An Examination of the Historical Time-Period and
Socio-Cultural Factors that Influence Use and Non-Use
of Information and Communication Technologies
by Older, Working-Class Black Americans

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This journey started as a personal goal to learn about technology innovation and the implications for under-served populations within our society. I was particularly interested in learning more about the usage patterns, perceptions, and attitudes of older, working-class Black Americans towards Information and Communication Technologies (ICTs). By doing this research, I hoped to make visible the challenges facing older, working-class Black Americans as society transitions to a dependence on technology for common tasks, activities, and services.

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ABSTRACT

The United States Administration on Aging (2011) predicts that over the next forty years the number of people 65 and older will double and the number of people 85 and older will triple. Meanwhile, technology is becoming more and more important in our everyday lives. The ubiquitous presence of technology in our lives is evidenced in daily activities such as the use of self-service kiosks in grocery stores, the act of completing and submitting forms and documentation online using the Internet, and the disappearance of public pay phones due to the mass marketing of cell phones. These digital technologies, including methods for communication and techniques for storing and processing information, are known collectively as Information and Communication Technologies (ICTs). ICTs are often studied in the context of how modern communication technologies affect society. This study was designed to better understand the use and non-use of ICTs by working-class, Black American older adults. The study focused on these specific ICTs: computers, cell phones, and tablet PCs. The questions guiding the inquiry were these:

- What socio-cultural factors influence use and non-use of ICTs among older, working-class Black Americans?

- What are the engagement patterns, learning experiences, and behavioral transference among older Black Americans within the lower-income and working-class economic strata with ICTs?

The target audience for this study was Black Americans within the working-class and lower-income social strata, ages 65 and over. The data collection consisted of a pre-screen questionnaire, individual interviews, and a brief survey about perceptions and attitudes towards ICTs. Narrative research inquiry was used to analyze the interview responses in relation to the engagement patterns, learning experiences, and behavioral transference with ICTs by the target audience.

Research on the usage of ICTs has focused primarily on lower-income youth and middle- and higher-income adults with higher levels of education. This study is different in that it focuses on a population often marginalized and not considered in the analysis of patterns and trends regarding use and non-use of ICTs. This study contributes to the field by exploring the historical time-period and socio-cultural factors that influence use and non-use of ICTs by an audience that has been inadequately studied. The research conducted reveals how age, race, and class influence the access, adoption, and use or non-use of ICTs.

The findings of this research reveal socio-cultural factors limit the levels of use by the target audience. The learning experiences are greatly influenced by

family members and peers. The desire of the target audience to learn more about

ICTs is driven both by personal interest and the idea that older adults will be left

behind. Engagement patterns include the adoption, acquisition, and use of ICTs.

Similar to the learning experiences, family and peers play a critical role in the

engagement patterns. Although the current engagement patterns and use of ICTs

by Black Americans within the working-class and lower-income social strata

mirrors global trends regarding the usage of ICTs, there are psychosocial factors

influencing the magnitude of usage and level of proficiency achieved by the

study participants. Behavioral transference from inside the home to outside of

the home in regards to using ICTs is directly related to the user type level.

In conclusion, older Black Americans, ages 65 and over, within the

working-class and lower-income social strata, have an interest in and a desire to

adopt, learn, and use ICTs. There is a direct correlation between use and non-use

of ICTs by members of this audience and the historical time-period, prior

experience and exposure to ICTs, and income and education levels. Participants

who were exposed to computers in the workplace during the late 1970s and early

1980s possessed higher comfort, skill, and knowledge levels regarding ICTs.

Education and income levels also impacted use or non-use of ICTs. Participants

with higher levels of education and income used computers and cell phones

more than those with fewer years of education and lower income. The activities and tasks conducted on computers and cell phones were also more advanced.

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Chapter 1: Introduction

[The] paradoxical relationship between innovativeness and the need for benefits of an innovation tends to result in a wider socio-economic gap between the higher and lower socio-economic individuals in a social system. Thus, one consequence of many technological innovations is to widen socio-economic gaps in a social system (Rogers, 1995, p. 295).

