested:

1. This study sought to identify and understand the relationship between older

learners' demographic characteristics and their satisfaction with distance learning in

the Web-based environment at NOUT. Future scholarly research should investigate

whether other factors may have a significant main effect on older learners' satisfaction

with distance learning. For example, other factors relating to gender differences in the

distance learning environment need to be considered in future research, such as

comfort with   interaction, and learning style. Kramarae (2001) noted that women and

men interact in somewhat different ways in online classes and Marley (2007) and

Chen (2006) found that gender differences may influence learning style and use of

technology in distance learning courses. Personality as a factor related to satisfaction

should also be studied. According to Moore and Kearsley (1996), "much less reliable as a predictor of success or failure, but clearly relevant, are the personality characteristics of the student" (p. 162).

2. Future research should be conducted that involves the use of interviews and other qualitative research methods in investigating the older adult's family responsibilities in relation to their success in engaging in Web-based distance learning. Qualitative research can provide in-depth explanation for some of the quantitative findings of this study.

3. Future research should include an examination of students' interaction between instructors and learning content in order to gain understanding of the effects of different levels and types of interaction. The instrument might include a scale of interaction with instructor and course content.

4. Future research should check content validity of the instrument, particularly as it related to cultural differences.

Limitations

The study had several limitations that need to be considered. First, participants were limited to those enrolled in distance education programs in the four main learning centers at NOUT in Taiwan. It is assumed that examination of different populations, such as city and rural dwellers, may offer different results.

Second, the present study did not investigate other relevant variables that may

affect distance learning satisfaction, such as learners' personality or learning style.

Third, in this study a survey was distributed in 2010 at mid-spring semester. It is

possible that learners may change their thinking about their satisfaction with the

distance learning environment upon completion of online programs at NOUT.

Fourth, this study did not examine the effect of their different course designs

with different levels of expected interaction on different levels of instruction support.

Finally, the participants in this study were enrolled in hybrid distance courses.

NOUT provides face-to-face meetings once a mouth in each learning center. For this

reason, the results of the study may not apply to fully online courses or other type

courses.

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Appendix A

Survey Questionnaire

Two-part survey

Part 1: Background Survey

1. Gender:

_____Male

_____Female

2. Age

_____60-64 Years old

_____65-69 Years old

_____70-74 Years old

_____75 Years and older

3. Marital status:

_____Married

_____ Single (never marry)

_____ Divorce

_____ Widow or Widower

4. What is your highest level of educational background?

_____High School

_____Vocational School

_____Four-year Bachelor Degree

_____Master

_____Doctorate

Part 2. Distance Education Learning Environment Survey
Please circle your choice for each statement.

In this class…

---

1. Distance education is stimulating.
   Never Seldom Sometimes Often Always
2. The instructor adequately addresses my questions.
   Never Seldom Sometimes Often Always
3. The instructor responds promptly to my questions.
   Never Seldom Sometimes Often Always
4. I share information with other students.
   Never Seldom Sometimes Often Always
5. I am satisfied with this class.
   Never Seldom Sometimes Often Always
6. It is easy to contact the instructor.
   Never Seldom Sometimes Often Always
7. I collaborate with other students in the class.
   Never Seldom Sometimes Often Always
8. I discuss my idea with other students.
   Never Seldom Sometimes Often Always
9. The instructor encourages my participation.
   Never Seldom Sometimes Often Always
10. Group work is a part of my activities.
    Never Seldom Sometimes Often Always
11. I relate my work to other's work.
    Never Seldom Sometimes Often Always
12. I enjoy studying by distance.
    Never Seldom Sometimes Often Always
13. If I have an inquiry, the instructor finds time to respond.
    Never Seldom Sometimes Often Always
14. Distance education is exciting.
    Never Seldom Sometimes Often Always
15. I work with others.
    Never Seldom Sometimes Often Always

16. I look forward to learning by distance.
    Never Seldom Sometimes Often Always
17. The instructor provides me positive and negative feedback on my work.
    Never Seldom Sometimes Often Always
18. Distance education is worth my time.
    Never Seldom Sometimes Often Always
19. The instructor gives me valuable feedback on my assignments.
    Never Seldom Sometimes Often Always
20. I prefer distance education.
    Never Seldom Sometimes Often Always
21. The instructor helps me identify problem areas in my study.
    Never Seldom Sometimes Often Always
22. I would enjoy my education more if all my classes were by distance.
    Never Seldom Sometimes Often Always

