

**OLDER PEOPLE'S ADAPTATION TO NEW MODES OF COMMUNICATION**

by

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## **ABSTRACT**

The advances in Information Communication Technology (ICT) in the past three decades have served to improve the lives of older persons globally. While this evolution of ICT has in large measure benefited older Canadians, it has also resulted in their alienation from many activities in mainstream society. This alienation has been attributed to the rapid advance of ICT, and the slow rate at which older Canadians are adopting and using mainstream computers, new mobile communication devices and Internet services. Therefore, this thesis sought to explore how older persons in Canada are adopting and adapting to using these different technologies, in formal and informal settings.

This study utilized a qualitative descriptive methodology as the strategy of enquiry. Using inclusion criteria and purposive sampling, semi-structured face-to-face interviews were used to collect descriptive data from ten participants in Thunder Bay, Ontario, Canada. The ages of the participants ranged between 67 to 81 years. Participants were selected from varying backgrounds, with different experiences using and interacting with ICTs.

The interview data was transcribed and coded into distinctive themes, and analyzed using conventional content analysis. These themes were used as the basis for presenting and discussing the findings. While some negative emotions could be attributed to the adoption behavior of a few participants, generally the findings suggest that Canadians 65 years and older in this study are adopting and using mainstream, computers, new mobile communication devices and the Internet on a regular basis.

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“A journey of a thousand miles must begin with a single step” Lao-Tzu

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## TABLE OF CONTENTS

ABSTRACT.....	iv
ACKNOWLEDGMENT.....	v
TABLE OF CONTENTS.....	vi
ORGANIZATION OF THESIS .....	ix
<b>CHAPTER ONE: OVERVIEW OF STUDY .....</b>	<b>1</b>
RESEARCH PROBLEM .....	1
PURPOSE OF STUDY .....	2
RESEARCH QUESTIONS.....	3
DEFINITION OF TERMS.....	4
SIGNIFICANCE OF STUDY.....	6
DELIMITATIONS.....	7
LIMITATIONS .....	8
CONCEPTUAL FRAMEOWRK (INTRODUCED).....	9
<b>CHAPTER TWO: LITERATURE REVIEW.....</b>	<b>10</b>
OLDER PERSONS ADOPTION AND ADAPTATION TO ICT .....	11
THE ROLE OF ICT IN FORMAL AND INFORMAL LEARNING .....	13
BARRIERS TO ICT ADOPTION .....	14
Physical and Functional Barriers .....	16
Emotional Barriers.....	17
Educational Attainment Levels .....	18
Financial Barriers .....	19
Lack of interest.....	20
PERCEPTION OF OLDER PERSONS TOWARDS ICT .....	21
USER ACCEPTANCE OF ICT.....	23
CONCEPTUAL FRAMEWORK (EXPLAINED).....	24
<b>CHAPTER THREE: DESIGN OF STUDY .....</b>	<b>27</b>
DESCRIPTIVE QUALITATIVE RESEARCH.....	27
SAMPLING TECHNIQUES .....	29

PARTICIPANT IDENTIFICATION AND RECRUITMENT .....	30
Participants .....	31
DATA COLLECTION PROCEDURES.....	32
Interviews .....	33
DATA ANALYSIS .....	34
<b>CHAPTER FOUR: PARTICIPANT PROFILES.....</b>	<b>37</b>
ADAM’S PROFILE .....	38
ANDY’S PROFILE.....	39
JERRY’S PROFILE .....	40
SAM’S PROFILE .....	41
JESSICA’S PROFILE.....	42
SARAH’S PROFILE.....	43
MARTHA’S PROFILE.....	44
JAKE’S PROFILE .....	45
<b>CHAPTER FIVE: PRESENTATION OF FINDINGS .....</b>	<b>47</b>
MAJOR THEMES OF THE FINDINGS.....	47
Adoptive Behaviors.....	47
Adoption Preceded by Apprehension, Anxiety, Fear.....	47
Adoption Preceded by Excitement, Interest, Willingness.....	50
Adoption of New Mobile Communication Devices and Internet services.....	51
Length of Time for Adoption .....	51
Prevalence in Use of New Mobile Communication Devices .....	53
Ownership of New Mobile Communication Devices .....	55
Preference in the Use of New Mobile Communication Devices.....	57
Location of Adoption and Patterns in Adoption of Computers and the Internet.....	59
Preference in Location for Use of Personal Computers and the Internet.....	60
Pattern of Computer and Internet Usage .....	61
Adoption Decision.....	62
Personal Decision to Use New Mobile Communication Devices.....	63
Personal Decision to Not Use New Mobile Communication Devices.....	63
Influence of Family Members to Adoption .....	65
Challenges to Adoption of Computers, the Internet and New Mobile Devices.....	68

Cognitive Challenges.....	68
Psychological Challenges.....	70
Physical and Functional Challenges.....	71
Socio-Economic Challenges.....	72
The Potential of ICT to Promote Continuous Learning.....	74
SUMMARY OF THE FINDINGS.....	77
<b>CHAPTER SIX: DISCUSSION OF FINDINGS.....</b>	<b>78</b>
DISCUSSION OF THEMES.....	78
Adoption Behavior and Adoptive Decision.....	78
Patterns, Prevalence, and Preferences in Adoption and Use.....	80
Socio-Economic Factors and Adoptive Behavior.....	82
Location Preferences.....	83
Challenges to Adoption and Use of ICT.....	85
<b>CHAPTER SEVEN: CONCLUSION.....</b>	<b>87</b>
SUMMARY OF THE STUDY.....	87
REVISITING THE RESEARCH QUESTIONS.....	89
LIMITATION OF THE FINDINGS.....	95
IMPLICATIONS FOR POLICY AND PRACTICE.....	95
IMPLICATIONS FOR FUTURE RESEARCH.....	96
SUMMARY OF THE CONCLUSION.....	97
<b>REFERENCES.....</b>	<b>98</b>
<b>APPENDICES.....</b>	<b>119</b>
APPENDIX A: ETHICS APPROVAL LETTER.....	119
APPENDIX B: LETTER OF INFORMED CONSENT.....	120
APPENDIX C: CONSENT FORM.....	123
APPENDIX D: INTERVIEW GUIDE.....	125

## LIST OF TABLES

<b>Table1.</b> The original Technology Acceptance Model (TAM).....	25
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## **Organization of Thesis**

This thesis contains seven chapters. The first chapter introduces the topic - Older People's Adaptation to New Modes of Communication. An overview of the study is provided that outlines the problem of the study, and highlights and discusses the background information about how the study evolved. Within this section the context of the convergence of two phenomena; the increase in new Information Communication Technologies (ICTs), and the exponential growth of an aging older population of persons 65 years and older, are reviewed. One central research question is put forward with several subordinate questions. The significance of the study is articulated by outlining the contributions of this research to the scholarship on ICT research relative to older persons, the value of the research to social policy and its contribution to practice in both public and private spheres. The section concludes with an introduction of the conceptual framework, the Technology Acceptance Model (TAM). This framework is discussed in detail within the literature review.

The second chapter reviews the literature that supports this thesis. The section contains broad headings with several subordinate headings. This layout is used in an effort to orient readers to the important issues that impact the core ideas of this research. An examination of the literature that supports the adoption and utilization of technology is conducted in an effort to highlight the advancement in ICT, in conjunction with the constant evolution of ICT innovations. The role of ICT in formal and informal settings is reviewed, to show how these settings can influence the decision of older persons to adopt and use communication technologies.

The barriers that impede older persons from adopting and adapting ICTs are examined, to better understand how these barriers may prevent the adoption and utilization of ICTs. To conclude this section the conceptual framework (TAM) is discussed in detail, and the two constructs within TAM: Perceived usefulness (PU) and perceived ease of use (PEOU) are explored, to highlight how perceptions of usefulness and ease of use may determine adoption or non-adoption of ICTs.

The third chapter outlines the Design of the Study. This section begins with a brief discussion of qualitative research. The purpose of the study and the main research question are restated to orient readers, and to launch the descriptive qualitative methodology. The section continues with the introduction of the research design; the descriptive qualitative research design. The different elements of the descriptive qualitative research design are reviewed, in order to explain why this research design is suitable and appropriate for the study. The different sections in the research design are also outlined and discussed; namely, the sampling technique, participant identification and recruitment, data collection instruments, and data analysis procedures. The data analysis section outlines procedures used in analyzing the interview data, describes how the data was coded, and how different themes emerged from the coding process.

The fourth chapter presents the Profiles of the Participants. The section identifies each participant by pseudonym for anonymity and confidentiality, and outlines the ages of the participants and their experiences with using ICTs.

The fifth chapter presents the Findings. The findings have been presented using several broad themes. These themes emerged from the coding of the data. The descriptions of several participants are presented under each theme. Using this approach, the perceptions of



several participants for different themes are captured. The section concludes with a summary of the findings.

The sixth chapter presents the Discussion of the Findings. The important imperatives of the findings are addressed, to show how the Technology Acceptance Model helps to explain the interaction of the older participants with ICTs.

The seventh chapter presents the Conclusion of the thesis. This chapter is divided into three sections. The first section provides a summary of the study including, the problem statement, purpose of the study, conceptual framework, methodology and research methods (data collection and data analysis). The second section revisits the research questions and situates them within the findings. The third section discusses the limitations of the findings, implications for policy and practice, and concludes with suggestions for future research.

## **CHAPTER ONE**

### **Overview of the Study**

The progressive increase in the population of older persons globally is seen as unprecedented, pervasive, profound and enduring (United Nations, 2002, p. xxviii). This has given rise to what has been referred to as a demographic transition. In 2009, the global population of people aged 60 years and older was estimated at 680 million. Based on this population growth trend, the 60 and older age cohort is projected to exceed the number of younger persons globally by the year 2050 (United Nations, 2009). This socio-demographic phenomenon has been attributed to the rise in life expectancy (particularly among baby boomers), and the decrease in fertility rates among fecund populations. These trends have contributed to reshaping the age structure of the population in most regions of the world (United Nation, 2000). Occurring almost simultaneously with the changing demography of older populations is the rapid diffusion of Information Communication Technology (Bernard & Phillips, 2000).

### **Research Problem**

The rapid diffusion of Information Communication Technology (ICT) is expected to play an important role in improving the quality of life of older persons, by promoting opportunities for social interaction (Bernard & Phillip, 2000), and learning via access to online support and services (Cody, Dunn, Hoppin, & Wendt, 1999; White et al., 1999; Cole, 2000; Kozma, 2001), thereby promoting the social and economic mobility necessary for human development. For example, ICT is changing the way people communicate, become informed or do business (Anie, 2011).

ICT is expected to bridge the information gap (Burdick, 2001, p.562) and help reduce the “digital divide” (p.370) (Burdick, 2001; Dewan & Riggins, 2005) between young and older persons. Therefore, to remain current in the “information age” (Selwyn, 2004, p. 369), older persons are encouraged to engage with, and adopt new mobile communication technologies (Melenhorst, Rogers & Caylor, 2001; Hill, Beynon-Davies, & Williams, 2008).

Notwithstanding the potential of ICT to empower older persons and improve their quality of life, computer use amongst older persons has at times been perceived as a minority activity. This perception has been attributed to a lack of interest among older persons in ICTs (Selwyn, Gorard, Furlong, & Madden, 2003). As a result, there is the fear that non-adoption of ICTs by older persons will serve as a further disadvantage in contemporary society, by forcing them “to remain behind a veil of limited knowledge and opportunities” (Green & McAdams, 2003, p.8).

### **Purpose of Study**

The purpose of this study is to explore and describe the experiences of Canadians 65 years and older who are using Information Communication Technologies (ICTs). More particularly, the study seeks to examine the extent to which older adults in Canada are adopting and adapting to using technologies such as computers, Internet and new mobile communication devices (Harvey, 1989), in formal and informal settings. Additionally, the research seeks to identify and explore in-depth the possible barriers associated with the adoption and adaptation of ICTs.

## Research Questions

The main research question guiding this study is:

What are the lived experiences of Canadians 65 years and older in adopting and utilizing Information Communication Technologies (ICTs), particularly, personal computers, Internet services and new mobile communication technologies (Tablets, Smartphones and Kobo) in their daily lives?

The following subordinate questions have been addressed in the research:

1. How do older Canadians adopt and adapt to using ICTs, particularly, computers, Internet and new mobile communication technologies?
2. How do older Canadians in formal and informal settings (for example; home, work and school) adopt and adapt to using computers and Internet services (Skype, Facebook, E-mails)?
3. What are the challenges encountered by older Canadians in adopting and adapting to ICTs?
4. How does the socio-economic status, for example, income and education, influence the adoption and utilization of ICTs among older Canadians?
5. What are the perceptions of older Canadians concerning the value of personal computers, Internet services and new mobile communication technology?
6. What role does ICT play in the process of self-directed learning for older Canadians?
7. How have computers and new mobile communication technologies enhanced the learning experience of older Canadians?
8. How do older Canadians continue to utilize ICTs after initial adoption?

## Definition of Terms

**Adaptation:** Adaptation refers to both the current state of being adapted and the dynamic evolutionary process that leads to adaptation. In this study, adaptation refers to the use of mainstream computers in addition to the process of transitioning from mainstream computers to the adoption and use of new mobile communication devices.

**Adoption Decision:** Decisions made by individuals to make full use of an innovation as the best course of action available (Rogers, 2003).

**Adoptive Behavior:** The change that comes about after individuals have made the decision to adopt and use an innovation.

**Criterion Sampling:** “This involves searching for individuals who meet a certain criterion, e.g., selecting all the individuals who have had a particular life experience” (Given, 2008).

**Demographic Transition:** “The demographic transition is a shift from a demographic regime characterized by high rates of fertility and mortality to another one with lower fertility and mortality rates. The transition leads to changes in the size and age structure of the population” (United Nations, 2002).

**Digital Divide:** “Digital divide refers to the perceived gap between those individuals and communities that own, access, and effectively use information and communication technologies (ICT) and those who do not”. This definition draws attention to the three main constituent parts of the digital divide: Ownership, access and use (BECTA, 2001).

**Information Communication Technology :** “ICT includes technologies such as, desktop and laptop computers, software, peripherals and connections to the Internet that are intended to fulfill information processing and communications functions” (Statistics Canada, 2008).

**Life Expectancy:** “Life expectancy is generally interpreted as the number of years a person is expected to live from the day he or she was born. Life expectancy measures the quantity rather than quality of life” (Statistics Canada, 2000).

**Lived Experience:** “Lived experience is a person’s essence or being in this world (Merleau-Ponty, 1962). Lived experience also allows a person to describe his or her experiences through verbal and non-verbal statements. The term “experience” rather than “lived experiences” will be utilized in this thesis.

**Mobile Communication Devices:** A mobile communication device is a mobile telephone, email appliance, wireless personal digital assistant, or a device combining two or more of those functions.

**Older Persons:** The World Health Organization (WHO) has proposed a working definition for older persons as the chronological age of 65 years and over. In this study, older persons are those 65 years and over, and the term will be used interchangeably with the term older adults or older people.

**Perceived Ease of Use (PEOU):** “The degree to which a person believes that using a particular system would be free of effort” (Davis, 1989).

**Perceived Usefulness (PU):** “The degree to which a person believes that using a particular system would enhance his or her performance at any given task” (Davis, 1989).

**Purposeful Sampling:** “A technique used in sampling for selecting information rich cases for in depth study” (Patton, 1990).

**Smartphone:** A mobile phone that uses computing technology for a wide range of services, including; Internet access, databases, video and still photography.

**Tablet:** “A mobile computers that have a touch screen and measuring 18 to 25 cm”

(Smart, 2012).

**Technology Acceptance Model (TAM):** “TAM is an information systems theory that models how users come to accept and use a technology system. The model proposes that when users are presented with a new technology, two constructs influence their decision about how and when they will use the technology, notably: Perceived usefulness (PU) and Perceived ease-of-use (PEOU)” (Davis, 1989).

### **Significance of the Study**

Older persons exist in a world where there is a proliferation of new mobile communication technologies, which are constantly evolving and changing the way they may interact in different social environments (Lawton, 1998). Additionally, the rapid pace at which computers and new mobile communication technologies are evolving makes it necessary for older persons to keep up with a rapidly changing technological world (Charness & Boot, 2009).

Research on Information Communication Technology (ICT) adoption among older persons is relatively new and still evolving. Since the 1990s, there has been an increase in research on ICT and older persons. However, most of the research has been concentrated in Europe and the United States. In Canada, there appears to be a lack of gerontology related research in the area of ICT usage among the older population (65 years and older). It is on this premise that this research seeks to contribute to the scholarship on ICT adoption and adaptation by adults 65 years and older.

The study is important because it provides a basis for understanding the perceptions of older persons towards adopting ICTs. It is also valuable for understanding how older persons perceive communication technologies, and how these technologies may have changed the way

they communicate and interact on a daily basis. The research is intended to influence new thinking in the area of ICT adoption, particularly, how these technologies can be developed to facilitate ease of adoption and adaptation among older adults.

The Technology Acceptance Model is used as a conceptual framework for understanding how older persons make the decision to adopt and use ICTs. Technology Acceptance Model (TAM) is an information system theory that describes how users come to accept and use technology (Davis, 1989). The application of TAM is relatively new, when looking at the technology adoptive behavior of older persons. TAM is a useful tool for analyzing adoption behaviors. In populations such as groups of employees, TAM has been widely used by researchers to study adoption, use, and acceptance of technology. Therefore, TAM has significance for the insights it provides into the ICT adoption and utilization behaviors of older Canadians.

The value of this research pertains to its relevance to Gerontology policy and practice (Marshall & Rossman, 1989), as well as its applicability to different private and public agencies in areas such as, healthcare and education. These sectors provide important services to older persons and ICT is seen as a strategic tool through which older persons can access these services (Chismar & Patton-Wiley, 2003). Therefore, the findings can be used by different government agencies as a guide for both policy and practice in specific areas.

### **Delimitations of the Study**

The study has been delimited to participants 65 years and older in Canada, who have access to computers, Internet, new mobile communication technologies, and who use these technology services in both formal and informal settings. The data collection techniques



(purposive sampling and semi-structured interviews) utilized, and the population for this study have been selected based on certain inclusion criteria (Patton, 2002).