This chapter is organized into eight sections. The first section provides an overview of the topic. The second section provides background information about the demographic shift in the aging population and the history and growth of ICTs. The remaining sections consist of the problem statement, key terminology, the significance of the study, the study limitations, an overview of the methodology, and the document structure.

Overview

This study was designed to examine the historical time-period and socio-cultural factors that influence older Black Americans' engagement patterns, learning experiences, and behavioral transference in relation to Information and Communication Technologies (ICTs). *Historical time-period* refers to the significance of world events and technological innovations in the field of ICTs experienced within generational cohorts. The generational cohorts are aligned with these technological eras: (1) mechanical era, before 1930, (2) the electro-mechanical era, c. 1930 to c. 1960; and (3) the digital software era, after c. 1960 (Lim, 2010). Experiences within technology generations are connected with the

way older adults relate to and come to understand ICTs. *Socio-cultural factors* are personal attitudes, perceptions, experiences, and relevancy in relation to the acceptance, adoption, and usage of ICTs.

The specific ICTs designated for examination in this study were personal computers, cell phones, and tablet PCs. These devices were chosen based on research in the field that discusses the benefits of personal computers, cell phones, and tablet PCs for older adults. These devices were also chosen due to their current and growing popularity. Cell phones are the most popular ICT device among American adults; desktop computers are also used by a large percentage, and tablet PCs are growing in popularity (Zickuhr, 2011). Tablet PCs appeal to older adults due to lack of set up time versus personal computers and the installation of software.

The specific audience for this study is Black Americans within the working-class and lower-income social strata, ages 65 and older. For the purposes of this study, *Black Americans* is an inclusive term for people of African descent and heritage who were born and raised in the United States of America. Ethnic and racial minorities who have low socio-economic status, low social support, and who may feel financially or socially isolated, are often referred to as *marginalized* and *socially disadvantaged* (Rigby, Bruch, & Soss, 2007; Sohler et al., 2009; Lewis, Larson, McClurg, Boswell, & Fisher, 2012). This means that people

identified within these groups are on the margins of society and are often

disenfranchised due to larger social, political, and economic forces. The presence

of and reliance upon ICTs has the potential either to exacerbate the

disenfranchisement of this population or to serve as a tool to reduce

disenfranchisement (Zheng & Walsham, 2008). There are benefits associated

with being able to access and use ICTs; in particular, the Internet. For individuals

access to the Internet equates to access to job information, financial services,

entertainment and goods, faster communication mechanisms, lower costs

associated with travel through discounted websites, enhancements of basic

freedoms and cultural life, and accumulation of knowledge (Hill, Beynon-Davies,

& Williams, 2008). Age is an additional factor influencing marginalization and

disenfranchisement. According to Hill, Beynon-Davies, and Williams (2008),

older adults "are at risk of social exclusion and disengagement from the Internet.

The likelihood of Internet engagement is shown to rapidly decrease with age,

and patterns of disengagement are most pronounced amongst the oldest

generation" (p. 245).

   This study focuses on engagement patterns, learning experiences, and

behavioral transference in this target audience. *Engagement patterns* are the ways

in which people interact or do not interact with ICTs. Engagement patterns

include the acquisition, adoption, and use of ICTs. *Learning experiences* refer to

the methods used to acquire knowledge, skills, and competencies related to ICTs.

Behavioral transference is the voluntary and active participation in using ICTs

outside of the home environment for consumer activities; for example, self-

service checkout stations, ticket-purchase kiosks, and automated teller machines

(ATMs).

The intention of this study is to explore how technological innovations

within ICTs perpetuate and, in some instances, exacerbate societal inequalities

among marginalized and socially disadvantaged groups (Calcutt, 1999). Previous

research on the usage of ICTs within these groups has focused primarily on

lower-income youth. This study contributes to the field by exploring the

historical time-period and socio-cultural factors that influence use and non-use of

ICTs by an older audience that has been inadequately studied in the past. The

research conducted reveals how age, race, and class influence access, acceptance,

adoption, and use and non-use of ICTs. "It is widely recognized that digital

information and communication technologies are implicated in social inequities

associated with class, gender, race, ethnicity and age (among others)" (Halford &

Savage, 2010, p. 937). The data from this exploration will add to discourse

focused on the digital inclusion of the identified audience. A digitally inclusive

society is defined as a society where every citizen is able to (1) explore the

potential and benefits of new technologies, (2) access and share information and

services freely, and (3) effectively participate in the community through the use

of ICTs (Lam & Lee, 2006).