Appendix B

Chinese Version Survey Questionnaire

參與空中大學網路課程滿意度調查問卷

敬愛的同學，您好：

　　本問卷旨在瞭解您參與空中大學網路課程的學習經驗。您的意見十分寶貴。全部資料僅作改善教學與學術研究之用，絕對保密，且不涉及個案探討，請放心作答。

　　懇請撥空填寫，非常感激您的支持與協助。

　　　　　　　　　　　　　　　　　　　　　敬祝 順心

一、基本資料

(1) 性別： □ 女性 □ 男性

(2) 年齡：□60-64　　□65-69　□70-74　□ 75 以上

(3) 結婚狀況： □ 已婚 □ 未婚 □ 離婚 □ 喪偶

(4)就讀空大前，最高學歷是 ：□ 高中 □ 高職
　　　　　　　　　　　　　　□ 技術學院 (科技大學)、大學
　　　　　　　　　　　　　　□ 碩士 □ 博士

謝謝您提供寶貴的意見

二、遠距學習環境滿意度

請在下列各題中，圈選最符合您在空大的實際上課情形之選項

	從 不	不 常	有 時	經 常	總 是
1. 遠距學習環境能增加我的學習動機。	1	2	3	4	5
2. 教師能適當地理解我的發問。	1	2	3	4	5
3. 教師能及時地回應我的提問。	1	2	3	4	5
4. 我會和其他學生分享資訊。	1	2	3	4	5
5. 對於目前的遠距學習環境感到滿意。	1	2	3	4	5
6. 我能容易的和教師連絡。	1	2	3	4	5
7. 在這遠距環境，我能和其他同學一起合作學習。	1	2	3	4	5
8. 我會和其他同學一起討論。	1	2	3	4	5
9. 老師能夠鼓勵我參予學習活動。	1	2	3	4	5
10. 分組工作是成為我學習活動的一部份。	1	2	3	4	5
11. 我會參考其他同學的對於課業的想法。	1	2	3	4	5
12. 我很享受這種遠距學習模式。	1	2	3	4	5
13. 如果我有問題，教師會安排時間來協助我。	1	2	3	4	5
14. 遠距學習模式是令我感到有好的學習意願。	1	2	3	4	5
15. 我會和其他同學一起做課業工作。	1	2	3	4	5
16. 我期待還有這種遠距學習環境。	1	2	3	4	5

	從不	不常	有時	經常	總是
17. 教師能針對我的課業表現提供我多元不同的意見。	1	2	3	4	5
18. 這是值得花時間參予遠距學習活動。	1	2	3	4	5
19. 教師能針對我的作業提供有意義的建議。	1	2	3	4	5
20. 我會比較偏好遠距學習模式。	1	2	3	4	5
21. 教師能夠幫助我找出我的學習問題與困難所在。	1	2	3	4	5

22. 我會比較能享受學習活動，當所有的科目都是利用遠距教學的方式呈現。

        1   2   3   4   5

Appendix C

IRB Approval

PENNSTATE

Senior Vice President for Research	The Pennsylvania State University	(814) 865-1775
Office for Research Protections	The 330 Building, Suite 205	Fax: (814) 863-8699
	University Park, PA 16802-3301	http://www.research.psu.edu/orp/

Date: Wednesday 03-10-2010 9:50:00 AM

From: Joyel D. Moeller, Research Compliance Coordinator

To: Ho-Yuan Chen

Subject: IRB# 33415 A Study of Older Adult Students" Satisfaction with Web-¬based Distance Learning at the Taiwan National Open University

The Office for Research Protections (ORP) has reviewed the application for the research study noted in the subject line and determined it to be exempt from IRB review. You may begin your research. This study qualifies under the following category(ies):

Category 1: Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods. [45 CFR 46.101(b)(1)]

PLEASE NOTE THE FOLLOWING:

- Include your IRB number in any correspondence to the ORP.
- The principal investigator is responsible for determining and adhering to additional requirements established by any outside sponsors/funding sources.
- Record Keeping
    - The principal investigator is expected to maintain the original signed informed consent forms, if applicable, along with the research records for at least three (3) years after termination of the study.
    - This will be the only correspondence you will receive from our office regarding this exemption determination.
        - **MAINTAIN A COPY OF THIS EMAIL FOR YOUR RECORDS.**
- Consent Document
    - The most recent consent form(s) that you sent in for review is the one that you are expected to use.
- Follow-Up
    - The Office for Research Protections will contact you in three (3) years to inquire if this study will be on-going.
    - If the study is completed within the three year period, the principal investigator may complete and submit a **Project Close-Out Report**:
        http://www.research.psu.edu/orp/areas/humans/applications/closeout.rtf
- Revisions/Modifications
    - Any changes or modifications to the study must be submitted to the Office for Research Protections on the *Modification Request Form - Exemption* available on our website:
        http://www.research.psu.edu/orp/areas/humans/applications/modrequest.rtf
    - Modifications will not be accepted unless the Modification Request Form is included with the submission.