### **Limitations of the Study**

Descriptive qualitative research is an excellent approach for gathering information-rich, substantive, and in-depth data, but it has its limitations. In particular, the descriptive nature of the research may not allow for the data to be generalized. This poses a challenge, because descriptive qualitative research requires detailed narrative descriptions of experiences, as older persons may generally be less able to describe personal experiences in-depth (Kirkevold & Bergland, 2007).

The intergenerational differences between participants and the researcher may impact on data generation, and this may create difficulty in achieving a common understanding of the participant's experiences. To reduce this risk, Patton's (2002) recommendations have been adopted in this research. Patton (2002) suggests, that the researcher must "explore his or her own predisposition, making it as explicit as possible, by engaging in a "mental cleansing processes" (p.553). Before the research began, and during the data gathering, data analyzing, and data reporting processes, personal biases and standpoints were constantly reviewed and revisited. This was done to ensure that the outcome of the research was not influenced by the researcher's own point of view.

Regarding the conceptual framework, Moon and Kim (2001) have indicated that the fundamental constructs of the Technology Acceptance Model (TAM) does not reflect the specific influences of technological and usage-context factors, which may alter users' acceptance. Davis (1989) suggests, that the future of technology acceptance research must report how other variables affect usefulness, ease of use, and user acceptance. As a result, perceived

ease of use and perceived usefulness may not fully explain behavioral intention of individuals towards the use of ICTs. Therefore, this necessitates a search for additional factors that can better predict the acceptance of ICTs.

### **Conceptual Framework (Introduced)**

The conceptual framework used in this descriptive qualitative research is the Technology Acceptance Model (TAM) (Davis, 1986). Sandelowski (2000) suggests, that descriptive qualitative research requires the researcher "staying with the surface of the words and events" (p. 2), in order to elicit descriptions about the experiences of the persons who are in the experience. Researchers conducting descriptive qualitative research must deliberately choose to describe experiences and events in terms of a conceptual, philosophical or abstract framework (Sullivan-Bolyia, Bova, & Harper, 2005). The systematic nature of TAM allows for this type of analysis described by Sullivan-Bolyia et al. (2005), to explore and describe the experiences of older persons with ICTs (Davis, 1986).

The value of the TAM in predicting user behavior with ICT is understood based on its two cognitive constructs: Perceived usefulness (PU) and perceived ease of use (PEOU) (Legris, Ingham, & Collerete, 2003). PU and PEOU are important in this research for understanding why individuals make the decision to use, or not to use computers, Internet and new mobile communication technologies. Using TAM within this descriptive qualitative study allows for a deeper exploration of the experiences of actual users of ICTs. TAM is explored in more detail in chapter two.

## **CHAPTER TWO**

### **Literature Review**

The literature review in this section is intended to provide related information in the area of Information Communication Technology (ICT) and older persons; including, the role of ICT in formal and informal learning environments, barriers that impede ICT adoption (physical and functional barriers, emotional barriers, education attainment level, financial barriers and lack of interest), perceptions of ICT by older persons and user acceptance of ICT. The literature review also supports the use of the conceptual framework (Technology Acceptance Model). A review of TAM concludes the section.

Communication technologies have defined the society in which individuals live. As a result, many commentators have argued that ICT is essential for the participation of older persons in modern society (Selwyn, Gorard, Furlong, & Madden, 2003). Selwyn et al. (2003) suggest, that the growing evolution of ICT will impact older persons significantly, changing the way they interact, communicate and conduct business on a daily basis.

The evolution of ICT has given rise to new research, focusing on the role of computers in the lives of older adult users (Karavidas, Lim & Katsikas, 2005; Hernandez-Encuentra, Pousada & Gomez-Zuniga, 2009); including, the attitudes of older persons toward computers, Internet and email usage (Iyer & Eastman, 2006; Gatto & Tak, 2008) and closing of the digital divide between younger and older persons (Dewan & Riggins, 2005).

In spite of the vast amount of literature available on ICT, knowledge of the adoption behavior of older persons is still limited. Research is needed regarding the adoptive behavior of older technology users (Kelly & Charness, 1995; Wagner, Hassanein, & Head, 2010). The majority of studies on ICT adoption have examined the processes and factors contributing to

technology adoption, while neglecting the adoptive behaviors of older persons and their patterns of technology adoption (White et al., 1999; Alder, 1996; White & Weatherall, 2000, Lam & Lee, 2006). The lack of research on the experiences of older persons in adopting and adapting to ICT needs to be addressed, in an effort to examine and understand the pre and post adoption behaviors of older persons towards ICTs (Wahl, Scheidt, & Windley, 2003). As a result, this literature review explores the facilitating role of ICT, and how it fosters adoption and adaptation behaviors in older persons.

### **Older Person's Adoption and Adaptation to Information Communication Technology**

The communication technology needs of older persons are in many respects similar to mainstream younger computer and new mobile communication technology users. However, older persons may differ from mainstream younger users in how they adopt and use new mobile communication technologies, to meet their varying needs (Mallenius, Rossi, & Tunnainen, 2007). Mynatt, Melenhorst, Fisk, and Rogers (2004) have shown that older persons are proactive in the way they utilize Information Communication Technologies (ICTs), to aid in daily activities, and to learn new skills. For example, older persons can use ICT to monitor health, build social networks, increase participation in society and supplement safety.

According to the European Older People Platform (2008), communication technologies can be used by older persons to facilitate social inclusion, participation in society, and ultimately enhance independent living. Communication technologies also have the potential to provide independence for older persons, in ways that will improve well-being and quality of life (Gitlin, 2000; 2002). For example, Holmes, Teresi, and Holmes (1990) have shown that computers, the Internet and mobile handheld devices can be used to provide effective interface between doctors and patients. Holmes et al. (1990) suggest that computerized voicemail can be

used as reminders to older persons for reducing medical non-compliance. Additionally, communication technologies have the capacity to enable social interaction and communication with family and friends (Dickinson & Hill, 2007), provide avenues for entertainment (Xie & Bugg, 2009), and opportunities for learning and mental stimulation (Kim, 2008). ICTs also have the capacity to decrease isolation and loneliness (Fokkema & Knipscheer, 2007; Sum, Mathews, Hughes, & Campbell, 2008), and contributes to improvement in self-esteem, life-satisfaction, and the overall quality of life (Shapiro, Barak, & Gal, 2006; Sleger, van Boxtel, & Joles, 2008).

It is important for older persons to understand and utilize new mobile communication technologies, because these technologies are rapidly becoming a feature in today's society (Kurniawan, 2008). The proliferation of new mobile communication technologies such as, Smartphones and Tablets allow older persons unlimited access and connection with family and friends via social media (Lindley, Harper, & Sellen, 2009). Handheld computing devices such as Smartphones and Tablets have become an integral part of modern life (Smart, 2012). These devices serve as a platform for integrating different functions seamlessly, thereby, enhancing mobility and independence for older adults, and bridging the digital divide between the young and the old (Dewan & Riggins, 2005; Zhou, Rau, & Salvendy, 2012).

ICT has a facilitating role to play in the way older people participate and interact in society. Sorensen (1997) has highlighted the role of ICT in maintaining the physical independence of older persons through the use of assistive technology. However, in order for ICT to enable and maintain independence for older persons, computers hardware and mobile communication devices have to be adapted, to facilitate ease of access, and ease of use (Xie, 2003), in formal or informal environments.

## **The role of Information Communication Technology in Formal and Informal Learning Environments**

Traditionally, Information Communication Technology (ICT) existed primarily in formal education institutions (White, 2005). In the last two decades, ICT has increasingly become a central component of the learning environment outside of formal learning settings. The introduction of ICT into informal learning environments have provided older adults with the ease of access to online resources, required to acquire the basic skills that are necessary to facilitate continuous learning, through the engagement of the learner (Paas, 2008; Wadi & Sonia, 2002).

Formal learning occurs in a more structured learning environment (McGivney, 1999). This environment is typically institutional and classroom based. Informal learning occurs in settings that are not stereotypically classroom based or highly organized. The control of learning in informal settings primarily exists in the hands of the learner (Marsick & Watkins, 1990). This type of learning arises out of daily activities relating to work, family interaction or leisure (European Commission, 2001). According to Jones, Issroff, Scanlon, Clough and McAndrew (2006), informal learning activities are more motivating than learning in formal settings, because it offers the freedom to define different tasks and relate activities to specific goals. This offer of freedom that informal learning environments provide is deemed necessary for older persons to adopt and use ICTs.

The introduction of ICT into adult education has contributed to older adults engaging more in informal learning, because ICT provides the avenue for learning at any time and any place (Ginabury, Sabatini, & Wagner, 2000). The promise of learning ‘anytime and anyplace’ has contributed to the attractiveness of ICT in adult learning, while removing the constraints of distance, time, and location (Tiffin & Rajasingham, 1995; Field, 1997). Rogers (1995) argues

that the decisions regarding the adoption of ICT and new mobile communication technologies in formal and informal settings is usually dependent on the amount of knowledge an individual has on how to use the technology appropriately, as more complex technologies such as, the Internet, smartphones, and tablets require more knowledge.

Learning in formal and informal settings is driven by the support older persons receive in those settings. Because learning for older persons is more self-directed, it is necessary to understand how self-directed learning is operationalized in informal settings, in conjunction with how the learning environment may influence the adoption and utilization of ICT (Newsom, 1977). Self-directed learning has been described as “the learning method of choice by older adults, because they make all the decisions regarding their learning” (Tough, 1979). Self-directed learners make learning meaningful. These learners are curious and willing to try new things, view problems as challenges, and enjoy learning (Taylor, 1995; Lyman, 1997). Lorys (1987) suggest “that the ability to be a self-directed learner is a requirement for all adults in a rapidly-changing technologically-complex society” (p. 21).

However, because self-directed learning is controlled by the learner’s own initiatives, barriers to ICT adoption may hinder the learning process. Therefore, an exploration of the barriers that may impede the self-directed older learner is necessary, to understand how certain factors may contribute to non-adoption of ICTs.

### **Barriers to Information Communication Technology Adoption**

While Information Communication Technology (ICT) holds great promise for independent aging, several barriers have been identified in the literature as preventing its adoption by older persons (Alwan & Nobel, 2008). Charness and Boot (2009) have identified age-related changes as impacting on technology adoption and utilization. Some of those changes

are manifested in visual, perceptual, psychomotor and cognitive abilities. For example, Smith, Sharit, and Czaja (1999) suggest that age-related decline affects the ability of older persons to use computer devices, such as computer mouse's and keyboards. Likewise, Birren and Warner (1990) and Blake (1998) suggest that psychomotor and visual deficiencies impact the overall cognitive abilities of older persons, preventing them from adopting and utilizing computers, Internet and other new communication technologies.

Advancing age slows cognitive processes, decreases memory capacity and attention control, causing older persons to resist learning and adopting ICTs (Salthouse, 1996; Charness & Boot, 2009). Charness and Holley (2004) explain that these cognitive changes are influenced by fluid abilities and crystallized abilities. Fluid abilities enable novel or abstract problem solving capabilities and have a physiological basis, whereas crystallized abilities are associated with learned or acculturated knowledge and are the result of learning and knowledge attained over one's lifetime (Cattell, 1963; 1987). Fluid ability is necessary for problem solving and learning but is affected by advancing age (Charness & Boot, 2009). They explain that whereas fluid ability decreases with advancing age (Charness & Boot, 2009), crystallized ability is positively correlated to age, and is necessary for technology adoption (Czaja et al., 2006).

Age-related declines have prompted researchers Fisk, Rogers, Charness, Czaja, and Sharit (2009) to suggest that technology designed for older persons must be re-configured to meet their technological needs. Changes in visual acuity, color perception, and auditory systems, present challenges to older persons as they try to use technology (Charness & Boot, 2009). The declines in fine motor control and cognitive systems contribute to the reluctance of older persons in adopting and utilizing ICTs.



Understanding the influence of age-related declines, and how they may impact the physical and functional capacity of older persons is necessary. If older persons are limited by physical and functional deficiencies, then they are not able to adopt and utilize technology. These limitations are discussed in an effort to understand how physical and functional barriers may hinder the use of ICT by older persons.

### **Physical and Functional Barriers**

Physical and functional independence are critical issues for many older persons who want to “age-in-place” (Shafer, 2000, p. 26). Physical and functional independence allow the older person to remain in his or her own home, while pursuing certain interests (Shafer, 2000; Mynatt & Rogers, 2002). However, many older persons face physical and functional challenges when interacting with Information Communication Technologies (ICT), because some technological applications are not adapted to meet their needs or capabilities (Selwyn, Gorard, & Furlong, 2003). Physical and functional challenges as they relate to ICT, stem from issues related to hardware designs, which require modification (adaptation of key-guards, and larger label of keys on the keyboards), to support the declining motor functions of older persons (Frydenberg, 1988). According to Frydenberg (1988), the lack of support for the decline in motor functions (dexterity and hand-eye coordination) of older persons poses a challenge for the adoption and utilization of technological systems.

Physical and functional decline in older persons reduce opportunities to access ICT related services for working, learning, shopping, banking, and communicating with others (D’Aubin, 2007). Blake (1998) suggests that the declines in physical and functional abilities contribute to the difficulty faced by older persons when using new screen-based technologies including, keyboard and mouse manipulation (Charness & Holley, 2004).

Czaja and Smith (1998) suggest that in order for older persons with physical and functional challenges to utilize ICTs, the designs of these technological systems need to be addressed since ICT holds great promise, especially for persons with some impairment or disability, to remain active and functional in a technological world.

Physical and functional declines can impact the emotions of older persons, resulting in a lack of effort in adopting and utilizing ICTs. Negative emotions may lead to anxiety, perceived loss of control and fear of negative evaluations in older persons, when attempting to adopt and use ICTs (Raub, 1981).

### **Emotional Barriers**

Several authors have linked a lack of computer knowledge, and decreased confidence among older persons in mastering computer-related tasks, to emotional factors (Czaja & Sharit, 1998; Ellis & Allaire, 1999; Marquie, Jourdan-Boddaert, & Huet, 2002). For example, Raub (1981) have found causal linkages between computer use and levels of anxiety among older computer users.

Computer anxiety as described by Raub (1981), “is the complex emotional reaction evoked in individuals who interpret computers as personally threatening,” (p. 101). According to Ellis and Allaire (1999), computer anxiety causes older persons to develop negative perceptions toward technology (Meier, 1985). One such negative perception is explained as perceived loss of control (Baltes, 1996; Flammer, 1995). Perceived loss of control is a belief held by individuals about their immediate environment and their inability to navigate that environment. Perceived loss of control has an adverse effect on older adults. This adverse effect has contributed to the lack of interest in performing tasks that are necessary to achieve a desired outcome

(Rotter, 1971). Perceived loss of control increases with cognitive decline and contributes to increased computer anxiety (Baltes & Baltes, 1990; Flammer, 1995).

Fear of negative evaluation has also been associated with computer anxiety. “Fear of negative evaluation pertains to the apprehension, distress and expectation held by one individual over the negative evaluation of others,” (Watson & Friend, 1969, p. 449). Fear of negative evaluation has been associated with low self-esteem and social apprehension in older persons (Leary, 1983; Fleming & Courtney, 1984). The fear of negative evaluation has been credited with leading to the disinterest shown by some older persons towards ICTs (Morell, Mayhorn, & Bennett, 2000). Understanding how these emotional barriers may impact ICT adoption is important for assisting older persons to overcome computer -related anxieties. However, other barriers may also have an emotional influence on older persons, which might also contribute to non-adoption of technology.

### **Educational Attainment Levels**

Educational attainment has been cited as a contributory factor to the adoption or non-adoption of ICTs (Howard, 1986; Jeffres & Atkin, 1996; Atkin, Jeffres, & Neuendorf, 1998). Zimmer, Lui, Hermalin, and Chuang (1998) have identified educational attainment among older persons as being positively related to ICT adoption and use. They suggest that the higher the education level of older computer users, the more willing they will be to adopt and utilize ICTs. The converse is also true; the lower the educational level of older computer users, the less likely they will be to adopt and utilize ICTs.

For example, highly educated individuals tend to adopt and use new communication technologies more readily than individuals who are less educated (Welch, 1970; Wozniak, 1984; 1987; Krueger, 1993; Lleras-Muney & Lichtenberg, 2002). This has been validated by White and

Weatherall (2000), who found that more than 50% of seniors in a household survey who were college graduates owned a computer, compared to 7% of individuals in the same survey with less than a high school education owned a computer.

Riddell and Song (2011) have argued that higher education attainment levels increase the probability of older persons adopting technology because they are better able to understand the different commands that operating the technology system requires. Riddell and Song (2011) also suggest that lower levels of educational attainment by older persons may act as a disincentive to the adoption and acquisition of ICTs.

These findings give credence to the notion that ICT adoption and utilization by older persons may be contingent on the levels of education attained, since older persons with lower levels of education tend to resist the adoption and utilization of ICTs. The level of education attainment may also influence the decisions to invest in ICTs. It is therefore worth examining how financial barriers may also serve as a limitation to acquiring and investing in ICTs.

### **Financial Barriers**

Limited income has been identified as a barrier to older persons investing in Information Communication Technology (ICT) related equipment, software systems and services (Browne, 2000; Fisk & Rogers, 2002). The Office for National Statistics (2003) in the United Kingdom (UK) identifies cost of access as a major obstacle to Internet usage among older persons. A survey conducted in Derbyshire UK, revealed that the cost of buying a computer, and the cost of Internet access were significant impediments to the non-adoption of computers and Internet services by older persons (Dutton, di Gennaro, & Hargrave, 2005).

Russell and Staffore (2002) have suggested that there exists a connection between Internet usage and the cost of accessing the Internet. In a household survey conducted by these

researchers, 24% of older persons highlighted the need for free or cheaper access to computer and Internet services, while 13% of older persons highlighted the need for free and cheaper Internet lessons.