Background

Aging Defined

The meaning of aging is a social construct defined by society's ideals of

what becoming older means (Weeks, 2008). As a social construct, age is based

upon chronological, biological, psychological, and sociological processes

involving the individual and the structural characteristics of the social system

within which it occurs (Matcha, 1997; Hooyman & Kiyak, 1991; Stuart-Hamilton,

2011). It is important to understand the phases of aging and the cohorts

associated with older adults because the phases and cohorts affect the levels of

engagement and perceptions about ICTs. Levels of engagement and perceptions

influence adoption, access, and use of ICTs.

Chronological aging is the definition of aging on the basis of a person's

years from birth. Within chronological aging there are two cohorts of "older

adults." These cohorts are known as the Third Age and the Fourth Age. The

Third Age is often referred to as the period of healthy aging, while the Fourth

Age refers to the period of non-healthy aging (Hooyman & Kiyak, 1991). Healthy

aging is the process of growing older in which mental and physical capacities

remain intact, quality of life is not compromised due to health limitations, and

independence is maintained. Non-healthy aging is the condition of aging in

which chronic diseases, illnesses, and conditions impact the individual's quality of life.

Biological aging consists of the physical changes that reduce the efficiency of organ systems, such as lungs, heart, and the circulatory system. *Psychological aging* includes changes that occur in the sensory and perceptual processes, mental functioning (i.e., memory, learning and intelligence), personality drivers, and motives. *Sociological aging* is an individual's changing roles and relationships in the social structure—with family and friends, with the work world, and within organizations such as religious and political groups (Hooyman & Kiyak, 1991).

Growth of an Aging Population in America

A shift of perspective regarding what it means to grow old may be influenced in the future by the fact that more people in the United States and other industrialized countries are becoming old. "Over the next forty years, the number of people aged 65 and older is expected to double and the number of people aged 85 and older is expected to triple" (Administration on Aging, 2011). According the report titled "A Profile of Older Americans: 2011," published by the Administration on Aging, the number of adults 65 and over increased from 35 million in 2000 to 40 million in 2010 and is expected to increase to 55 million by the year 2020 (see Figure 1). In addition, the number of adults 85 and over is projected to increase from 5.5 million in 2010 to 6.6 million in 2020.

Figure 1: Number of Persons 65+, 1900 - 2030 (numbers in millions)
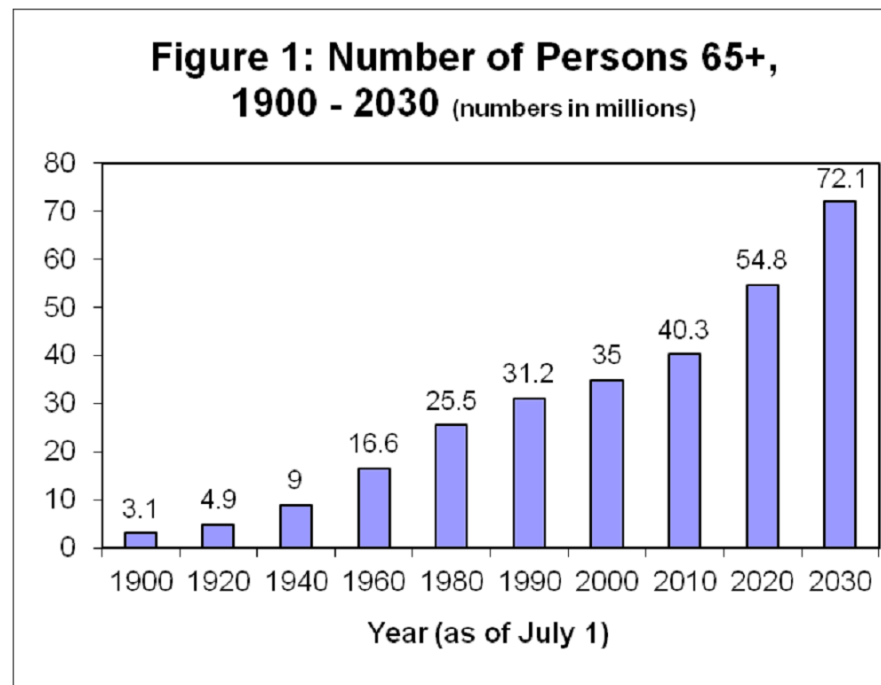
Figure 1: Number of Persons 65+, 1900 – 2030, created by the Administration on Aging.