Please do not hesitate to contact me if you have any questions or concerns.

Joyel D. Moeller
The Pennsylvania State University | Office for Research Protections | The 330 Building, Suite 205 | University Park, PA 16802
Direct Line: (814) 865-7957 | Main Line: (814) 865-1775 | Fax: (814) 863-8699 | www.research.psu.edu/orp

Appendix D

Permission Letter by the Instrument Developer

---------------- Forwarded Message ----------------
From: Scott Walker <walkstx@gmail.com>
Date: Thu, Dec 3, 2009 09:57 AM
Subject: Re: For Dr. Scott Walker
To: "HO-YUAN (Jason)" <huc140@psu.edu>

Ho-Yuan,

Attached are three forms of the DELES and you letter of permission.

Regards,

Scott

Appendix E

The Informed Consent Form

Informed Consent -A Study of Older Adult Students' Satisfaction with

Web-based Distance Learning at the Taiwan National Open University

Title of the study: A Study of Older Adult Students' Satisfaction with Web-based

Distance Learning at the Taiwan National Open University.

Principal investigator's contact information: Ho-Yuan Chen, PhD. Candidate,

Adult Education program, Pennsylvania State University

Email:huc140@psu.edu, Phone: (814)-441-7636

You are being asked to participate in my research study. This form provides you

with information about the study. This is a research study. Please take your time in

deciding if you would like to participate. As questions about anything you do not

understand before deciding whether to participate or not. You arc free to ask

questions at any time before or after your participation in this study. The principal

investigator (Ho-Yuan Chen) will answer all of your questions. Please feel free to ask

questions at any time. Your participation is entirely voluntary and you

can stop to participate without penalty or loss of benefits and grades.

Purpose of the study: The purpose of this study is to explain the relationship between

older adult learners' satisfaction and Web-based learning environment at Nation Open

University in Taiwan. You are at least age 60 years or older and enroll in a Web-based

course at Nation Open University in Taiwan.

Procedure: This survey takes about 15 minutes to complete. If you agree to

participate, the teachers will give the survey to you. After that, you will place the

completed survey into an envelope in person, and then teachers will send these

envelopes directly to the researcher by post.

Confidentiality assurances: Your participation in this research is confidential. The

data will be kept confidential and stored electronically on "password protected"

computer. The data collected is intended for academic study only.

Possible benefit: If you decide to participate in this study, you may be able to

examine your distance learning satisfaction in the Web-based environment by

completing the Distance Education Learning Environment Survey (DELES) survey.

Contact for questions: If you have any questions about this research study, please

feel free to contact the principal investigator at +1-(814)441-7636 or email to:

huc140@psu.edu

Right to withdraw:

You are free to choose whether or not to participate in this study. Your participation in

this study is completely voluntary. There will be no penalty or loss of benefits to

which you are otherwise entitled if you choose not to participate. You can stop at any

time. You can choose not to answer certain questions in this survey.

Your grades will not be affected by participation. Completion and return of the survey

is considered your implied consent to participate in this study. Please keep this form

for your records.

VITA

Ho-Yuan Chen

EDUCATION

2010   **Ph.D.,** Adult Education Program
                 The Pennsylvania State University, University Park, PA

2007   **M.Ed.,** Instruction Media,
                 Arkansas Tech University, Russellville, AR

WORKING EXPERIENCES

2009~2010   **Part-time Instructor,** Department of Applied Gerontology,
                 Toko University, Taiwan.

2009~2010   **Part-time Instructor,** Department of Computer Science and
                 Multimedia Design, Diwan University. Taiwan

2008~2009   **Graduate Assistant,** Adult Education Program,
                 The Pennsylvania State University-University Park.

2004~2005   **Teacher**, Yen Feng High School, Taiwan

PUBLICATION

1. Chen, H.Y. (2010). A Study of the Collaborative Learning on Adults and the Perception of the Technology in the Web-Based Environment. *2010--World Conference on Educational Multimedia, Hypermedia & Telecommunications.* Toronto, Canada

2. Chen. H.Y. (2009). Web 2.0 Applications in Distance Education and Training. *International E-Learn Conference*, Vancouver, British Columbia.