Notwithstanding these financial limitations to ICT adoption, older persons could be motivated to invest in new communication technologies if they understand the potential benefits of these technologies (Melenhorst, 2002). However, some older persons are not finding the potential benefits of ICT substantial enough to invest. This has led to the lack of interest shown by some older persons in investing and adopting ICTs. This lack of interest is associated with the cost to acquire and use different technology devices. Some authors have suggested that this disinterest is also due to the lack of access to computers and the Internet, lack of prior experiences with technology, and negative social stereotypes ascribed to older persons (Kornbluh, 1983; Docampo, Ridder, & Bourma, 2001).

### **Lack of Interest**

According to Fissen (2005), there appears to be a level of contentment among some older non-users of technology regarding the value of technology in their daily lives. This level of satisfaction results from a lack of interest toward technology (Morris, Goodman, & Brading, 2007). Two factors have been attributed to this lack of interest: misconceptions about the suitability of ICTs for use by older persons, and the perceived difficulty of adopting and utilizing ICTs (Morris et al., 2007). These misconceptions about ICT not being suitable for older people are held by younger persons concerning the ability of older cohort to adopt and utilize ICTs. Demiris et al. (2004) suggest that older persons are not averse to using ICTs particularly, if they are appropriately designed and introduced.

The perceived difficulties related to the adoption and utilization of ICTs is held by older persons because of the challenges or fear experience when attempting to adopt and use technologies. The removal of fear of technology is important in understanding why some older persons are not interested in adopting ICTs, and why they perceive ICTs as not useful in meeting their varying needs (Bailey & Sheehan, 2009). As a result, it is necessary to understand the role perception plays in the adoption and utilization of ICTs. Also, how the perceptions held by older persons may influence their decision to use, or not to use ICTs.

### **Perceptions of Older Persons toward Information Communication Technologies**

Selwyn (2004) suggests that older persons do not adapt well to Information Communication Technologies (ICTs) and new communication technologies. This is because of the negative stereotypical views held by society toward older technology users. The stereotypical views are held by some younger cohorts of persons who use negative statements to discourage older technology users. For example, many younger persons believe that ‘you cannot teach an old dog new tricks,’ suggesting that older persons are too old to learn anything new. The negative views held by older persons have also contributed to their beliefs about ICTs, and their abilities to learn and adopt these new communication technologies.

The perceptions of older persons toward ICTs are changing (Czaja & Sharit, 1998; Rogers, Cabrera, Walker, Gilbert, & Fisk, 1996). This change in perception is due to new efforts by technology developers, focusing on the usability of computer systems, geared toward enhancing technology adoption (Coughlin, Ambrosio, Reimer, & Pratt, 2007).

Baldi (1997); Jay and Willis (1992) have suggested that many older persons display positive attitudes toward technology and have positive experiences with using technologies. For example, Clark (2002); Nahm and Resnick (2001) found that older persons engage with computers for

entertainment, surfing the Internet for gathering information, and communicating with family and friends. These positive experiences have caused some older persons to have favorable opinions about ICTs.

Perception about technology is important for technology adoption and utilization, and is contingent on how beneficial and useful technology is perceived (Coughlin et al., 2007). Coughlin et al., (2007) have argued that a major problem preventing adoption of technology is the perception held by some older persons about technology infringing on their privacy and security. The privacy and security concerns held by older users and non-users of ICT are not without merit. Olphert, Damodaran and May (2005), found that concerns relating to privacy and security have resulted in older internet users spending less time on the Internet and exercising more caution while using the Internet. Conversely older non-users have also reported that security concerns were a prominent reason why they did not use the Internet.

Mann, Marchant, Tomita, Frass, and Stanton (2002) have argued that the security and privacy concerns held by some non-users result from their lack of understanding of the potential benefits of technology. Thus, having an understanding of the perceptions of older persons about technology is necessary as it offers great insight into how older persons make the decision to adopt and use ICTs.

Perceptions towards ICTs may act as an incentive or disincentive to the adoption of technology, and may be used as a gauge to measure the acceptance, or non-acceptance of technology by older persons. Mann et al. (2002) believe that if older persons perceive ICTs as useful and easy to use, they will adopt and use ICTs. Coughlin et al. (2007) suggest if older persons believe that technologies are necessary and important, and aid in improving their daily lives, then they will make the decision to use technologies.

It is therefore important to understand what factors influence the decisions made by older persons to use or not to use technology, and how perceptions influence user acceptance, contributing to intrinsic and extrinsic motivations for technology acceptance.

### **User Acceptance of Information Communication Technologies**

According to Dillon and Morris (1996), user acceptance is: “the obvious willingness of an individual or group to use ICT for the tasks it is designed to support,” (p.4). User acceptance is determined by two motivational concepts: extrinsic and intrinsic motivation (Brief & Aldag, 1977; Vankatesh, Morris, Davis, & Davis, 2003). In extrinsic motivation, individuals will perform an activity if they perceive the activity to be instrumental for achieving some valued external outcomes. In intrinsic motivation, individuals will engage in an activity because the activity itself is interesting, engaging, and in some way satisfying (Amabile, Hill, Hennessey, & Tighe, 1994).

Conci et al. (2009); Davis, Bagozzi, and Warshaw (1992) suggest that intrinsically motivated technology users perform an activity for the sake of the activity, and not for the attainment of any rewards, whereas extrinsically motivated technology users are driven by the expectation of rewards and benefits, derived from the system-user interaction (Brief & Aldag, 1977; Amabile et al., 1994; Pearlson & Saunders, 2006). Pearlson and Saunders (2006) argue that if users do not perceive the system-user interaction to be rewarding, then adoption and utilization of the technological system would not occur, since the benefits intrinsically motivated users derive from technology is obtained from the enjoyment of the system-user interaction.

The two motivational structures (intrinsic and extrinsic) have been investigated in relation to the acceptance of new technology (Conci et al., 2009; Teo, Lim, & Lia, 1999).



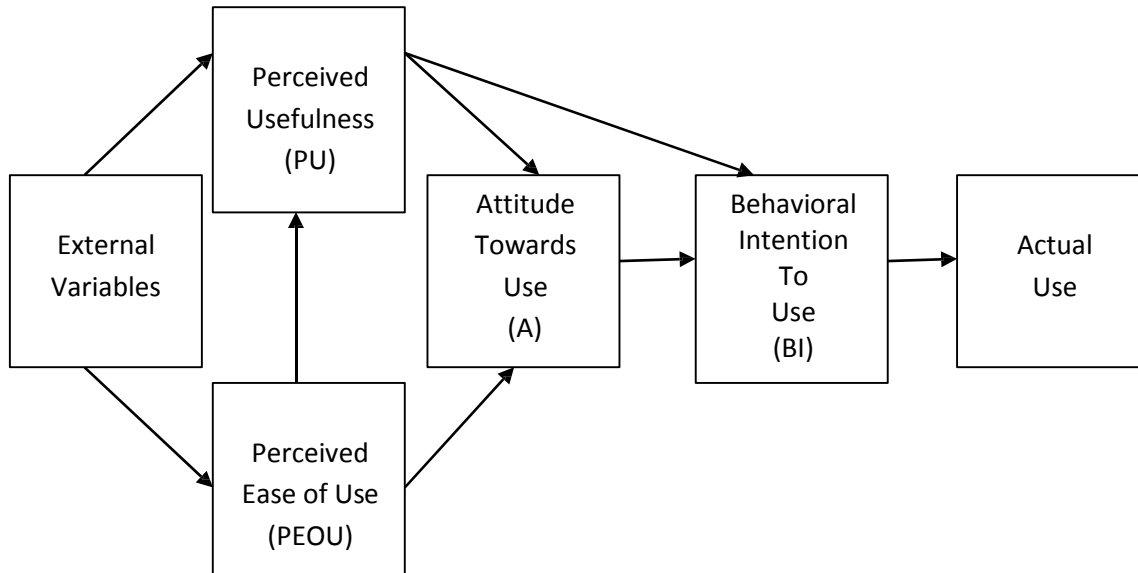
Conci et al. (2009) suggest that there is a utilitarian consideration for user acceptance, which is a significant driving force for the intentions to use ICTs. Venkatesha (2000) further explain that when individuals engage with technology, it is because of the intrinsic benefits they ascribed to the technology.

Davis (1989) suggests that user acceptance is determined by the two cognitive constructs explored in the Technology Acceptance Model (TAM): Perceived usefulness (PU) and perceived ease of use (PEOU), which are both instrumental to user acceptance of technology. TAM is explored in details as the conceptual framework, to better understand and describe the adoptive behaviors of older persons toward technology. The TAM is considered as most useful for predicting the acceptance of ICTs (Davis et al., 1989).

### **Conceptual Framework (Explained)**

The conceptual framework used in this descriptive qualitative research is the Technology Acceptance Model (TAM). The TAM is an information systems theory that models how users come to accept, and use a technology. Davis (1989) explains that TAM is “a method of evaluating user acceptance of a system by assessing user beliefs, attitudes, intentions and actual adoption behavior," (p.19).

Below is a schematic representation of the original Technology Acceptance Model (TAM), (Davis, 1989).



**Figure1. Original Technology Acceptance Model (Davis, 1989)**

The TAM provides a framework for understanding an individual's perception and acceptance of computer systems (Susan, Chuleeporn, & Robert, 2006). According to the TAM, system usage is determined by the intention to use a particular system, which in turn is influenced by perceived usefulness and perceived ease of use of the system (Davis, 1989; Davis et al., 1989). Perceived usefulness (PU) is the degree to which a person believes that using a particular technology system will be free of effort. Perceived ease of use (PEOU) is the degree to which a person believes that using a particular system would enhance job performance (Davis, 1989). These two cognitive constructs (PU and PEOU), when studied within a computer technology user acceptance context, reveal that there is a causal relationship between the two. It was shown that PEOU is a predictor of PU (Davis, 1989).

Davis (1989) also claims that user acceptance of technology is determined by behavioral intention. Behavioral intention (BI) is determined by a person's attitude (A) toward using a system. Attitude is the primary determinant of BI, which is "the positive and negative feelings individuals display about performing a specific behavior" (Ajzen & Fishbein, 1980, p. 2). The

attitude-behavioral intentional relationship (A-BI) demonstrated by the TAM diagram implies that people form intentions to behave in particular ways, if they believe these behaviors will have positive effects (Fazio, 1986). Davis (1986); Davis et al., (1989) argue that attitude guides the individual's behavior to adopt and use a system, by filtering information and shaping perceptions.

The main goal of the TAM is to predict user acceptance of Information Communication Technology (ICT) (Dillon & Morris, 1996). The TAM has been validated in many studies since 1989, as a theoretical model in helping to explain and predict user behavior toward ICT. This model has been credited with substantiating approximately 40% to 50% of user acceptance of technology (Legris, et al., 2003). Davis (1993) conducted an empirical study of 153 corporate email users, and found that PU had a positive effect on 58% of actual users.

Teo et al. (1999) have shown PEOU as having a significant effect on the frequency of Internet usage. Atkinson and Kydd (1997) also reported similar results for PEOU among Internet users for entertainment (hedonic) purposes. Consequently, Moon and Kim (2001) suggest that PEOU is the strongest predictor of attitude toward using the Internet.

These findings point to how important user perception is in terms of its influence on technology adoption and adaptation. There is value in understanding how the perceptions held by older persons concerning ICTs can influence attitudes, which in turn leads to intention, and user behavior (Ajzen & Fishbein, 1980). The TAM's two cognitive constructs PU and PEOU, allow for an exploration of the perceptions of older persons concerning ICTs, and how older persons make the decisions to use or not to use technology.

## **CHAPTER THREE**

### **Design of the Study**

This chapter outlines the design of the study. The section begins with a discussion of the methodology and its suitability for conducting this research. A description of the processes for sampling, participant identification and recruitment, data collection and data analysis procedures concludes this section.

The descriptive qualitative research has been chosen as the methodology, given its appropriateness for capturing personal experiences from the perspective of those having the experience. Descriptive qualitative research is designed to elicit rich, straightforward descriptions of the experiences of participants, in a language that is easy to understand (Sullivan-Bolyai, Bova, & Harper, 2005; Sandelowski, 2000).

Sandelowski (2000) suggests that descriptive qualitative research is amenable to obtaining largely unadorned answers to questions about the current status of a phenomenon that is relevant. This methodology facilitates data collection and analysis in a naturalistic fashion, allowing the researcher to focus completely on the individuals involved in the study and their experiences of the phenomenon in question (Duffy, 2008).

The descriptive qualitative methodology is aligned with the purpose of this study. This research sought to explore and describe the experiences of Canadians 65 years and older with using ICTs. More particularly, the study examined the extent to which older adults in Canada are adopting and adapting to using computers, the Internet, and new communication devices, in formal and informal settings. Additionally, the research identified and explored the possible barriers associated with the adoption of ICTs.

A descriptive qualitative methodology was employed to address the main research question:

- What are the lived experiences of Canadians 65 years and older in adopting and utilizing ICTs, particularly, personal computers, the Internet and new mobile technologies (Tablets, Smartphones, Kobo) in their daily lives?

Several subordinate questions were also explored within this research as described in the purpose of the study. The term descriptive qualitative method was utilized instead of the qualitative descriptive method. However, it should be noted that the literature does not make a distinction between the two terms (Sandelowski, 2000).

Researchers conducting descriptive qualitative studies stay close to the “surface of the data and events” (Sandelowski, 2000, p.336). According to Sullivan-Bolyai et al. (2005) the purpose of the researcher in a descriptive qualitative study is to search for a precise account of the “experiences, events and processes that most people (researcher and participants) would agree are accurate” (p. 128). These researchers suggest that the focus should be placed on direct communication with the research participants, in an effort to elicit rich descriptions about the phenomenon under study.

The descriptive qualitative design is of special relevance to ICT research, in that it can influence technology designers and policy makers, to address questions pertaining to the adoption and utilization of ICTs by older persons. Such questions include: What are the concerns of older persons about technology devices or services? What reasons do older persons have for adopting and using technology devices or services? When are older persons using technology devices or services most? What factors facilitate or hinder adoption and utilization of technology devices or services?

In the following sections, the sampling technique, participant identification and recruitment (along with the criteria for selecting those participants), data collection procedures (instrument used) and data analysis procedures are presented and discussed, in relation to the conduct of the descriptive qualitative study.

### **Sampling Technique**

Purposive sampling described by Patton (1990) was used in this descriptive qualitative research. Purposive sampling is a kind of non-probability sampling, for identifying the primary participants who will provide rich descriptive in-depth data (Welman & Kruger, 1999).

Patton (1990) also suggests that the purpose of purposive sampling is to select information-rich cases. The information-rich cases are those participants from which the researcher can learn a great deal about the phenomena as it relates to the purpose of the study, and who will illuminate the questions under study (Denzin & Lincoln, 2000; Patton, 2002).

In purposive sampling, the researcher specifies the characteristics of the population of interest and tries to locate the participants who fit those characteristics (Johnson & Christensen, 2004). A type of purposive sampling called ‘criterion sampling,’ which involves choosing participants who meet a particular criterion, was utilized in the sample selection process for this research (Patton, 2002). The inclusion criteria are outlined below:

- Older persons who are 65 years and older at the time of this research.
- Older persons who have knowledge of computer and Internet services, and who utilize new mobile communication technologies.
- Older persons who are utilizing computers and Internet services, and who are utilizing new mobile communication technologies in informal and informal settings.
- Older persons living within the Province of Ontario.

Purposive sampling allows the researcher to actively select the most productive sample to answer the research question (Marshall, 1996), because selecting participants who “have had experiences relating to the phenomenon to be researched,” (p. 150) is important (Marshall, 1996). Utilizing a purposive sampling technique in research should be guided by the research purpose and question (Babbie, 1992; Greig & Taylor, 1999; Schwandt, 1997).

### **Participant Identification and Recruitment**

Following approval from the Research Ethic Board at Lakehead University, the distribution of the information letters and consent forms regarding the study was essential. I spent considerable amount of time photocopying the information letters, consent forms, purchasing envelopes and return stamps, to send the documents through express mail to my contact in Thunder Bay, who did the distribution of the documents.

Participants were required to satisfy several qualifications: “They must have experienced the phenomenon identified for the study; they must be able to communicate with the researcher; and they must be willing to tell their stories to a researcher interested in learning about their experiences” (Magilvy & Thomas, 2009, p. 299). So because it was necessary to locate these persons who had these qualifications, I enlisted the assistance of my former classmate in Thunder Bay.

The recruitment process was tedious, as we had to call several participants to ask them to participate in this unique study that allowed them to talk about their experiences with Information Communication Technologies (ICTs). My former classmate contacted over forty participants before we obtained the ten participants who met the inclusion criteria, and who were willing to be interviewed. We got two additional participants from the initial eight approved by the Research Ethic Board of Lakehead University to conduct the research.

The ten participants who volunteered to be interviewed were chosen from a cross-section of older persons living in the city of Thunder Bay, located in the province of Ontario Canada. The participants came from different backgrounds with varied experiences with using ICTs. Initially, participants for the study were placed into four categories (mature students, lecturers, retired professionals and home makers). Each category consisted of two participants. Participants included both male and female, as established in the research proposal approved by the Research Ethics Board. The initial four categories of participants were altered, as it was difficult to find another mature student at Lakehead University over the age of 65 years, or two participants to fill the category of home maker who had never worked outside of the home. So because of these alterations and the time constraints of the research, participants selected to fill the category of home markers and mature student were determined based on the expressed willingness of any older person in Thunder Bay to be interviewed.

### **Participants**

Ten participants from Thunder Bay, Ontario, volunteered to participate in the study. However, only eight participants were included in the data analysis process, as this was the number approved by the Ethics Review Board. Ten participants agreed to be interviewed and participate in the research. I interviewed all ten participants because I did not want to disappoint the two additional participants who voluntarily agreed to participate. The two additional interviews were used in the selection process. However, only the eight interviews that addressed the research questions and purpose were used for the data analysis. All ten interviews will be stored at the Lakehead University for five years. The ages of the participants ranged from 67 to 81 years. All were married, except for one participant who was a widow. All participants were retired from full time employment and were doing other private jobs. One participant recently



graduated from the Lakehead University with a Graduate degree. Another participant recently retired after 60 years of teaching. Only one participant identified her family income as high; the others identified their family income as medium. Profiles of the eight participants who were included in the data analysis of this study are presented in chapter four.