This increase in the older population has been attributed to the baby boomer generation, an increase in life expectancy, and access to better health care (Olshansky, Goldman, Zheng, & Rowe, 2009; Danigelis, Hardy, & Cutler, 2007). The *baby boomer generation* refers to people born between 1946 and 1964, after the Second World War (Feng, Tyler, Clark, & Mor, 2011; Stuart-Hamilton, 2011). During this period, more babies were born than during any other time period in recent history: 3.4 million babies were born in 1946, 3.8 million were born in 1947, and 3.9 million were born in 1952. Between 1954 and 1964, 4 million babies were born each year. It is speculated that this increase in births was a consequence of citizens feeling optimistic about the future after surviving historical events like the Great Depression and WWII. The significance of the baby boomer generation

is that, due to the very large number of babies born in that generation (compared to babies born during other time periods); a huge percentage of the United States' population is now growing old.

In addition to the number of baby boomers, an increase in life expectancy in industrialized countries has impacted the growth of an aging population (Stuart-Hamilton, 2011; Lim, 2010; Czaja & Sharit, 2009). Olshansy, Goldman, Zheng, and Rowe (2009) suggest that factors such as the extension of life and progressive increases in disability-free life expectancy have generated a dramatic transition in the United States.

Related to the increase in life expectancy is the growth in initiatives geared toward raising awareness and promoting behaviors and habits that facilitate healthy aging. For example the Center for Disease Control sponsors a program titled the Healthy Aging Research Network. The purpose of this network is to identify and share best practices for keeping older adults healthy. Another example is the National Institute on Aging's research focus on factors that contribute to healthy old age. Compliance with these types of initiatives contributes to an increase in the aging population.

Growth of an Ethnically Diverse Older Population

Coupled with the increase in the population classified as "older," there has also been a shift in the racial and ethnic representation of older adults. The

older population is becoming more racially and ethnically diverse as the overall

minority population grows (Bicket & Mitra, 2009). Minority populations are

defined as non-White individuals categorized as Hispanic, Black, Asian and

Pacific Islander, and American Indian or Alaskan native (Bicket & Mitra, 2009).

Minority populations have increased from 5.7 million in 2000

(representing 16.3% of the elderly/older adult population) to 8.0 million in 2010

(representing 20% of the elderly/older adult population) (Administration on

Aging, 2011). The minority population is projected to increase to 13.1 million in

2020, at which time minorities will represent 24% of the elderly/older adult

population. The increase in Hispanic and Asian populations has been attributed

to immigration patterns of people moving to the United States. In addition,

Hispanics are reported to have a longer life expectancy (Gassoumis, Wilber,

Baker, & Torres-Gil, 2010).

The Black American older population was 3.2 million in 2008 and is

projected to grow to over 9.9 million by 2050. In 2008, Black Americans made up

8.3 percent of the older population. By 2050, Black Americans are projected to

account for 11 percent of the older population (Administration on Aging, 2009).

Both the older population and the ethnically diverse population are increasing.

Growth of Information and Communication Technologies (ICTs)

As the population of older Americans grows, simultaneous growth is taking place within the field of ICTs. The growth in sophistication and implementation of ICTs is contributing to the creation of a digitally dependent society—a society in which citizens are becoming more and more reliant on ICTs to facilitate daily activities. ICTs are creating platforms and mechanisms for the redistribution of tasks and activities for education, health, medicine, leisure, and business. Within the field of ICTs, the Internet has become a major tool for the growth of online communication and commerce transactions, providing a framework to enable a digital economy (Economics and Statistics Administration [ESA] & National Telecommunications and Information Administration [NTIA], 2010; Zarcadoolas, Blanco, & Boyer, 2002).