### **Data Collection**

Data were collected through semi-structured face-to-face interviews that were audio-taped with permission from all ten participants, as well as through field notes jottings. Each interview was guided by a series of questions set out on an interview guide that was developed by the supervisor and student researcher (See Appendix D). The semi-structured interview guide was designed with questions and probes to assist in focusing the responses of participants during the in-depth interview process.

The Interview Guide was divided into three sections; the first containing introductory questions, the second core questions and the third closing questions. The introductory questions were designed to establish rapport and build a harmonious relationship between the interviewer and interviewee (Spradley, 1979). This introductory section contained the biographic and demographic data about each participant.

The core question section was designed to address the main research question, subordinate questions, and the purpose of the study. Within the core questions section there were five subordinate headings, with questions generated for in-depth analysis, with probes for detailed descriptions of the experiences of the participants. This section also explored the adoption behaviors of older persons concerning ICT adoption, types of mobile communication technologies utilized and the challenges experienced by older persons while adopting and utilizing ICTs.

The closing questions section allowed participants to give their opinions about the questions asked during the interview process, and their overall experience with the interview process.

### **Interviews**

Interviews were conducted in settings that were convenient and appropriate for each participant. Some of the interviews were conducted in the homes of the participant. Others were conducted at public locations such as a church office, and at the Lakehead University library. The variation in the interview locations occurred to fit the varied schedules of each participant. In each instance, before the interview began, the voluntary consent was sought from each participant using a standard statement. Participants were further informed that they could withdraw from the study at any time, as well as refuse to answer any questions. Participants were informed of the purpose of the study and assured about the anonymity and the confidentiality of their information.

The recorded interviews consisted of an in-depth conversation with each participant that was guided by open-ended questions. The use of a semi-structured interview guide (See Appendix D), served the purpose of beginning with a standard set of questions (Pilot & Beck, 2008). Semi-structured interviews allowed each participant the freedom to respond to questions in-depth, and to narrate their experiences without being tied down to specific answers (Morse & Field, 1995). The semi-structured interview approach offered the researcher a valuable opportunity to acquire 'inside' knowledge about a particular phenomenon (Sandelowski, 2000).

A semi-structured and open-ended interview format was necessary to avoid limiting the responses of the participants, and to encourage free expressions and freedom to answers in an

unstructured fashion (Sandelowski, 2006). The Interview Guide was reviewed and re-evaluated after each interview sessions. This re-evaluation was done to ensure that the main focus of the research was maintained, and that experiences of each participant were expressed in an insightful and thoughtful manner.

The duration of each interview varied from a minimum of one hour to a maximum of one hour and thirty minutes. Interviews were unhurried and were completed without interruption. The interviews were conducted over a four day period. At the end of each interview, an attempt was made to begin the transcription of the verbatim conversation, after which I recorded my impressions and concerns about the interview process.

### **Data Analysis**

The conventional content analysis approach was chosen in this study, given that it is widely used in qualitative research (Hsieh and Shannon, 2005), and has been regarded as a flexible method for analyzing text data (Cavanagh, 1997). This flexible method focuses on the characteristics of language as communicated by participants, where particular attention is placed on the content or contextual meaning of the text (Budd, Thorp, & Donohew, 1967). The goal of conventional content analysis in research is “to provide knowledge and understanding of the phenomenon under study” (Downe-Wamboldt, 1992, p. 314).

The guidelines for conventional content analysis suggest that audio-tapes should be transcribed verbatim and read repeatedly to achieve immersion and obtain a sense of the whole. In keeping with the guidelines I listened to the audio-taped interviews one by one repeatedly and transcribed the verbatim responses of each participant. I then read the transcribed verbatim responses word-by-word to derive codes that highlighted the exact words or sentences from the participant’s responses that appeared to capture key thoughts or concepts of the phenomenon

(Miles & Huberman, 1994; Morgan, 1993; Morse & Fields, 1995). This process of reading repeatedly provided a second immersion into the interview data and allowed me to gain an understanding of the perspectives of each participant (Tesch, 1990).

I then approached the transcribed data by making notes of my first impressions and thoughts. As this process continued, codes emerged that were reflective of key thoughts. These codes emerged directly from the transcribed data, to form the initial coding scheme. Luborsky and Rubinstein (1995), suggest that codes are the antecedent, the building blocks or foundations, to irradiate discovery and initiate “the interpretative processes of describing relevant units for analysis and dimensions of meaning” (p.103). I then classified the codes using cue words or phrases, to represent the phenomenon uncovered in the data (Strauss & Corbin, 1990).

In working with the data in the preliminary phase, I used coding to set the direction for the analysis (Bogdan & Biklen, 1992). Codes were also changed and elaborated upon, without changing the intent of the interview conversation (Knodel, 1993; Strauss & Corbin, 1990). It was important for me to present the experiences of all participants in a concise and accurate manner, so that the authenticity of their conversations was reflected. I then infused the verbatim conversations of participants within the data analysis, to substantiate the lived experiences of each participant.

I color coded and sorted the verbatim transcriptions into initial categories, in an effort to develop themes. This task involved focusing intensely on each transcribed interview, to unearth the salient points within the conversations. This was important to preserve and maintain the experience of each participant with using ICTs. It was also necessary for me to develop some kind of structure, through which I could organize my themes. The transcribed interviews data

along with the Interview Guide (See Appendix D) were used to organize the findings. The conceptual framework also assisted in structuring and organizing the findings.

The broad themes that emerged were used to guide the presentation of the findings, and to reflect the research focus and questions. The findings are presented in chapter five. However, chapter four now presents short profiles of the eight participants who shared their individual experiences about using ICT.

## **CHAPTER FOUR**

### **Participants Profiles**

This chapter presents the profile of each participant; including their ages, a brief outline of their family composition, and the time they have spent in Thunder Bay. Additionally, the profiles highlight the experiences of each participant with using Information Communication Technologies (ICTs), particularly computers, Internet services and new mobile communication devices. The section also highlights the perceptions and thoughts of the participants about technology adoption and use. Each participant has been assigned a pseudonym, to protect his or her identity. All other personal information such as job titles and locations has been disguised to provide further anonymity.

The age of the participants in this study ranged from 67 to 81 years. Each participant willingly and voluntarily shared his or her experiences about adopting and utilizing ICTs. The interviews were obtained through face-to-face contact with each participant in varying locations in Thunder Bay. During these guided conversations, each participant described his or her personal experiences with adopting and using personal computers, the Internet and new mobile communication devices.

All direct quotes or statements used represent information transcribed from the verbatim interviews with each participant. The quotations used have been matched to the pseudonym of each participant. The pseudonyms used in this study are: Adam, Andy, Jerry, Sam, Jessica, Sarah, Martha, and Jake.

### **Adam's Profile**

Adam is 67 years old, he considers himself a “Boomer”. He has lived in Thunder Bay all his life, except when he went to college. Adam also spent some time teaching in Southern Ontario. When I first met Adam for the interview he appeared quite stately. When asked about his employment status he jokingly indicated that he was retired. He then indicated that he was an author. The interview was conducted at his cottage overlooking Lake Superior. Adam shares his home with his wife. The interview was conducted in the mid-afternoon. Adam and I sat down on his leather couch over-looking the lake, which had a breath-taking view. I was somewhat anxious and nervous at the beginning of the interview. However, through his openness and honesty, the nervous tensions subsided and we had a wonderful interview. Occasionally, Adam deflected the interview questions I asked him back to me for my opinion.

Our conversation was very enlightening. He was very open about his experiences with adopting and using Information Communication Technologies (ICTs). He indicated that his love for technology was developed during his childhood, when he owned a pocket calculator with LED light. He credits his fascination with computers to that early exposure to the pocket calculator.

Adam is very optimistic about the potential of adopting and using ICTs. He revealed:

I have seen and experienced tremendous benefits from adopting and using the personal computer and the Internet. Some of these benefits include, but are not limited to, sourcing information, communicating, and keeping in touch with people.... Internet services such as Google and Wikipedia are my very best friends.

Adam believed that the potential of adopting and using technology is great for older persons and explained that older persons needed to adopt and use ICTs.

“I do not think there is any should about it [older persons need to adopt and use technologies].”

### **Andy’s Profile**

Andy is 70 years old, and has lived in Thunder Bay all his life. He is married and has three sons and six grandchildren. He attended Lakehead University, and has an undergraduate degree. He has worked for more than fifty years in different capacities.

Andy and I met at my friend’s house in Thunder Bay for the interview. My first impression of Andy was that he was very tall. He was polite and apologetic for arriving late for the interview. The interview took place mid-afternoon. We sat at the kitchen table. He appeared to be very enthused with sharing his experiences with using personal computers and new mobile communication devices. He was very deliberate while sharing his experiences. Andy said:

“I was excited about the computer when it first came out, and as I recall I was not nervous because it was new technology.”

Andy shared his perspective about the potential of ICT in promoting continuous learning for older persons.

Technology will enrich older person’s lives because it [technology] is a forward looking experience for older persons, rather than a sort of introspective negative thing....With ICT adoption and use you may not get old mentally, since older persons are involving themselves with the technology”.

Andy explained that he is a great promoter of ICTs, and in trying to get older persons to adopt and use ICTs.



### **Jerry's Profile**

Jerry is 75 years old, and has lived in Thunder Bay all his life. He and his wife have three children. He is a college graduate, and has worked in several different jobs over the years. What was striking about my first contact with Jerry was his quite disposition and easy going manner.

The interview took place in the afternoon at his home. We sat down to the interview at the dining table. He spoke slowly and thoughtfully during the interview as he shared his experience. He was very pleasant and polite. Jerry explained that he was in his Forties when he began using computers. He admits that he was very terrified and overwhelmed by the computer because it was something new, and something that he had to adopt and use as a job requirement.

“I was afraid of it [computers] because I did not know anything about it...or how it worked....But I began to use it and the more you use it [computers] the easier it became, and I enjoyed it more.”

Jerry believes that older persons can benefit tremendously from adopting and using Information Communication Technologies (ICTs). He is convinced that ICTs represent the future and hold great promise for promoting lifelong learning.

“I think it [ICTs] keeps your brain working and keeps your brain sharp... I feel sorry for the older persons who do not use it...they are missing out on what computers and the Internet have to offer.”

Jerry suggested that personal computers, the Internet, and new mobile communication devices need to be more user friendly for older people. He believes that this is the reason why some older persons are not happy with adopting and using the technologies.

“It is difficult for them [older persons] to adopt [ICTs] because they know nothing about it, and if they are made easier [to use perhaps] they might try.”

### Sam's Profile

Sam is 81 years old, and has lived with his wife in Thunder Bay on and off since 1960. He has five children, seven grand-children, and five great grand-children. He completed his formal education more than thirty-five years ago, after which he worked as a lecturer. Sam has just completed two years of graduate studies at Lakehead University. He indicated that he enrolled at university to keep him active and his brain, or what he calls his 'noodle' active and engaged. He considers himself a professional student.

Sam was my first interview, which was conducted in the Library of the Lakehead University. The Library was selected because it was very quiet and convenient. Students had already left for their summer vacation. The interview was very in-depth and very casual, because Sam and I were classmates for two courses in our graduate program.

Sam was very thorough in answering the specific questions posed to him. He spoke highly of Information Communication Technologies (ICTs) and the benefits older persons can derive from adopting and using personal computers, the Internet and new mobile communication devices.

Sam explained:

“Oh, they [technologies] are a really good, they are quite incredible in what it enables you to do both professionally, and personally...professionally in terms of finding information, and personally in terms of communicating with family, friends and children who live far away.”

Sam spoke about how amazing and revolutionizing ICTs have become in providing individuals with access to all kinds of information instantly from anywhere. He believes that

older persons should be ‘forced’ to adopt and use technologies, to remain mentally active and socially engaged in society.

He hopes in the future that ICTs will be used to provide electronic monitoring for older people at home, for keeping track of their every movement. He believes that the next great dimension in ICT will be in healthcare, in terms of enabling older people to live safely and independently in their own homes.

### **Jessica’s Profile**

Jessica is in her 70s, and is originally from southern Ontario. She moved to Thunder Bay to accompany her husband for work more than thirty-eight years. She has two children and several grand-children. She has a university degree, and has worked in education for several years. When I met her to conduct the interview she was very warm and welcoming. The interview took place in the afternoon. She offered me tea, and we sat at the dining room table for the interview.

Our conversation about Information Communication technologies (ICTs) was very interesting. Jessica initially viewed personal computers, the Internet and new mobile communication devices as intimidating. Now she views ICTs as very convenient and wonderful for connecting with the rest of the world.

“ I think the whole thing has been a growing experience[for me], right from being afraid of it [personal computers, and the Internet] to being made to do it [use], not pushed.” Jessica believes that there is great potential in the adoption and use of ICTs by older persons.

“To be in your home and interact with people on Skype, to get information, and communicate with family and friends online.”

### **Sarah's Profile**

Sarah is in her 80s, and has lived in Thunder Bay for more than fifty years. She is married and has five children. She is a university graduate with a Master's degree. She has been involved in education for more than fifty-nine years, and has recently resigned from full-time teaching.

I met Sarah at her church office in the morning to conduct the interview. She was very warm and welcoming. She introduced me to the pastor of the church, with whom I chatted briefly. I then sat down with Sarah on a couch in the foyer and conducted the interview.

Our conversation about Information Communication Technology (ICT) was very engaging. Sarah is an avid computer and new mobile communication technology users. She owns two computers (desktop and laptop), and about five new mobile communication devices (Ipad, ITouch, Blackberry, iPhone and Kobo). She is very competent at using all of her devices.

Sarah has a positive outlook about ICTs, and believes that the adoption of computers, new mobile communication devices and the Internet are necessary for older persons existing in modern day society. She believes in the potential of ICT in enabling older persons as they get older.

She sees benefits in adopting ICTs for home safety, communicating with family and friends, for engaging the brain and keeping the brain active. Sarah is very hopeful that older persons will engage with the technology if they find someone who will assist them to explore and use the technology at their own rate.

Sarah concluded: "I [really] want to see older persons use, and be taught to use technologies".

### **Martha's Profile**

Martha is 74 years old, and is the only child for her parents. She moved to Thunder Bay several years ago with her husband. She has three children. She is a high school graduate with one year of social work training at Lakehead University. She worked a few years outside the home after marriage until her first child was born. Subsequently, the other two children came along and she left her job and spent 16 years at home raising her three children. She returned to work after the children were teenagers. She retired about ten years ago from the job she held for twenty-five years.

The interview with Martha was conducted in the afternoon at her home she shares with her husband. We sat at the dining room table and conducted the interview. She is an interested lady, and spoke highly of Information Communication Technologies (ICTs), especially personal computers.

Martha believes that ICTs are progressive, positive and the future for older persons. However, she is very sceptical about new mobile communication devices for personal reasons, and has made the decision not to adopt and use new mobile communication devices such as the smartphones.

“I am a social person and an outgoing person, and I rather have interaction with a person, than with mobile communication devices.”

Martha explained that her reluctance to embrace new mobile communication devices stems from her observations that the devices are contributing to the lack of social interaction between grand-children, family, and friends. Martha is however, very optimistic about the potential of ICT in fostering continuous learning, but is concerned about whether older persons are interested in adopting and using them.

Although Martha holds strong views concerning the diminishing value in social interactions caused by new mobile communication devices she suggested:

“I will continue using the technologies [computers and kobo], and I have not totally closed my mind to [other] new mobile communication devices [such as the iPhone, or Blackberry].”

### **Jake’s Profile**

Jake is in his 70s, and has lived in Thunder Bay for over thirty-seven years. He is married and has two children, and “some” grand-children. He is a university graduate, who has worked for the government for twenty-eight years, before he retired. He is self-employed, and enjoys working with his hands.

The interview with Jake was conducted at his home in the mid-afternoon. Our conversation was very interesting. He believes Information Communication Technologies (ICTs) have made a tremendous improvement in the way certain tasks can be completed.

“I don’t know what I will do without it [computers].... I used the technology to do so much for my building projects.’

He explained that he will probably have difficulties living without them [computers, iPhone], because of the benefits derived from his computer and new mobile communication devices, and in keeping him connected with family and friends over the Internet.

Jake suggests that there is great potential for ICT adoption and use by older persons.

“There is no doubt that older people have to use those [technologies] in the age we are living...because technology is going to be a part of their lives.”

Jake believes that technology is going to become more advanced, and wants to be able to engaged when it does. He is concerned however, about his own frame of mind about ICTs as he

gets older. He wondered if he would be vibrant enough to continue using the new mobile communication devices. Jake explained:

I think there is a point reached [as you get older] where you think, I really do not need to be there [with technologies], doing all kind of things that the technology provides, but on the other hand, why wouldn't I... ICT is with us to stay, it is insidious.

These individual profiles serve to provide some background information of the participants of this study. Additionally, these individual profiles provide brief insights into the adoptive behaviors of the participants and their perceptions about adopting and using ICTs.

## **CHAPTER FIVE**

### **Presentation of Findings**

In this chapter, the findings of the study are presented. The findings are presented under headings that emerged from the data analysis process. In seeking to answer the main research question, this study has pursued as a general objective describing the adoptive behavior and experiences of older persons who are using ICTs. Additionally, this research locates the adoptive behavior of the participants within the context of formal and informal learning environments, such as; the workplace, schools and places of residence. The findings are presented using descriptive statements, to capture the general perspectives of the participants. Verbatim quotations have been used to provide additional depth in understanding the experiences of each participant. The verbatim quotations are also meant to guide the presentation of the findings, to ensure that the descriptions convey the actual lived experiences of each participant (Corden & Sainsbury, 2006).

#### **Adoption Behavior**

Based on the descriptions of the participants, there were clear patterns of adoption behavior. The behaviors of participants have been categorized under two broad headings, each reflecting different themes, namely: Adoption preceded by apprehension, anxiety, fear or nervousness; and adoption preceded by interest, excitement or willingness. The findings under these two broad themes are presented below, utilizing the verbatim quotes from the participants.

#### **Adoption Preceded by Apprehension, Anxiety, Fear or Nervousness**

Adoption preceded by apprehension, anxiety, fear, or nervousness implies that some of the participants had negative perceptions and emotions, when adopting and using computers (Raub, 1981; Ellis & Allaire, 1999). This first theme addressed the negative emotions expressed



by four participants, while adopting and using Information Communication Technologies (ICTs). These participants indicated that they were introduced to personal computers for the first time at their places of work, and were required to adopt and use computers because it was mandatory and an important component in their jobs. Jessica described her experience thoughtfully when she stated:

I started to teach at 45 years old. This was a later decision to return to work after working for the government for many years before. Then all of a sudden, the report cards for the children had to be done on the computer. So I really had no choice, I had to use it. It [computer] was a little bit intimidating because it was the beginning of using the computer, and I had a fear that it would crash.... We Teachers began to grumble over the use of the computer, but once we got over the initial hurdle, we loved the computer.

Jessica explained about her first encounter with the computer:

“Scary, although I was a good typist I was so concerned that I would do something wrong on it [computer].... [But] once I began using it [computer] more and more, it has become so convenient.”

Martha, like Jessica, had her first encounter with computers at work, during her tenure on the School Board, a job that she held for 25 years.

She described her first time encounter with computers in this way:

Well, I think I remembered when computers first came out, and I was working, and I was apprehensive certainly about using them.... Very quickly you learn to adapt because that was a part of the working environment. The longer I stayed at work the more computers came into existence in the work place.... So I went from being apprehensive to recognizing that they [computers] were necessary and that they saved time.

Martha eventually received support to overcome her apprehension.

The School Board provided training right from day one. So as soon as they decided that computers were going to [be introduced] into the school, everybody was rounded up into groups of seven or eight, and that training was continuous.... So whether I was apprehensive in the beginning, I had the job and I had to do it. So the apprehension disappeared as I became more comfortable using it [computers].

In Jerry's case, fear was the prevailing emotion experienced during his first encounter with computers:

"I was afraid and overwhelmed, because I did not know how it [computers] worked, or what it did, or anything about it.... But over time I began using it [computers] in my job and the more I used it, the easier it became."

Sam's experience was not dissimilar to that of Jerry; his first encounter was coupled with anxiety and fear.

I was quite anxious and afraid of pushing a wrong button and losing something [on the computer]....I think the computer was quite complicated in the 1980s, and you had to work diligently at [using] the computer.... The computer was not user friendly until in the middle 1990s.

Although these participants experienced negative emotions at the beginning of their initial exposure to ICTs in the workplace, these emotions did not persist or hinder the continued use of technology. These participants were provided with the necessary training and support in the workplace that helped them overcome the negative emotions toward technology.

### **Adoption Preceded by Excitement, Interest or Willingness**

Adoption preceded by excitement, interest, or willingness implies that participants made the decision to adopt and use computers based on the positive emotions, perceptions, and intentions ascribed to the technology (Lawler & Porter, 1967; Berlyne, 1966). This second theme addressed the positive emotions experience by participants, while adopting and using Information Communication Technologies (ICTs). These participants saw the benefits to be derived from the adoption and use of ICTs.

Andy recalled:

I was excited about it [computer] as I recall and not nervous, because it [computer] was new technology....The first computer I bought was for work, and it had little memory like my pocket calculator... I could not do much on it, but I was *excited to be using computers* [emphasis added].... I kind of wished I was back in school again, because of all the things you can do with it [computers] now....I will be lost without it [computer]. I do a lot with computers now.

Like Andy, Jake's sentiments in many ways summarize the feeling of those participants who had positive emotions about ICTs. Jake, an early adopter said:

“The computer changed my life for the better.... I probably would have difficulties living without the technology [now].”

Although Sarah had financial constraints when computers came on the market, she was still driven by her interest in acquiring one, to communicate with her family and friends.

Sarah explained:

When computers came out, I had one of the first computers there was. It was a second-hand one because the children were young, and having five children did not allow me to

purchase a new one.... [But] I wanted one [computer].... It says to me [now] I can communicate with my kids.... When I was growing up back then, there was no such thing.

The adoptive behaviors of the participants were influenced by both negative and positive emotions, especially when adopting and using mainstream computers. These negative and positive emotions experienced by participants were not limited to the use of only mainstream computers, but also influenced the transitioning process in adopting new mobile communication devices and Internet services.

### **Adoption of New Mobile Communication Devices and Internet Services**

The decision to adopt and use new mobile communication technologies and Internet services showed how older persons transition from using only mainstream technology systems (personal computers and laptops), to include new mobile communication devices (Smartphones, Tablets and Kobo), and Internet services (Skype, Electronic mail, Google, Facebook, YouTube). The adoption and use of new mobile communication devices and Internet services have been explored within four themes: Adoption time or length of time for adoption, prevalence or regularity of use, ownership of new mobile communication devices, and preferences in use of mobile communication devices.

### **Length of Time for the Adoption of New Mobile Communication Devices**

Adoption time refers to the length of time it took participants to adopt and use new mobile communication devices. The length of time participants were exposed to mainstream computers seems to have influenced the time taken to adopt and use new mobile communication devices. Generally, the pattern of early and late adoption by participants observed in the use of mainstream computer was also evident in the adoption of new mobile communication devices.

For example, Sarah, Jessica and Andy adopted and used new mobile communication devices after they were introduced to the market.

Sarah explained:

“When mobile devices [Smartphones] came out on the market, I immediately wanted them and started to use them....I like gadgets, [so] I wanted in [to own and use the mobile devices].”

Jessica revealed that she made the decision to adopt and use new mobile communication devices a while after they came out on the market.

“I have an iPhone for about two years in round figures...this was after it came on the market.... and the iPhone is basically used for text messaging.”

Andy, an early adopter of mainstream computers explained:

I have a Kobo for about two years. It took me a couple of months to become used to reading the small screen.... I enjoy using my Kobo now. It has about one hundred books on it.... I will be lost without my Kobo; I am getting to prefer using the Kobo to the book.

Unlike Sarah, Jessica and Andy, Sam did not transition to new mobile communication devices very quickly because of dexterity and memory sequencing issues. He explained:

“I am not swift on getting and using the new stuff [pointing to his Blackberry] ... I really should get a new Blackberry because this one is old and obsolete for what I do....The memory sequencing bit [problem] contributes to my later adoption.”

What Sam is suggesting above, is that as he gets older it is more difficult for him to learn and organize novel things, hence the reason for his late adoption and transition to new mobile communication devices.

Sam discussed when he actually adopted new mobile communication devices and what he used them for.

I have an iPad for a few years [now]. I use the iPad to read books, magazines and newspapers. The Blackberry, I have for three years and I use it for keeping track of people, things, and all that kind of stuff....What is nice about the iPad is that it is “idiot proof” and “user friendly”....It does not take many brain cells to use an iPad.

The length of time it took some participants to adopt and use new mobile communication devices varied. Some participants were swift in adopting and transitioning from mainstream computers to new mobile communication devices, because they were early adopters and users of the mainstream computers. For one participant, this process of transitioning to new mobile communication devices occurred over a longer period of time, because of challenges with memory and sequencing issues, which is necessary for operating and using new mobile communication devices.

### **Prevalence in the use of New Mobile Communication Devices and Internet Services**

Prevalence or regularity of use refers to the frequency with which participants adopted and used new mobile communication devices and Internet services. Generally, participants were regular users of new mobile communication devices and Internet services. Concerning the regularity with which new mobile communication devices and Internet services were used, some of the participants could be categorized as heavy technology users.

Sarah explained:

I would have to say every day at some point [I am on my devices and the Internet].

[It also] depends on what I am doing, because I do so many things [with my devices]. I could be upstairs [music room at church] and on the Internet. But because I have the

devices I can do that [right here, in the foyer].... I use these things [mobile devices] regularly, but I do not sleep with them. I put them [away] in the kitchen [at nights]. I plug them in but far away... I am addicted, I need these things because of what I do [on them], and because of my family.

Sarah provided an example about her daily activity with one of her new mobile communication device:

On any given day, I make about five phone calls from my Blackberry; receive two phone calls on my Blackberry; send two text messages from my Blackberry; send thirteen emails from my Blackberry; receive about five emails on my Blackberry and search and listen to about thirty-eight orchestra musical pieces on YouTube.

When asked about the regularity with which he uses his mobile device, Jake explained:

Probably first thing I do in the morning. After I get my juice out of the fridge, I get my iPhone and flip through my emails and get rid of junk mails, then throughout the day I view my emails. I receive text messages and send text messages throughout the day.

Sam's use of his mobile devices begins early in the morning and is influenced by his need to be informed, Sam explained:

More or less I get up in the morning, turn on my iPad and download my newspapers, and then I go for coffee at the coffee shop. I come back home and read the papers...I read three to four newspapers on the iPad daily.... I am a heavy [iPad] user.

Jessica revealed that her regular usage of her mobile device requires her to keep it close to her at all times.

“I use my iPhone seven days a week. I use my iPhone for text messaging mostly...The iPhone goes almost everywhere with me.”

Concerning the use of Internet services, three of the participants identified a number of Internet software they use on a daily basis on their new mobile communication devices.

Jessica said:

“I am on Facebook every day. I read my Facebook messages on my iPhone, but not much of anything else. I also do [some] online banking on the device.”

Sarah described:

“I use YouTube daily. I search and listen to over thirty-eight original musical pieces on YouTube [On any given day]; I check and respond to emails; Skype with my sons who live abroad, and with my great grandson occasionally, which is super nice.”

Jake also spoke about the Internet services he used:

I use Skype every now and again. It is mainly church related, where a couple of us get together [online], wave our hands and talk about a table or whatever....I use the Internet daily for searching for recipes and for my carpentry stuff.... On the iPhone there is an application for that. I also access the Internet on my iPhone for YouTube.

A high prevalence of usage of new mobile communication devices and Internet services existed among participants. Participants could be classified as heavy users of new mobile communication devices and Internet services, which they used on a daily basis for carrying out various activities such as, reading emails and newspapers, communicating with family and friends, and searching for information online.

### **Ownership of New Mobile Communication Devices**

Ownership refers to the number of devices owned by participants. There was a high rate of ownership of new mobile communication devices among some participants. Some participants owned multiple devices, while a few participants were content with owning only one mobile



communication device. Participants who owned many devices were more likely to be regular users of mobile communication devices for multiple purposes.

Sarah could be considered an ‘avid mobile device user’. She shared in great details how many different new mobile communication devices she owns and used for several different purposes.

Sarah stated:

I had a tablet; I gave it to my son. I own a Blackberry. I own an iPad. I own an I-Touch. I own a desktop and I own a laptop... I think that is a big enough list...I use my Blackberry to phone people, to text people, and to check my emails. My iPad, actually I play games on it, which I do not do on this [Blackberry], because it is so little...the iPad is used more for games, but I can do everything on it. I also use my iPad upstairs when I am rehearsing because I want to hear those pieces of music.

Sam owns two mobile devices, which he utilizes mostly for keeping up with current information and interpersonal communication.

I have an iPad and Blackberry. The iPad is nicer for news, movies, Ted Talks, *and so much more* [emphasis added]. The Blackberry is for texting and keeping track of people....These devices [Blackberry and iPad] are amazing for looking up information, read newspapers, and watch movies.

Unlike Sarah, and Sam, Jake only owns one mobile device; however, like Sam he relies on his iPhone for personal communication and information. Jake shared:

“I own an iPhone. On the iPhone I get my emails. I look up information on the Internet from my iPhone...I use the iPhone because it is [so] handy.”

The general pattern of ownership and usage of new mobile communication devices by Sarah, Sam and Jake is not dissimilar to other participants in the study. However, a few of the other participants have not adopted Smartphones, opting instead for using regular mobile phones that do not have the necessary software applications for activities such as texting. There was a high ownership rate among some of the participants, who used multiple devices on a daily basis to carry out various functions, while for some participants they were very content in owning one mobile communication device.

### **Preference in the use of New Mobile Communication Devices and Internet Services**

The preference in use of new mobile communication devices and Internet services of participants suggest that they had a greater liking for one device or Internet service over another. While this section is intended to highlight the new mobile communication preferences of participants, a few participants indicated that they had a preference for using mainstream computers over new mobile communication devices. Some participants, based on their responses, could be categorized as integrated users. For these users there was no clear preference between the use of new mobile communication devices or mainstream computers. The preferences for both mainstream computers and new mobile communication devices and Internet services have been included in this section.

Sarah and Jake had a preference for using new mobile communication devices.

Sarah explained:

The Blackberry is probably the thing I am using the most.... I no longer have to sit at the computer to get my emails because I can get my emails on the Blackberry, or on my iPad....I am most comfortable using my Blackberry, but that depends on what I am doing [activity I am engaged in].

Jake expressed his affinity to his iPhone in this way:

I am also comfortable with the iPhone...the iPhone is very handy and gives me information on the go....I don't know what I will do without it [iPhone]... you know. I have this thing on my belt [pointing to his iPhone] and the capabilities of this iPhone allows me to view my emails, text, and is so handy to have.... *When I am away from home* [emphasis added], I find there are all kinds of things you can do with the iPhone.

Jessica and Sam could be considered integrated ICTs users. They were comfortable with using both mainstream computers and new mobile communication devices. Jessica Said:

“I am comfortable with both [computer and iPhone], but most comfortable with the computer, because I used it for many years [at my job]. The iPhone is still [relatively] new and I am still getting used to it.”

Sam's response was consistent with that of Jessica in terms of level of use and comfort. Sam ranked his preference with using computer system and new mobile communication devices in this way.

I am more comfortable with the computer, second the iPad, and third the Blackberry.... These devices [Blackberry and iPad] are marvelous for when I travel. I use both [devices] simultaneously when I am planning my trips.... I see myself as an “integrated user,” who used the devices in conjunction with each other.

Other participants like Jerry, Andy and Martha had preferences for mainstream computers.

Jerry explained:

“I am more comfortable using the personal computer because that is what I learned on, and familiar with, and what I enjoy [using] the most....But I think I will get an iPad sometime [in the future].”

Andy indicated that he experienced some level of difficulty with navigating software on his new laptop, which forced him to revert to using his desktop, a device with which he is most comfortable.

Andy said:

I am comfortable with using my desktop because of the software programs I have on it and familiar with [using].... I use a laptop but it has windows 8 and I am having trouble navigating it....I think the learning curve is very big on it [Windows 8 software].

Martha, like Andy indicated that she had a preference for using her desktop based on ease of navigation. She revealed:

“I don’t like using the laptop I have, because I don’t like to swipe [cursor]. I like using a [desktop] computer with a mouse...so my preference is my desktop.”

The different responses by participants suggest that some participants were integrated users, who had a preference for both new mobile communication devices and mainstream computers. Other participants had a preference for either new mobile communication devices or mainstream computers, which was based on the ease or comfort with which the participants engaged with the technologies.

### **Location of Adoption and Patterns in Adoption of Personal Computers and the Internet**

This section deals with the preferred locations by some participants in the adoption and use of personal computers, new mobile communication devices and the Internet. Additionally, it explores patterns in the use of personal computers and Internet services by some older participants.

### **Preferences in the Location for use of Personal Computers**

Four participants identified their home as the preferred place for adopting and using personal computers, while others did not have any preference. Those participants, who identified their homes as more comfortable, appreciated that they were using the technologies in familiar surroundings, and at their own pace. Sam explained:

When I go to the library downtown to use the computer, and someone is helping me and they are going too quickly, I say please slow down, I am still on screen one and you are on screen four, so slow down....But at home, when I want to learn something new on the computer, or on my mobile devices, my wife and daughter teaches me [at a pace that is comfortable to me]....You can sit at your computer at home and you can access the universe of knowledge [from there].... So rather than coming here [to the University] to do research...I can do [on the computer] at home.

Jerry also spoke of why he prefers his home:

At home I have my desktop in the basement and I feel more comfortable using my computer there....I have never used the computers at the library because I do not think I could handle people staring at me...or constantly asking someone for help.

Andy explains why he uses his devices at home.

“I use my computers only at home in my office... I am very comfortable using the computers at home...I just go and use it.

Adam has a preference for using his personal computer at home because of the activity he engages in daily.

When I am writing, I have a den that houses my computer and printer to print out the stuff that I am writing. But when I get tired of working on the novel [in the den], I will go

upstairs [the house] with the laptop because it is more private, and the sun comes into one of the windows up there better.... So everywhere in the house I use my computers but for different reasons.

Preference in location of use of personal computers for some participants was clearly influenced by the ease with which usage of the technology occurred at this location. This ease was impacted by the level of comfort participants associated with their home environment. The home environment was the preferred locations for adoption, because using the technologies at home was based on comfort and ease of use.

### **Pattern of Personal Computer and the Internet Usage**

Pattern of use refers to the regularity in usage of personal computers and the Internet by participants. Pattern in use was influenced by the level of comfort, and interest of participants in information or general communication. These patterns were evident in the responses of participants.

Sam explained:

“I probably spend about six to seven hours per day when I am at home on the computer, because I use it for news, looking up information, and contacting people.... The computer is on for the entire day sometimes.”

Adam’s writing ties him to the computer for extended periods. Adam explained:

I am on the computer seven days a week, maybe ten times a day or more...when I am working on my novel, I have to look up so much information, so I spend considerable time doing research [on the computer].

Andy, a somewhat below average computer users said:

I spend two hours per day on the computer for business reasons and communicating. Also to check my emails, and search Google for information....I check my Facebook once every couple of days. I also do a bit of online shopping, basically for clothes or musical equipment.

Jerry another average user reported:

“I use the computer about three times per day, spending approximately four hours in total...checking emails, and searching for information.”

Generally, the pattern of usage by participants could be described as average, and below average. Some participants because of their professional activities and interests spend a considerable amount of time on the computer gathering information and doing research. Other participants spend a few hours per day on the computer and Internet, reading emails, and shopping. These patterns could be reconciled with other studies of computer use among older persons (Carpenter & Buday, 2007; Wagner, Hassanein, & Head, 2010).