Throughout the history of ICTs, government agencies, such as the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC), have played a large role in writing policies and providing funds for networks, equipment, training, and an infrastructure to establish, build, and grow ICTs. The NTIA's earlier focus was on developing programs to make digital network technologies available to both public and private sectors (Bertot, 2003). The NTIA's current programming and

policymaking focus on the expansion of broadband Internet access and adoption by all users.

The FCC's involvement in the growth of ICTs was initiated through the establishment of the Wireless Telecommunications Bureau (WTB). The WTB is responsible for all FCC domestic wireless telecommunications programs and policies, as well as communications or broadcasting by satellite, including licensing, enforcement, and regulatory functions. In addition to the government's involvement in the growth of ICTs, corporations, non-government organizations, and educational institutions have played a role in the transformation and popularity of ICTs. For-profit corporations, in particular, have played a major role in facilitating the growth of ICTs through the telecommunications industry and through the establishment of Internet Service Providers (ISPs). Internet Service Providers are responsible for building the infrastructure and networks to make the Internet physically accessible via a paid subscription for services. These efforts by governmental agencies, corporations, non-government organizations, and educational institutions have helped narrow the gaps in ICT access, adoption, and use between marginalized and non-marginalized groups. However, there still remains a gap in access, adoption, and use based on socio-economic status, ethnicity, and age (Gatto & Tak, 2008). This concept is covered in more detail in Chapter 2.

The growth of ICTs has transformed the ways in which daily transactions and activities occur. This growth is evidenced by the reliance on the Internet for communication, social activities, the collection and dissemination of information, entertainment, commerce, and education. The growth of ICTs has also fostered an increase in the number of government social service programs that provide and collect information via the Internet and may require the completion of online forms. These types of programs are referred to as e-Government. Listed is a sample of the types of services provided by the United States' e-Government system: filling out forms for Disability, Social Security, and Food Stamps; completing forms for Medicare Part D (prescription drug benefit program); making appointments with immigration officials; filing court petitions; taking driver's tests; and paying fines. With e-Government, public sector services move online into an electronic format, where American citizens must learn how to access, decipher, interact, and respond to this new approach to government.

This example illustrates how the growth and prevalence of technology innovations may contribute to larger social inequalities. For this study, the specific inequalities being examined are those associated with the fundamental impact of the target population's ability to access, adopt, and use ICTs. Hill et al's (2008) definition of Internet engagement can be used to define the broader context of ICT access, adoption, and use. *Internet access* refers to the level of

contact an individual has to the Internet and Internet services, either inside or outside the home (i.e., use of the Internet through a personal computer physically located in the home or in a library or other public facility). *Internet adoption* is ownership of household Internet connections, including either acceptance or rejection of ownership. *Internet use* is usage of the Internet inside and outside the home; the term also has reference to the nature and quality of that usage. The growth of both ICTs and the population of older adults from ethnically diverse backgrounds present both benefits and challenges.

Statement of the Problem

There are differences in access, adoption, and use of ICTs based on socio-economic status, age, ethnicity, gender, and education level. Research referenced by Cresci, Yarandi, and Morrell (2010) suggests that "older adults using the Internet tend to be younger, more educated, and have higher incomes and are more likely to be Caucasian and equally male or female when compared to seniors who do not use the Internet" (p. 502). When compared to the population at large, older adults with lower education and income levels are least likely to use ICTs. Studies show that even though there have been significant gains in Internet access, adoption, and use, the poor and members of racial minorities are lagging behind society's dominant groups in terms of computer ownership and Internet connectivity (Duran & Valadez, 2007).