### **Adoption Decisions**

The decision of participants to use new mobile communication devices is in many ways similar to the initial adoption and use of personal computers. Consequently, the underlying perspectives regarding initial adoption and use of personal computers are also relevant to the adoption of new mobile communication devices. However, there were also participants who made the personal decision not to adopt certain new mobile communication devices for one reason or another. The adoption decisions of participants could be categorized as: personal decisions or decisions influenced by family members.

### **Personal Decisions to use New Mobile Communication Devices**

The personal decision of some participants to adopt and use new mobile communication devices occurred because they wanted to use the devices and were curious about the potential of the devices. The decision of other participants to adopt and use some new mobile communication devices were influenced by family members. Sarah and Sam shared their personal decisions to adopt and use new mobile communication devices. Sarah's decision was similar to her adoption of main stream computers. She explained:

“When mobile devices came out I immediately wanted one because I wanted to be connected...and have access to information at any time [and anyplace].”

Sam, who also made the personal decision to adopt and use new mobile communication devices indicated:

I was curious and amazed at the potential of the devices [Blackberry, iPhone, iPad]... for finding out things that are of interest to me...My motivation for adopting and using these devices was primarily because I was curious about [the devices].

These participants who made the personal decision to use new mobile communication devices were motivated by an innate personal interest associated with the benefit of these devices. In the case of the other participants, adoption and use of new mobile communication devices were influenced by a second party; invariably the second party was a close relative such as a child, or an in-law.

### **Personal Decision to not use New Mobile Communication Devices**

In addition to the participants who made the decisions to use new mobile communication devices, some participants also made the decision not to adopt and use more advanced new mobile communication devices such as smartphones (mobile phones that have Internet access



and several applications). These participants adopted and used older versions of mobile phones that make and receive calls only. The decisions were made for varying personal reasons.

Adam explained:

I do not own a Smartphone because I don't need to. One of the things I really value because of where I live and the kinds of work that I do is privacy. And I can't afford to let myself start to waste time [with Smartphones]. I know that I will do that. I know that I will become addicted to the Smartphones. I know that I will love the Smartphone, so I try to stay away from them.

Martha presented an interesting perspective on her reasoning for not adopting and using new mobile communication devices like iPad or iPhone. Martha uses a regular mobile phone on which she makes and receive calls only.

I am really not interested in [adopting and using] new mobile communication devices [Smartphones]...I do not want to do all the things that are available with that new technology...I do not like some of the results of it...I think it has diminished social interaction with people. I see when I am with my grandkids sitting at the table and they are [only] texting and not absorbing any part of the conversation. That is the part [about the technology] I do not like.

Sarah, a user of several mobile devices and an avid reader indicated that although she is comfortable with using new mobile communication devices, she has made the personal decision not to adopt and use a Kobo.

This decision was made because of her preference for reading books. She explained:

“I do not own a Kobo... I do not want one, because I rather have the book.”

Generally, the participants who made the personal decision not to use new mobile communication devices did so because they felt the devices were taking away their privacy and valuable social interaction with family and friends.

### **Influence of Family in the Adoption and use of New Mobile Communication Devices**

For some participants, transitioning from using only mainstream computers to new mobile communication devices was influenced by family members. This was particularly the case with the adoption and use of the iPhone and Kobo's for five of the participants.

Jerry explained who influenced his decision to start using his mobile communication device.

“I started using the Kobo three years ago; my son bought it for me...”

Similar sentiments were expressed by another participant concerning who influenced her decision to adopt and use her new mobile devices. Martha's son was instrumental in her starting to use a Kobo.

Martha explained:

“Two years ago when I visited my son, it was shortly after the Kobo came out, and our son and daughter-in-law gave the Kobos to my husband and me as gifts.”

Whereas, Martha received her device as a gift, Andy purchased his own Kobo; however, his decision to do so was influenced by his spouse.

My decision to buy the Kobo was influenced by my wife. I bought the Kobo so I can download books to read to my wife who has a problem with her vision....It took [me] a couple of months to get used to reading the small screen...I enjoy using my Kobo [now] and it has about one hundred books on it....I will be lost without my Kobo. I am a voracious reader, so I like it [Kobo]. I am getting to prefer using the Kobo than the book.

Jessica's son and his wife influenced her decision to adopt the iPhone.

My husband and I just purchased two iPhones... It was something that a few of our friends used.... [But] It was our son and his wife who first got theirs and they were the ones who encouraged us to get ours"... Now we are inseparable [referring to herself and the iPhone]...I think we finally made the decision to adopt and use the iPhone because of our son and daughter-in-law's encouragement, and we wanted to try it for ourselves.

Many of the participants were encouraged by their children and in-laws to use new mobile communication devices, for reasons such as remaining engaged mentally, for security and safety, along with keeping in touch frequently with older parents. For example, Sam's situation differed a bit from other participants in that his daughter is employed in the field of computers and was able to convince both him and his spouse in their mobile technology adoption decisions.

Sam explained:

My daughter, who lives out of town and works for an Internet safety security firm, encouraged her mom and me to adopt and use a tracker device. I actually have a tracker device on here [pointing to his blackberry], so when my blackberry is on my wife could know exactly where I am on a map, any time 24 hours a day.

Martha explained that she was cajoled by her son into using a Kobo; however, her use of the devices was short-lived.

I use it [referring to her Kobo] very little. I do not like it....I like to read the book. I do not know if it is because I like to feel the pages as opposed to (sliding).... I do not know I just like the book.

Jerry who also received his Kobo as a gift from his son revealed:

“I use it [Kobo] a couple of times but I do not find it pleasurable. I rather have a book in my hands because I want to feel the pages.”

The adoption behavior of some participants to new mobile communication devices support the notion that adoption is largely dependent of the user’s own perception about the mobile device, the ease of use, and the perceived usefulness of that device. The response from participants like Martha and Jerry seems to suggest that the initial perception of usefulness of the Kobo quickly diminished after it was used.

For example, Martha shared:

When I got the Kobo I had decided that I was going to read all the classics, so I was excited and began downloading and reading Alice in wonderland, Tom Sawyer and others...Then I found I just could not get into using it [Kobo].... For one thing you have to be recharging it [Kobo] and you do not have to do that with a book.

Although the decision of participants to use new mobile communication devices was influenced by the recommendations and promptings of family members, it is interesting to note that they did not lead to sustained use of the new mobile communication devices. Some participants tried the devices, but did not continue using them (Venkatesh, Morris, Davis, & Davis, 2003). Persistent use of the devices seemed to be dependent on the perceived utility of the devices by the participants.

## **Challenges to Adoption of Personal Computers, Internet services and New Mobile Communication Devices**

Many challenges were identified by the participants in this study. These challenges have been categorized as, cognitive, psychological, physical or functional and socio-economic. Generally, the challenges faced by the participants were accompanied by feelings of anxiety, fear, nervousness and apprehension, and behavioral responses based on perception of the computer system, Internet service and new mobile communication devices (Raub, 1981; Baltes & Baltes, 1990).

### **Cognitive Challenges**

For older Information Communication Technology (ICT) users, cognitive challenges have led to serious problems related to system usability and functionality. These challenges become more acute for older users due in part to cognitive declines, which also affect psychomotor functioning (Birren & Warner, 1990; Blake, 1998). The challenges faced by both Andy and Sam can be categorized generally as cognitive.

According to Andy:

The [computer] programs keep changing, so I had to adjust. Some of the jargon that computer people use I have a hard time understanding, because it is in a state of flux. I don't like emoticons, or acronyms, because they can mean different things to different people.

Concerning Internet services, Andy explained the challenges he encountered while attempting to operate and use a particular Internet service.

Andy said:

“Skype is a bit challenging. I think it is me connecting the people with Skype, or a matter of communicating with people back and forth. I do not use it [Skype] quite a lot [because of these challenges].”

Sam, on the other hand identified his cognitive challenges as memory sequencing and cognitive decline issues when he explained:

I have memory sequencing problems, due to the deterioration of the brain as one gets older....I had to work very diligently with staring at the computer [or mobile communication devices] because for me the short term memory declines... so I have to practice how to do things a lot.

Adam’s challenge was not dissimilar to that of Andy or Sam. He explains the challenges faced by older persons when operating computer technology.

One problem with technology adoption, as people age their ability to learn decreases, especially when they are being asked to use something that they don’t already know....

We [older people] are good at learning the nuances of what we already know, and are not good at learning things that are brand new.

Although these cognitive challenges existed for some participants, they did not hinder the adoption and utilization of technologies. Some of the participants had to work harder at understanding the functionality of the computer system or Internet service. However, the cognitive challenges did impact on the emotional state of some participants, causing them to experience psychological challenges, such as anxiety and fear in operating the computer system or mobile device.

## Psychological Challenges

The psychological challenges identified by some participants related to operational anxiety, usually associated with using computers and Internet services. For example, Jessica expressed her discomfort when confronted with unfamiliar pop ups on her computer screen.

Jessica explained:

Okay, sometimes I will be researching or even typing up a letter, or a form and something might pop up on the screen, and when this happens I freeze, and that is where I become uncomfortable. It may simple say ‘do you want to stop and reboot’. I will call my husband frantically and he will come along and assist me.... So my discomfort occurs when I get messages on the computer and I do not know what it means or what to do.

Sam identified both fear and anxiety in relation to his computer and Internet challenges. He labels himself as someone who is ‘technologically anxious.’

I was quite anxious because I had the regular experience of losing things [on the computer].... In the back of my mind, there was always this fear that I will push the wrong buttons [on the computer] and lose everything on the computer, because that was the way it was back then when I first began using the technology.

The psychological challenges experienced by the two participants are not unique to only older computer users, but are experienced by younger computer users as well. These psychological challenges can be explained in terms of the unfamiliarity in the initial stages of technology adoption and use. The unfamiliarity with the functioning of computers or mobile communication devices were compounded by physical and functional declines, which impacts the motor functions of the older person.

## Physical and Functional Challenges

The fine motor skills of older persons tend to decline as they age, leading to difficulty with tasks that require certain levels of dexterity. This decline in some cases poses significant challenges for navigating computer hardware devices and software (Frydenberg, 1988). Physical and functional challenges become more acute with the decline in fine motor skills, which eventually affect operational abilities (Blake, 1998). Sam's explanation very succinctly captures this decline:

“Older people experience deterioration in their eye-hand coordination as they get older and that is the driving bit of adopting technology....Your fine motor skills deteriorate, and your vision deteriorates...and most interestingly and most devastatingly.”

Jerry identified the navigation of software as a functional challenge for him when he explained:

“There are some things I just can't get around, like converting a pdf file from a Microsoft Word [document], I find that difficult, and trying to find out where to go to do that...that sort of thing I find difficult.”

According to Martha:

Well sometimes things happen to the computer that is not normal in my day to day use...when this happens I need expert help in solving these problems.... I have never asked for help on the computer and quite frankly I would not understand what they are telling me because I am a visual person and not an audio person.... I've got to see the explanations.... I become frustrated [*when I have a problem*] [emphasis added]... because I am independent and I do not like to ask anybody all the time to solve a problem... but I usually ask my husband and if he does not know how to deal with a problem he'll ask somebody who knows and he will come and tell me.



Jake described his challenge with technology as floundering:

I flounder through with the iPhone until I understand it...because some [smartphones] do not come with self-teaching tools, so you have to flounder through and figure out how things work sometimes....The secret with using computers or iPhone is not to be afraid to give it [technology] a try. You do not have smoke coming out of these things, they may only shut down.

Functional and physical declines in older persons are usually associated with advancing age. The declines in motor skill and dexterity, prevents older persons from adopting and using ICTs. These challenges have impacted on the ease with which older users operate and use computer systems or mobile devices. Another challenge that impacts the adoption and use of ICT is the social and economic issues faced by some older persons.

### **Socio-Economic Challenges**

Social and economic conditions of older users present a major challenge for adoption and use of Information Communication Technologies (ICTs). While this was not a major concern of many participants, some participant did share their views on the socio-economic issues older persons are confronted with in their adoption and use of ICTs.

Martha explained:

I think cost is a barrier; also the level of education comes into it too. The average senior who do not have more that high school certification like I do, I do not know if they are interested in adopting the technology.... I am thinking about my own friends who will be in the same social class as I am and they use the computer sparingly and far less than I do....I think some seniors have difficulties with money, so adopting and using technologies may be an extra cost they could probably do without.... If the technology is

provided for them with minimal cost or no cost at all, I think there is enough interest out there.... I have been talking to some older people and there is some interest in using ICTs, but only if they are paid to use it.

Martha reflected on her lack of adoption of new mobile communication devices, and expressed concern about the high cost of purchasing and using these mobile devices.

Personally I will continue to use technology [computers] and I have not closed my mind to using new mobile devices. I know my husband wants an iPad, but we cannot purchase one now for the prices they are listed at ... I think cost is a prohibiting thing, and I like to live within my means, because I do not like debts and I do not want any debts....I think people my age may think the same way, because money is a factor. I have a normal cell phone and I do not pay a monthly bill. I do not think I am interested in paying fifty dollars a month for an iPhone [bill].

Generally, all the challenges identified above concerning the adoption and use of computers, the Internet and new mobile communication devices were influenced by different factors (cognitive, psychological, functional and physical, and socio-economic). These challenges identified did not impact in any significant way on the decisions made by some participants to continue adopting and using the technologies. However, it was necessary to observe the impact these challenges have on the decisions made by older users to adopt or not to adopt ICTs.

## **The Potential of Information Communication Technologies to promote Continuous Learning**

There were varied views expressed by participants about computers, the Internet and new mobile communication devices in relation to promoting lifelong learning, and the use of these technologies as tools for enhancing self-directed learning. Information Communication Technologies (ICTs) provide continuous access to information, utilizing new and innovative modes of delivery in many unconventional settings. However, opportunities for continuous or lifelong learning could be enhanced or hindered, based on the perceptions of users, regarding the value and role of ICTs as a suitable medium for learning (Peas, 2008; Wade & Sonia, 2002).

The perceptions of older persons regarding the potential of ICTs to promote continuous learning are influenced by different issues such as, perceptions of value of the device, ease of access and the value of using the technology in enhancing personal development and individual wellbeing (Mann et al., 2002). An important element here is the participant's own interpretation of lifelong learning. Jake's conception of lifelong learning is very instructive in this regard.

According to him:

Lifelong learning is the ability to remain informed through the use of the technology for sourcing anything one wants to learn or build...lifelong learning is using the computer and the Internet to try and find anything. It is doing research to put in a context to come up with application.

Sarah thought it was never too late to learn, and that ICTs have an important role to play in learning. Sarah suggested:

You [older people] can start now, it does not matter how old you are, and hopefully you will find somebody who will help you to explore at your own rate, which I think is good too.... In a classroom you are driven to go this fast, [I can't go that fast] but this

could be done “one-on-one” and at a pace which allows older persons who are slow at processing information to learn....The technology has allowed people access to services from any location.... I want to see older persons use and be taught to use the iPad...I am not very patient with people who say they don’t want anything to do with it [Technology].... But there is so much you can do with these technology systems and devices, and so much they [older persons] can learn.

Sam had an interesting perspective on ICTs and lifelong learning. Sam believed that in addition to promoting continuous learning, ICTs can be used to increase cognitive alertness.

“It is incredible how people can keep busy and cognitively alert with all of these devices.... The diversity of things you can do to stimulate the brain are quite incredible.”

When asked about the potential of using ICTs for lifelong learning Adam revealed:

“I do not think there is any should about it [adopting technologies]....The long and the short in it is that you cannot do very much to help older persons see the value in computers.”

Adam spoke about the challenges of learning via the medium of ICTs. Accordingly he said:

“Computer interface, like the interface between the person and the technology [system or mobile device] is sometimes very ill designed. It does not match the way people naturally behave, so it is difficult for them [older people] to learn.”

Martha’s value judgement on the relevance of ICTs as tools for promoting lifelong learning appears to be tempered by the value she places on technology as an older person.

Martha explained:

I am 74 years old, and I don’t know how much more I want to become engaged with computers....I think if you had used one of these devices when you were fifty to sixty years you might continue and want to be more engaged with different technologies. I

interact with a lot of people and I don't think many of them will want to do more than they do at present with computers and the Internet, and some people I know don't want to at all.

Martha also thought that cost might be a deterrent to older persons engaging with ICTs for lifelong learning. She felt that if training programs were made available to older persons without cost, adopting and using the technologies may occur.

I think I hang a lot of positive-ness [sic] on classes or workshops for seniors that we are going to be offering at church.... I think if the training is made readily available with minimal amount of cost [older people will attend the classes and adopt and use ICTs]....I think cost is a prohibiting thing, and I like to live within my means. I don't like to have debts, and I don't have any debts. I think people my age may think the same way, and money is a factor.

Jake responded very similarly to other participants about using ICTs for lifelong learning when he said:

“I don't think there is any doubt we [older people] have to use [technologies] in the age we are living in because technology is going to be part of our lives.”

### **Summary of the Findings**

The descriptions of participants and the many themes highlighted in the findings cannot be abstracted from the conceptual orientation of this work. Although not presented in any great depth, these findings are in concert with the notion that technology users are motivated by the perceptions and values attached to Information Communication Technologies (ICTs), which leads to the decision to adopt, or not to adopt a technology system, or a mobile communication device.

The findings have clearly revealed, that both the adoption and utilization of personal computers, the Internet and new mobile communication devices were motivated by the perceived ease of use of these mobile devices, the availability of Internet services, and the extent to which a prospective user perceives that there is some value and usefulness in the adoption of the technologies. This was the case for every participant, whether he or she was an early adopter or a late adopter of mainstream computers, and or new mobile communication devices.

The attitude-intention behavior of early adopters of ICTs was also exhibited by these participants in other aspects of the study. For example, participants who were early adopters and had a positive attitude toward the adoption of ICT also tended to have a favorable attitude about the potential of ICTs for lifelong learning. This positive attitude towards the potential of ICT held true even if the initial adoption of ICTs was influenced by negative emotions.