There is an abundance of research data chronicling the access, adoption, and use of ICTs by non-marginalized groups, including older adults within mainstream society. The marginalized groups that have been studied extensively are children and youth from disadvantaged backgrounds. Less research has been conducted and published about older, working-class, ethnically diverse Americans with lower levels of education and the identification of characteristics that influence use or non-use of ICTs by this audience. Identifying and understanding characteristics and qualities that influence use or non-use is important because there will be more older adults from ethnically diverse backgrounds as this century progresses and more instances in which ICTs will either replace or supplement communication activities and business transactions.

One example of this transition is the previously described e-Government initiative, which moves governmental transactions like driver's license renewals, completion of voter registration forms, and accessing social service information to the Internet. Other examples relevant to older adults include accessing medical information from primary care physicians through electronic mail (email) systems, viewing electronic versus paper copies of medical records, scheduling doctors' appointments, and paying bills online. As society becomes more dependent on ICTs, the older, ethnically diverse segment of the population is likely to become more digitally excluded.

For this study, research questions were developed to identify factors that contribute to the use or non-use of personal computers, cell phones, and tablet PCs. The questions also addressed the participants' learning experiences with these technologies and their attitudes and perceptions about ICTs. The research questions were created to facilitate a discussion around use and non-use of ICTs, with the intention of revealing personal attitudes, perceptions, and experiences that offer insight into challenges, barriers, and opportunities regarding ICTs for this audience. The research questions for the study include:

- What socio-cultural factors influence use and non-use of ICTs among older, working-class Black Americans?

- What are the engagement patterns, learning experiences, and behavioral transference among older Black Americans within the lower-income and working-class economic strata with ICTs?

The researcher also explored the following sub-category of questions:

- How do older, working-class Black Americans perceive ICTs?

- How do race, class, and gender impact use and non-use of ICTs?

- How do motivation, perception, and attitude impact use and non-use of ICTs?

- What function do ICTs serve in the lives of older, working-class Black Americans?

- How are older Black Americans accessing and using ICTs?

Key Terminology

Key terminology used in this study is defined in this section. The key terms include *older adults*, *working-class*, *Information and Communication Technologies (ICTs)*, *broadband*, *digital economy*, *e-Government*, *tele-health*, and *texting*.

Older Adults

The term *older adult* refers to the age cohort of 65 and over. Within the larger cohort there are two sub-cohorts (as described in the earlier section of this chapter, "Aging Defined"): Third Age and Fourth Age. The Third Age as a time when we are still healthy enough to engage in all of the normal activities of daily life, but are able to be free of regular economic activity. The Fourth Age is when the rest of our life will be increasingly consumed by coping with the health effects of old age (Weeks, 2008, p. 338). In addition to dividing older adults into cohorts, the research community has also developed age-based segmentation to classify three stages of the concept *old*. These stages are the *young-old*, representing people who are 65-74 years old; the *old-old*, representing people who are 75-85 years old; and the *oldest-old*, representing people who are 85 years and beyond (Lee, Chen, & Hewitt, 2011). The young-old and the old-old are within the Third Age. The oldest-old are in the Fourth Age.

Working-Class

Working-class is a sociology term used to characterize groups of people based on income, education, and ethnicity. It refers to the socio-economic status of people with wages below $25K a year. Socio-economic status encompasses an individual's income and education levels, as well as his or her occupation. Working-class is the social class used to distinguish between middle-class and low-income individuals. However, this segment of the population is often referred to as or grouped together with low-income individuals.

ICTs

Information and Communication Technologies (ICTs) refer to a wide range of digital technologies, including methods for communication (communication protocols, transmission techniques, communications equipment, media communication, etc.) and techniques for storing and processing information (computers, data storage, etc.). The ICTs focused on in this research study are personal computers, cell phones, tablet PCs, the Internet, and social media.

Personal computers are categorized as desktops and/or laptops accessed by the individual. Personal computers may be accessed either in the home or in a public or community space. *Cell phones* are mobile, hand-held devices used primarily for sending and receiving voice calls, although they may also be used for texting (defined below). Cell phones include *smartphones*, which incorporate miniature computers that enable more advanced activities (such as Internet

connectivity). *Tablet PCs* are miniature personal computers that are operated by less robust hardware (as compared to a regular personal computer). Within the tablet PC category are *eReaders*, which are web-enabled devices used to make print media available in an electronic format. *The Internet* refers to access to and usage of the worldwide computing network system. *Social media* refers to activities such as micro-blogging on Twitter, having a social networking profile on Facebook, or watching online videos from services like YouTube or Vimeo.

Broadband

Broadband refers to the equipment and services used to connect to the Internet at rapid speeds on a constant basis.

Digital Economy

A *digital economy* is one that relies on ICTs for monetary transactions and exchanges of goods.

e-Government

Former U.S. Vice President Al Gore coined the term *e-Government*. Gore's vision of e-Government consisted of linking citizens to the various agencies of government, enabling them to access government services in an automated and automatic way.

Tele-health

Tele-health is a term used to describe a set of tools installed in a person's home to monitor health and illness issues.

Texting

Texting is the activity of using a cell phone to send and received typed

messages from another cell phone.

Significance of the Study
Promise of the Internet

There is a dominant cultural view of what it means to be a participant or

actor in a technologically advanced and information-rich society. This view is

evident in the rhetoric that surrounds the diffusion of ICTs. The Internet has

been described as a platform for innovation, economic growth, and social

communication. This perspective embodies a utopian ideology that embracing

and participating in the adoption and use of ICTs will lead to a successful and

prosperous citizenry. "The Internet has revolutionized the social and economic

environment in which we live by providing an alternative or supplemental

channel for communication, gathering and disseminating information,

entertainment, commerce and education" (ESA & NTIA, 2010, p. 1). Contrary to

what mainstream media and research organizations reveal about the growth of

Internet adoption, on a global level the majority of the world's citizens *still* do not

have access to the Internet. This lack of access is associated with inequalities of

income and class, gender, race, and age (Halford & Savage, 2010). As

enhancements are made to ICTs (such as the increasingly common use of a

broadband connection versus a dial-up connection to access the Internet),

disparities between certain groups within society persist and may even widen.

The Economics and Statistics Administration and the National

Telecommunications and Information Administration states:

> The data reveal that demographic disparities among groups have
> tended to persist. Persons with high incomes, those who are
> younger, Asians and Whites, the more highly educated, married
> couples, and the employed tend to have higher rates of broadband
> use at home. Conversely, persons with low incomes, seniors,
> minorities, the less-educated, non-family households, and the non-
> employed, tend to lag behind other groups in home broadband use
> (2010, p. i).

A broadband connection enables faster connection speeds to access the Internet.

Slower Internet connections could discourage people from going online and

accessing the information and resources available on the Internet.

Education and Income Levels of Black Americans [and Latinos]

The socio-economic status of individuals is based on work/occupation,

education, and income levels. Understanding the current education and income

levels of Black Americans [and Latinos] compared to other racial and ethnic

groups provides insight into the current status of [these groups] that will help in

the analysis of how ICT use, adoption and access differs and why. The education

and income levels of Blacks [and Latinos] are still behind most other ethnic groups. In 2009, 63.8% of Black Americans aged 65 and older had finished high school compared to 83% of White Americans, 74% Asian Americans (2008), only 45.9% of Latinos aged 65 and older had finished high school (see Figure 2) (Administration on Aging, 2008 & 2009).
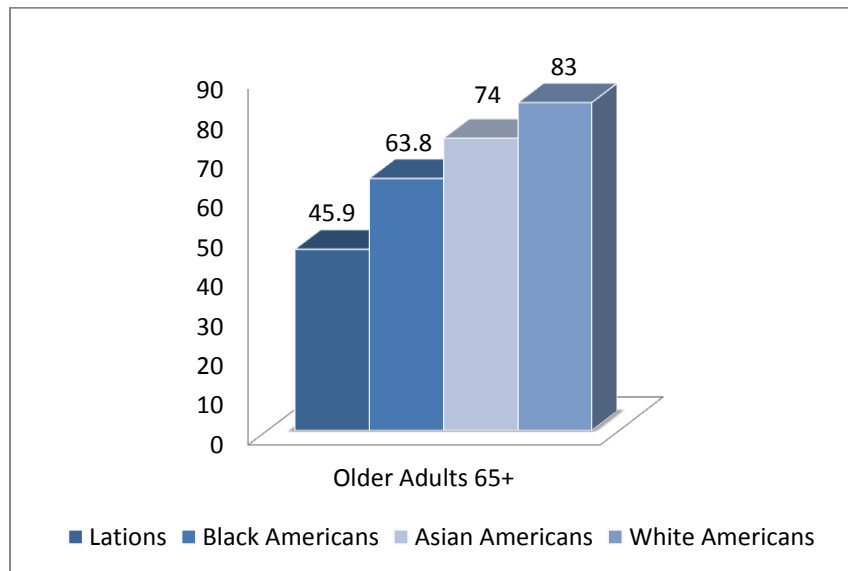
Figure 2: High School Completion Age 65+, 2009, created by Maléka Ingram