## **CHAPTER SIX**

### **Discussion of Findings**

This chapter discusses the findings of the study. The important imperatives of the discussion relate to how different constructs of the Technology Acceptance Model (TAM) help to explain the interaction of the participants with Information Communication Technologies (ICTs), particularly, the adoption and use of mainstream computers, new mobile communication devices and Internet services.

The discussion follows a general pattern based on several broad themes that have been identified in the findings. These themes include: Adoption behavior and adoptive decisions; pattern, prevalence and preference in ICT adoption and use; socio-economic factors and adoptive behavior; location preferences and challenges to adoption. The approach of using themes seeks to clarify the different factors that influence the behaviors and decisions of older persons in adopting and utilizing ICTs.

#### **Adoption Behavior and Adoptive Decisions**

Generally, the findings in this study suggest that older persons are adopting and using Information Communication Technologies (ICTs). However, the decisions to adopt and use different ICTs vary, based on the usefulness of the technology, its ease of use, location of use, and the purpose for which ICT is needed. These different dimensions have been discussed in Davis (1989) Technology Acceptance Model (TAM). Davis suggests that the usage of a technology system is determined by the intention to use the particular system. The behavioral-intention to use a particular computer system or new mobile communication devices is explained by two core constructs within TAM: Perceived usefulness (PU) and perceived ease of use (PEOU), (Davis, 1989; Gao, 2005). Coughlin et al. (2007) and Mann et al. (2002) have shown

that a causal link exists between perceptions about the usefulness of technology, the ease with which the technology could be used, and adoption behavior.

The prevailing sentiments expressed by the participants are supported by the two core constructs of the TAM: PU and PEOU (Davis, 1989). PU is the point reached, where a person believes that using a particular computer system or mobile communication device would enhance his or her performance at a task. PEOU is the point reached, where a person believes that using a particular computer system or mobile communication device would be easy and free of effort.

Both PU and PEOU are important for understanding why individuals make the decision to use, or not to use computers, new mobile communication devices and the Internet. For example, where participants perceived personal computers, new mobile communication devices and the Internet as meeting their daily needs, they made the decision to adopt and use them. Conversely, where participants perceived personal computers, new mobile communication devices and the Internet as difficult to adopt and use, they made the decision to still adopt and use these technologies but at a slower rate. Whether participants were early adopters or late adopters of both mainstream computers and new mobile communication technologies, perceptions of ease of use and perceived usefulness figured prominently in their decisions.

Five participants were early adopters of mainstream computers, which in turn led to the early adoption and use of new mobile communication devices. The other three participants were late adopters, and were initially reserved in adopting new mobile communication devices. The experiences of the participants with ICTs were not dissimilar to the adoptive behaviors among other older users in the literature. Previous studies have shown that older users who possess some application knowledge of technology tend to adopt and use computers and new mobile



communication devices more readily than those who do not possess application knowledge (White et al., 1999; Alder, 1996; Pierce, Kistova, & Dirks, 2001).

The assertion that older users who possess greater application knowledge of technology will transition more readily to adopting and using computers and new mobile communication devices was particularly evident in the adoptive decisions of the early adopters in this study. Prior knowledge gained from the adoption and use of mainstream computers served as incentive for participants to adopt and use new mobile communication technologies.

### **Patterns, Prevalence and Preference of Adoption and Use**

Patterns, prevalence and preference in adoption and use of Information Communication Technologies (ICTs) were generally associated with either the positive or negative attitudes of the participants. Positive attitudes were generally related to early adoption and the positive experiences gained while adopting and utilizing ICTs. Conversely, negative attitudes were usually associated with late adoption and the negative emotions and experiences related to the adoption and utilization of ICTs.

Attitude guides the individual's behavior to adopt and use technology, through filtering information and shaping perception. Using the Technology Acceptance Model (TAM), Davis (1986) has shown how behavioral intention (BI) is determined by a person's attitude (A) towards using a technology system (Figure 1). BI is the positive or negative feeling individuals display about performing a specific behavior (Ajzen & Fishbein, 2000). Positive attitude shaped the adoptive behaviors and influenced the decisions of participants in adopting and using computers, new mobile communication devices and the Internet. Negative attitudes served initially as an obstacle to some participants in adopting and using ICTs. However, these attitudes did not serve as a deterrent to participants adopting and using ICTs. Yang and Yoo (2003) suggest that attitude

may have an important effect on system usage. Attitude towards system usage has been identified as a factor that guides future behavior, or the intention that leads to a particular behavior. In TAM, attitude towards usage is the evaluative effect of positive or negative feeling of individuals in performing a particular behavior (Ajzen & Fishbein, 2000).

High pattern of use and frequency of use of computers, new mobile communication devices, and Internet services existed among the participants. The varying patterns of technology usage could be categorized as heavy, integrated or moderate. Heavy users tended to own and use multiple computers (laptop, desktop) and new mobile communication devices (Smartphones, iPads/Tablets, Kobo) daily (Salthouse, 1996; Sharit et al., 1999). Integrated users were more likely to own and use more than one new mobile communication device, which they used simultaneously to access different Internet services (Selwyn, 2004). Moderate users tended to own and use fewer computer systems and new mobile communication devices. For example, moderate users were more likely to use one computer system and or one mobile communication device on which they accessed a few Internet services. The reasons for these variations in patterns of technology usage have been associated with physical dexterity, cognitive decline, the cost related to acquiring different devices and general interest in communication technologies (Salthouse, 1996; Demiris et al., 2004; Dutton et al., 2005).

The patterns of use of computers, new mobile communication devices and the Internet were influenced by the user's own perception and acceptance, and the influence of family members. User acceptance relates to the willingness of participants to use the technology for the task for which it was designed (Dillon & Morris, 1996). Several participants indicated that they came to accept and use the computer and the Internet, based on their own interest in ICTs. The adoptive behavior of these participants seem to be supported by Conci et al. (2009) and

Davis et al. (1992) assertions that the benefits intrinsically motivated users derive from interacting with computers, new mobile communication devices and the Internet, stem from the enjoyment of the system-user interaction (Pearlson & Saunders, 2006). This system-user interaction seemed to be associated with the favorable adoption patterns exhibited by participants.

Family influence (such as those by children and in-laws) was critical in the adoption and use of certain new mobile communication devices. Many participants indicated that they were motivated to adopt and use computers, new mobile communication devices and the Internet, based on the prompting of a relative. Participants who adopted and used ICTs on their own accord tended to continue using these devices over a protracted period, compared to those who were influenced by family members. This suggests that sustained use of a new mobile communication devices might be related to the level of motivation by the user, the ease with which the user perceives that the technology could be used, and the perceived utility of the technology (Davis et al., 1989).

### **Socio-Economic Factors and Adoptive Behavior**

There is strong support in the Information Communication Technology (ICT) literature linking socio-economic circumstances to the adoption and utilization of ICTs. Socio-economic variables such as, educational attainment and income levels serve as strong markers for technology adoption and utilization (Huang & Du, 2002; Welch, 1970; Wozniak, 1984; Krueger, 1993). For example, in a household survey White and Weatherall (2000) were able to demonstrate the relationship between educational attainment and ICT adoption and use.

There was no major disparity in the socio-economic circumstances of the participants in this study. Where disparities existed, there was no significant difference in adoption and use

behavior based on the socio-economic profiles of participants. However, a couple of participants with middle to high income levels and advanced university degrees had a higher level of ownership of computers and new mobile communication devices, compared to participants with lower income levels and lower levels of education.

Although there was no extensive descriptive data from the participants to compare disparities, the limited findings in this research suggest, that lower levels of education attainment and median income were not constraining factors in determining the ability of participants to adopt and use computers, mobile communication devices or access Internet services. Only one participant among the eight indicated that income was an impediment to the adoption and use of new mobile communication devices.

### **Location Preferences**

There is no major focus on location preference in the literature on ICT adoption and use by older persons. However, the nature of research on the use of ICT by this age cohort invariably highlights preferences in location where ICT is being used (Magnusson, Hanson & Borg, 2004). In this regard, research has emphasized access and use of ICT at public places, without explicitly focusing on location preferences (Selwyn, 2003). Although there seems to exist no concerted effort in the literature to demonstrate any link between location of adoption and use of ICT by older persons, this research deliberately sought to make this connection.

Preference for the adoption and use of ICT varied across the participants. These variations occurred in part due to personal choices by some participants, while for others preference were related to locations where participants spent the majority of their time for work related activities, or activities associated with leisure. For example, some of the participants showed preference for using their desktops and laptops at home because they felt more

comfortable using the technologies at that location. For the other participants, they preferred using their new mobile communication devices “on the go” because it was handy and provide ease of use.

The location preferences were motivated by the level of comfort in a particular environment and familiarity with other users in that space. Preference for using computers and Internet services at home was impacted by help from family members. What was particularly revealing about this observation was the motivation participants derived from the assistance of family members to adopt and use ICT, in the home environment. Family members provided assistance to participants, which served to inhibit anxiety when the participants encountered challenges.

The preference by participants to use computer systems and Internet services at home is not dissimilar to that found in other studies involving older persons. For example, Newburger (2001) found that there were a large number of older adults using the computer and Internet within the precincts of their homes, due to the comfort of that environment. Location preference was also strongly correlated to computer and Internet use in relation to formal and informal lifelong learning. Where usage was primarily related to formal and informal learning, some of the participants showed preference for the home environment. The preference in using ICT for learning at home seemed to be related to the positive emotions and the associated comfort of the learning environment. Conversely, computer and Internet usage outside the home in places like libraries, or schools, were associated with negative experiences and emotions.

The preference for the home environment as opposed to public spaces such as a library, or school, could be explained by the fear of social anxiety (Baltes, 1996; Flammer, 1995).

For example, one participant shared his unfavorable experience with using a computer and the Internet in the classroom. He explained that his age, dexterity and slowness in processing information on the computer had contributed to many blank stares in the classroom from his younger classmates, when engaging in group activity. This fear of negative evaluation contributes to social anxiety, and has been associated with social apprehension in older persons, when using technology in public places. Negative evaluation has also been associated with computer anxiety among older users (Morell, Mayhorn, & Bennett, 2000).

### **Challenges to Adoption and use of Information Communication Technologies**

Age related challenges are an underlying feature of technology adoption and utilization (Charness & Boot, 2009; Smith, Sharit, & Czaja, 1999). This argument derives from the causal linkages between age, cognitive decline, and psychomotor functioning (Smith et al., 1999). The use of mainstream computers and new mobile communication devices requires coordination between psychomotor and cognitive processes. This coordination ultimately impacts on the proficiency with which Information Communication Technologies (ICTs) could be used, since the technology-human interface could be severely affected by decreased memory capacity and dexterity. As a result, interest in adoption and use of ICTs could be affected by these age-related impediments (Salthouse, 1996; Charness & Boot, 2009).

While there were no major impediments to the adoption and utilization of ICTs in this study, there was evidence of the presence of age related challenges (cognitive or memory sequencing declines and dexterity issues). Where participants encountered challenges, they were not significantly constrained from adopting and using ICTs. However, challenges impacted and delayed the decisions and behaviors of some participants in adopting and using computers and new mobile communication devices.

Challenges associated with negative emotions served as an aversion to adopting and using ICTs. However, these challenges by themselves did not deter adoption and utilization behavior. Factors such as personal interest, willingness, perceptions of use, perception of usefulness, ease of use of the technology and family support, contributed to the positive adoptive behaviors and outcomes to ICT adoption and use by participants in the present study.

The challenges highlighted support the notion that older persons can adopt and use different computer systems and new mobile communication devices with some measure of success, with or without secondary support. Where challenges existed, most of the participants made the decision to either seek help from family members and friends, or troubleshoot through the computer system or new mobile communication device, until they gained confidence and operational proficiency.

## **CHAPTER SEVEN**

### **Conclusion**

This last chapter is divided into three sections. The first section provides a summary of the study; including, the problem statement, purpose of the study, conceptual framework, methodology, and the research methods [data collection and data analysis]. The second section revisits the research questions and situates them within the findings. The third section discusses the limitations, implications for policy and practice, and concludes with suggestions for future research.

### **Summary of the Study**

This research was premised on the rapid diffusion of Information Communication Technology (ICT) in society, and the impact this phenomenon has had and is expected to continue having in the lives of older Canadians. Whereas ICTs have been generally acknowledged as having a positive impact on society as a whole, the evolution of ICT into mainstream society has the potential to isolate and exclude older persons. Therefore, in order to remain current older persons are expected to be adept at using computers, new mobile communication devices and Internet services, in the course of their everyday lives (Melenhorst, Rogers, & Caylor, 2001; Selwyn, 2004).

Issues relating to the exclusion of older persons from mainstream society via the information divide are of universal concern (European Older People Platform, 2008). Consequently, research in the adoption and utilization of ICT by older persons has become a major focus in the technology research agenda. In Canada, there seems to be great concern about the way ICTs are being adopted and utilized by the older population. These and other issues related thereto have served as the motivation for this thesis.



This study sought to explore and describe the experiences of Canadians 65 years and older who are using ICTs. In pursuit of this purpose, the study examined the extent to which older adults in Canada in both formal and informal settings are adopting and adapting to using technologies; such as, mainstream computers, new mobile communication devices and the Internet (Harvey, 1989). The study was also meant to identify and explore the possible barriers related to the adoption and utilization of ICTs.

The Technology Acceptance Model (TAM), served as the conceptual framework for this study. TAM is based on two foundation cognitive constructs: Perceived usefulness (PU) and perceived ease of use (PEOU). These two constructs are important for understanding how decisions are made by individuals in adopting and utilizing computers, new mobile communication devices and the Internet (Legris et al., 2003). Fundamentally, TAM posits that in order for a person to adopt and use a technology system, that person must firstly, perceive that the system is easy to use, and secondly, that the system has some useful purpose. The TAM is therefore in congruence with the purpose of this study.

A descriptive qualitative methodology was utilized. This methodology was chosen for its relevance in understanding the experiences of participants in exploratory research. Descriptive qualitative methodologies focus on the production of rich descriptions of personal experiences, to derive useful narratives from the participants in a study (Sullivan-Bolyai et al., 2005; Sandelowski, 2000). The descriptive qualitative methodology served to elicit unadorned answers to questions about adoption and utilization of ICTs (Duffy, 2008).

The ten participants were selected using purposeful sampling, based on certain inclusion criteria (Patton, 2002; Johnson & Christensen, 2004). This approach was used to allow for the selection of participants with significant experience with using ICTs (Marshall, 1996). Data was

collected using face-to face semi structured in-depth interviews, which were audio-taped. The audio-taped data was supplemented with field notes jottings.

Data collection was followed by transcription and analysis, using the conventional content analysis approach, which allowed for a deeper understanding of the perspective of each participant (Tech, 1990). Several broad themes and subordinate themes emerged from the data analysis process. These themes served as the basis for the presentation of findings. The discussion of findings was also premised on these themes.

### **Revisiting the Research Questions**

This section revisits the main research question, the subordinate questions, and a recap of the findings related to these questions. The limitations to this study are also discussed. The section concludes with a brief discourse on the implications for policy, practice and future research in Information Communication Technology adoption and use among older persons.

The main research question in this study relates to the lived experiences of Canadians 65 years and older in adopting and utilizing ICTs; including, personal computers, Internet services and new mobile communication technologies (Tablets, Smartphones and Kobos) in their daily lives?

The subordinate questions, which align more closely with answering the main question, are revisited below in turn with a brief summary of the findings:

1. How do older Canadians adopt and adapt to using ICTs particularly, computers, Internet and new mobile communication technologies?

Generally, participants have been classified as early adopters and late adopters. These categories served as the basis for explaining other adoptive and use behavior. For example, early adopters were self-motivated, showing great interest and excitement in adopting and using ICTs.

For late adopters, adoption and use of ICTs were usually accompanied by anxiety and apprehension.

The findings of this research suggest that older persons have been adopting and using ICTs; including, mainstream computers, new mobile communication devices and Internet services. Participants engaged with ICTs either based on personal decisions or decisions influenced by family members. From the findings, personal decisions were driven by a need to be engaged with technology, based on curiosity and a willingness to adopt and use technologies. Decisions influenced by other parties involved promptings and suggestions usually from family members.

2. How do older Canadians in formal and informal settings (home, work and school) adopt and adapt to using computers and Internet services (Skype, Facebook, Electronic mails)?

There were no significant location preferences in the use of ICTs by participants. The findings in this research suggests that the home environment was the preferred place for older persons to engage with different computer systems (laptop, desktop) and Internet services (Skype, Electronic mail, Facebook, YouTube, Goggle). Most participants indicated that their home was the most familiar surroundings to operate and use the technology at a comfortable pace.

Many participants had their first encounter with computers outside of the home environment. Although this was not an impediment to the adoption and use of the technologies on the part of some participants, other participants highlighted the level of discomfort and anxiety they felt having their first encounter with ICTs, in a formal work environment. Ultimately, there were no marked differences in adoption or utilization behavior based on

location. Adoption and use pattern based on location was a consequence of circumstance related to work or learning in a formal environment, and the convenience of the location in others.

3. What are the challenges encountered by older Canadians in adopting and adapting to ICTs?

The findings unearthed several challenges that were encountered by some participants, which in some way impacted on their adoption and utilization of ICTs. These challenges have been generally categorized as, cognitive, psychological, physical or functional and socio-economic. These challenges have been cited in the literature as major impediments to the adoption and use of new technologies (Charness & Boot, 2009; Blake 1998; Charness & Holley, 2004).

The challenges identified did not serve as impediments in the adoption and utilization of ICTs. Interestingly, in some instances these challenges served as motivation in the adoption and utilization of computers, new mobile communication devices and the Internet. The participants who experienced one or more of these challenges had to work harder at understanding the functionality of computers or Internet services. The most significant of these challenges pertained to memory sequencing in the interface between the participant and Internet service such as Skype. Other challenges related to operational anxiety due to the unfamiliarity with the functional attributes of computer software (Ellis & Allaire, 1999; Raub, 1981). Additionally, physical and functional challenges were highlighted relating to fine motor skills, which affect operational abilities (Blake, 1998).

No significant socio-economic challenges were identified in the findings. Two participants held the view that the cost of purchasing a computer, or a mobile communication device and lower education attainment could be prohibiting factors for some older persons

engaging with ICT. Although Zimmer et al. (1998) have linked lower levels of education with unfavorable transition to adopting and utilizing ICTs, educational attainment was not a significant barrier for any of the participants (White & Weatherall, 2000). Educational attainment as a challenge is addressed in more detail under subordinate question four.

4. How does the socio-economic status, for example, income and education influence the adoption and utilization of ICTs among older Canadians?

The socio-economic status of participants influenced the adoption and utilization of ICTs. Although this was not stated explicitly by participants, the findings suggest that participants with high income and advanced post-secondary education acquired a wide range of computer systems (desktop, laptop) and new mobile communication devices (Smartphones, iPads/Tablets, Kobo). However, most of the participants made the decision to invest in at least one new mobile communication device. Only one participant indicated that limited income was a prohibiting factor in obtaining a new mobile communication device.

If anything could be concluded from the observations above, it is that socio-economic status was not a prohibiting factor in the adoption and utilization of ICTs among the participants. However, participants with higher socio-economic profiles (higher education attainment and higher income level) seemed to own and use a wider array of computer systems and new mobile communication devices.

5. What are the perceptions of older Canadians concerning the value of personal computers, Internet services and new mobile communication technology?

Perceptions about ICTs serve as a primary driver for their adoption and use by older

persons. This is clearly reinforced by the Technology Acceptance Model (TAM) literature. The findings support the notion that the adoption and utilization of ICT by older persons was contingent on perceptions of the benefits and usefulness of the technology (Coughlin et al., 2007). The participants viewed ICTs as an important component of their existence. This was true even in those instances where participants were uncomfortable with interfacing with computers, different communicative devices and Internet services.

The perception about ICTs as being valuable was supported by the amount of devices owned and used by several of the participants, the amount of time spent using these devices, and the willingness of some participants to acquire and use new mobile communication devices and Internet services.

6. What role does ICT play in the process of self-directed learning for older Canadians?

Self-directed learning is the learning method of choice by older adults, because this learning method allowed them to make all the decisions regarding their learning (Tough, 1979). Self-directed learning had somewhat of a broad application in this thesis, referring to learning in both formal and informal environments that contributed to structured or unstructured learning about specific topics or topics of general interests. A few participants were engaged in learning in a structured academic environment. For those participants adopting and utilizing ICTs contributed immensely to their self-directed learning in relation to their academic work and learning in general. Other participants utilized ICTs for learning related to home projects, church projects, or to research topics of general knowledge and interest.

The learning patterns of participants suggest that the adoption and use of ICTs provided an avenue for self-directed learning, through a vast array of information readily available online.

Therefore, based on the findings, it is reasonable to conclude that self- directed learning among older persons is encouraged and enhanced through the adoption and utilization of ICTs.

7. How have computers and new mobile communication technologies enhanced the learning experience of older Canadians?

This question is closely related to question six above. Adoption and utilization of ICTs connect older persons with information not readily available without ICT (Taylor, 1995; Lyman, 1997). ICT enhances the learning experience through the promise of learning at ‘anytime and anyplace,’ while removing the constraints of distance, time, and location (Tiffin & Rajasingham, 1995; Field, 1997). All participants utilized ICTs for learning in everyday activities, from the mundane to more serious activities relating to healthcare and matters of public interests. ICTs enhanced the frequency of use, ease of access, and engagement in an environment, where there was controlled social interaction and therefore less anxiety.

8. How do older Canadians continue to utilize ICTs after initial adoption?

The answer to this question is captured by the willingness of participants to use mainstream computers, new mobile communication devices and Internet services after initial adoption. The question can also be answered based on the prevalence of use of new mobile communication devices, Internet services, and the persistence in using these devices and services overtime. The findings support the fact that older persons continue using ICTs after initial adoption. This holds true even among participants who were late adopters with negative experiences, while adopting and using ICTs. There was a high transition rate among older computer users, transitioning from mainstream computers to new mobile communication devices such as, laptops, Smartphones, Tablets and Kobo. Many participants have incorporated these new mobile communication devices and Internet services into their everyday activities for

communicating with family and friends, accessing public services, and for formal and informal learning. The willingness with which participants engaged with ICT post adoption of mainstream computers, seem to support the conceptual framework upon which this thesis was argued.

It could be argued based on the findings that the prevalence and persistence use of ICTs after initial adoption, coincide with the two core concepts of the TAM; namely, perceived usefulness and perceived ease of use. Having discovered the usefulness of ICTs, and the ease with which different computers and new mobile communication devices could be used, participants were able to transition more readily from mainstream computer (desktops, laptops) to new mobile communication devices (Smartphones, Kobo, Tablets), (Coughlin et al., 2007).

### **Limitation of the Findings**

This research is only an initial attempt at understanding the role of Information Communication Technologies (ICTs) in the lives of older persons in Thunder Bay, Canada. The findings are not intended to be generalized, or scaled up to other locations or jurisdictions. Therefore, it may be imprudent to assume that other older cohorts of persons will have similar experiences while adopting and adapting to using computers, new mobile communication devices and the Internet.

However, for age cohorts and profiles similar to this study, the findings may be useful for understanding the adoptive behaviors of older persons utilizing ICTs, which could serve as practical and experiential support to inform both policy and practice.

### **Implications for Policy, Practice and Future research**

These findings have implications for policy and practice related to Information Communication Technologies (ICTs) adoption and utilization by older persons. Many services that are critical to the independence of older person are currently delivered virtually. For



example, services to monitor health, build social networks, increase participation in society and supplement safety (Rogers, 2004). The adoption and utilization of ICT by older persons allow these services to be more readily available and accessible. This has implications for both cost saving in service delivery, and real time delivery of services. Although this research is not intended to be prescriptive, both the Federal government and local municipalities could utilize these findings to incorporate ICTs into their programs for service delivery.

The new wave of technology adoption among older age cohorts, and the rapid advance in new communication devices have revolutionized interpersonal communication. Although some negatives have been associated with older persons communicating and using virtual platforms, ICT has contributed to the narrowing of communication distance in both interpersonal and formal communication. The extent to which older persons are able to operate in this modern technology space, depend on their ability to adopt and use computers, new mobile communication devices and the Internet. Public policies must address issues pertaining to the adoption and utilization of ICTs if older persons are to become fully engaged in modern day society. Therefore, the framers and implementers of public policy must be cognizant of the ICT needs of older persons.

An appropriate starting point could be assessing some the ICT challenges faced by older Canadians. The challenges identified in this research have great value in terms of informing the ICT related policies of state and non-state agencies. The findings suggest that notwithstanding the impediments associated with adoption and use, older Canadians with the profiles in this study sampled are engaging with ICTs. A critical feature of this engagement is the extent to which the use of technology is self-directed, the prevalence of use of different devices and services, and the ability of the participants to use them. This suggests that older persons in the wider Canadian

society may be well adapted to using ICTs. What seems to be lacking is more targeted research informed by government policy to ensure that the needs of older Canadians are met, as ICT continues to evolve.

Another aspect for future research concerning older cohort of persons, is the awareness that older persons should not be treated as one homogeneous segment (Rigby, 2005). Future research should seek to investigate the relationship between ICT, age, and other socio-demographic variables, as well as explore the reasons for the non-adoption of ICT by some older persons. Additionally, it would be interesting to explore other issues such as faux users: people who use ICT before, but do not use them anymore.

### **Summary of Conclusion**

No definitive or predictive conclusions can be drawn from this study, although many of the findings are consistent with those in other published literature. This study has unearthed many of the concerns of older persons regarding the adoption and utilization of personal computers, new mobile communication devices and Internet services. As such, it provides a context for discussion and debate, not just among older users but also among educators, technology developers, manufacturers, and other stakeholders associated with the adoption and utilization of ICTs among older users.

There was no attempt in this research to be prescriptive, the purpose of this research, the questions asked, and the methodology pursued were not amenable to definitive conclusions. This research finds its relevance in the authentic descriptive narratives of participants, based on their experiences. Therefore, the findings are useful to the extent that they reflect the participant stories, which can be used to validate or invalidate perceptions regarding the adoption and utilization of ICTs by older persons.

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## APPENDICES

## A: Ethics Approval Letter

Lakehead  
UNIVERSITY

Office of Research Services

May 07, 2013

Tel 807-343-8934  
Fax 807-346-7749

Principal Investigator: Dr. Hope-Artene Fennell  
Co-Investigator: Seth Agbo  
Student Investigator: Kathleen Sandy-Thompson  
Faculty of Education  
Lakehead University  
955 Oliver Road  
Thunder Bay, ON P7B 5E1

Dear Researchers:

Re: REB Project #: 13112-13/ Romeo File No: 1463185  
Granting Agency: N/A  
Granting Agency Project #: NIA

On behalf of the Research Ethics Board, I am pleased to grant ethical approval to your research project titled, "Older People's Adaptation to New Modes of Communication".

Ethics approval is valid until May 7, 2014. Please submit a Request for Renewal form to the Office of Research Services by April 7, 2014 if your research involving human subjects will continue for longer than one year. A Final Report must be submitted promptly upon completion of the project. Research Ethics Board forms are available at

<https://www.lakeheadu.ca/research-and-innovation/forms>

During the course of the study, any modifications to the protocol or forms must not be initiated without prior written approval from the REB. You must promptly notify the REB of any adverse events that may occur.

Completed reports and correspondence may be directed to:

Research Ethics Board  
c/o Office of Research Services  
Lakehead University  
955 Oliver Road  
Thunder Bay, ON P7B 5E1  
Fax: (807) 346-7749

Best wishes for a successful research project.

  
D. Far: Mk: ell  
Chair, Research Ethics Board

/sew

Lakehead Research...CREATING THE FUTURE NOW

955 Oliver Road Thunder Bay Ontario Canada P7B 5E1 [www.lakeheadu.ca](http://www.lakeheadu.ca)



**Appendix B: Letter for Informed Consent**

# Lakehead

## UNIVERSITY

Faculty of Education – Graduate Studies

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Lakehead University- Faculty of Education  
Graduate Studies  
955 Oliver Road  
Thunder Bay

Title: Older People's Adaptation to New Modes of Communication

Dear Potential Participant,

My name is Kathleen Sandy- Thompson. I am a Master's in Education student at Lakehead University specializing in Gerontology. I am inviting you to participate in an interested research study that gives you the opportunity to talk about your experiences with using various electronic devices such as: Computers, Cellular and Smartphones, Tablets, Kobo and other Internet services and technologies.

The purpose of this research is to explore and describe the experiences of Canadians 65 years and older who are using Information Communication Technologies (ICTs).

More particularly, the study seeks to examine the extent to which older adults in Canada are adopting and adapting to using the electronic devices mentioned above in formal and informal settings.

The study aims to answer the following question:

What are the lived experiences of Canadians 65 years and older in adopting and utilizing Information Communication Technologies (ICTs), particularly personal computers, Internet services and new mobile technologies (Tablets, Smartphones and Kobo) in their daily lives?

For this research project, I am seeking participants who:

- Are 65 years and older.
- Have knowledge of, and use computers, Internet services, and new communication technologies in formal and informal settings.
- Are residents of Ontario, Canada?

Participants will only be selected if the above criteria are met. Participants will be asked to take part in one interview session, which with their permission will be audio-taped and then transcribed for further analysis. The interview will be conducted at a location of the participant's choice and is estimated to take about 60 to 90 minutes.

Many of the questions asked will be related to your personal experiences. Consequently, there is a possibility of minor emotional distress. However, this stress will be no greater than that experienced in a routine discussion or conversation. Your participation in the study is voluntary. You have complete authority to refuse to participate, or answer any questions. You may withdraw from the study at any time without penalty.

Your identity, and the information you have provided will be kept completely confidential, through the use of pseudonyms, and by number coding of the interview transcriptions. There will be no sharing of any information that identifies you with anyone other than with my supervisor Dr. Hope Fennell. Your information (paper copies and tapes) will be stored at the Lakehead University for five years according to Lakehead University's Review Ethics Board policy.

This study has received approval from Lakehead University's Review Ethics Board. Should you have any concerns about participating in this study, you may contact Sue Wright at the Research Ethics Board at (807) 343-8283 or [research@lakeheadu.ca](mailto:research@lakeheadu.ca). You may also contact me at (519) 505-2146 or by email at [ksandy@lakeheadu.ca](mailto:ksandy@lakeheadu.ca). Following the completion of this study, you may request a copy of the summary of the research by contacting me by telephone or e-mail. I will then make arrangements with the Lakehead University to forward the summary unto you. Should you have any further questions, please contact me at the above telephone number or my supervisor Dr. Hope Fennell at (807) 343- 8706 or by email at [hfennell@lakeheadu.ca](mailto:hfennell@lakeheadu.ca).

If you would like to participate in this study please sign the attached consent form, and return it to me in the stamped envelope provided. Thanks for considering this request to participate in this research project.

Yours sincerely,

.....

Kathleen Sandy-Thompson

## Appendix C: Consent Form

# Lakehead

UNIVERSITY

Faculty of Education – Graduate Studies

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(807) 343-8706  
 (807) 346-7771  
[hfennell@lakeheadu.ca](mailto:hfennell@lakeheadu.ca)

218 Union Street East,  
 Waterloo  
 Ontario  
 N2J 1C8  
[kmsandy@hotmail.com](mailto:kmsandy@hotmail.com)  
 1-519-505-2146

I,..... have read and understood the contents of the Informed Consent letter inviting me to take part in the research project by Kathleen Sandy-Thompson on ‘Older People’s Adaptation to New Modes of Communication’. I have received adequate information and description regarding the purpose and the nature of the study that looks at the experiences of older persons, and how they adopt and adapt to Information Communication Technologies, particularly computers, internet services and new mobile technologies (Smartphones, Tablets, and Kobo).

I also understand the following:

- My participation in this research is voluntary and that I may withdraw from the study at any time.
- There is minimal risk of emotional distress, but the potential exist where talking about my experiences may be beneficial to me psychologically.
- That the questions are of a personal nature and may arouse feelings of discomfort or anxiety.
- I am aware that I am under no obligation to respond to any questions that may be uncomfortable.
- I am aware that the data I am providing will be used in a thesis, pseudonym will be used to protect my identity, and that the information provided will be held in strict confidence.
- I understand that the information provide in this interview will only be shared with

Dr. Hope Fennell, the research supervisor.

- I understand that the interview will be taped-recorded and only Kathleen Sandy-Thompson and Dr Hope Fennell will have access to the tape recordings. I also understand that the tape recordings and other primary data will be stored for (5) years at Lakehead University.
- I am informed that if it is my desire I will receive a summary of the study, upon request, following its completion.

I hereby consent to participate in this research project.

Participant Signature:----- Date:-----

Date of Interview:-----

Supervisor Signature:----- Date:-----

Researcher Signature:----- Date:-----

## **Appendix D: Interview Guide**

Introductory questions are important for establishing rapport and building harmonious relationship in the interviewing process (Spradley, 1979).

### **Introductory Questions**

1. How long have you lived in the Thunder Bay area?
2. What is the composition of your household?
3. What is your relationship with these persons?
4. What is the highest level of education you have attained (e.g., secondary, college, university)?
5. How would you categorize your income bracket (low, middle, high)?

### **Core Questions (probing for descriptions)**

#### **Adoption/Adaptation Behavior**

6. What are your general perceptions about personal computers and the internet?
7. How has your perception influenced your decision to use computers and internet services?
8. What was your first encounter with using personal computers and internet?  
 Could you describe what this first encounter was like?  
*Probe: How did you feel, were you excited, anxious, nervous, and fearful.*
9. What event or circumstance made you decide to use personal computers and internet services?
10. What communication services (Skype, Email, Facebook and Twitter) do you access on these computer devices (desktop and laptop)?

#### **Use of New Mobile Communication Devices and Internet Services**

11. What type/s of new mobile devices (*Smartphones, Tablets, and Kobo*) do you use?

12. What communication service/s (Skype, Email, Facebook and Twitter) do you access on these new mobile devices?

13. For what purposes do you use these services?

*Probe: e-health information, entertainment, education, talking to family and friends?*

14. How did you decide to start using new mobile communication devices, such as Smartphones, Tablet and Kobo?

*Probe: were you influenced by others or was it a personal decision?*

15. How long have you been using these devices and services?

*Probe: when it first came onto the market or a significant time after?*

16. How regularly do you use these devices and services?

#### **Location of Use, and Pattern of use of ICTs**

17. Where do you usually use computers, and mobile devices most regularly to access services over the internet e.g., private residence, work, school or public place?

*Probe: Do you have a preference in terms of where you use and access these services?*

*Probe: Do you receive any support to access and use these services?*

18. How does your pattern of use differ from one environment to the other?

*Probe: Do you have a preference for some devices and services based on your location*

*(Private residence, work, school and public places).*

#### **Challenges faced by Older Persons with using ICTs**

19. What challenges do you encounter using computer devices and other communication technologies?

20. How would you describe these challenges e.g., physical, cognitive or emotional?

*Probe: How have these challenges affected your interaction with, and use of computers and mobile devices?*

*Probe: How have you dealt with these challenges?*

*Probe: Why did you persist in the face of these challenges?*

### **The Potential of ICTs to promote Continuous Learning**

21. Would you say that ICT has a role to play in the lives of older persons? What do you think is that role?

22. Would you say that using computers, mobile devices and internet services have made a valuable contribution to your life? How would you describe this contribution?

*Probe: Could you give examples of the contributions and how they have improved your life.*

23. Do you perceive ICT as a suitable medium for continuous learning?

*Probe: What role do you think ICT could play in lifelong learning for older persons?*

24. How have you utilized ICT as a tool for learning (formal or informal)?

*Probe: How has ICT contributed to that experience?*

*Probe: Have you found the internet to be a useful tool for sourcing information in this learning process?*



**Closing Questions**

25. Is there anything else you would like to share with me about your experiences with personal computers and new communication technologies and services?

26. In your opinion, did the questions seem clear? Should I have changed anything?

Thank you for participating in my research. May I contact you in the near future to clarify some of the information if necessary?