There are also variances in the median income of older [Latinos,] Black Americans, Asian Americans, and White Americans. According to research conducted by Purcell (2008) for the U.S. Congressional Research Service, the median income of [older Latinos was $11,957, while that of] older Black Americans was $14,357; the median income for older Asian Americans was $18,518, and the median income of older White Americans was $19,372 (see Figure 3) (Administration on Aging, 2008).
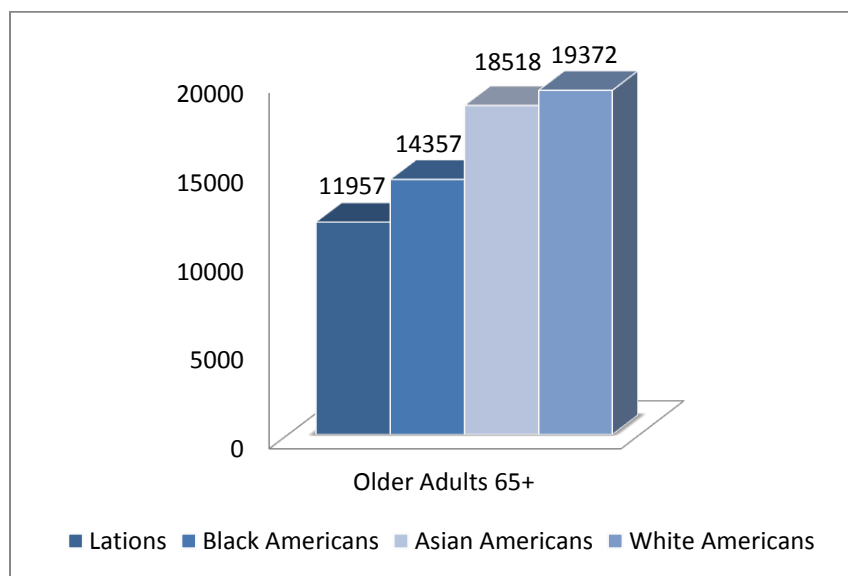
Figure 3: Median Income for Older Adults, 2008, created by Maléka Ingram

There is a 26% difference in median income between older Black and White Americans. [There is an even greater difference, 39%, in median income between older Latinos and White Americans.] Further income disparities are present when reviewing older adults suffering from poverty. The 2008 poverty

rates for older adults were 6.6% of elderly Whites, 12.1% elderly Asian-

Americans, compared to 19.5% of elderly African-Americans [and 18.3% of

elderly Hispanics] (Administration on Aging, 2008). The disparities in education

and income level between ethnically diverse older adults and White Americans

is significantly greater among Latinos. Latinos are another population in which

further research is needed to understand the challenges this segment of the

population may face in regards to use and non-use of ICTs.

The gap in income and education between older Black Americans and

[Latinos and] their Asian and White American counterparts points to the need

for more extensive analysis of how these differences influence access, adoption

and use and non-use of ICTs. This knowledge could prove useful to designers of

ICTs, agencies that provide services for the [ethnically diverse] target

audience[s], and other groups interested in the use patterns and adoption rates of

the ethnically diverse populations.

Methodology Overview

The methodology for this study included the design and distribution of a

pre-screen questionnaire, development of a set of responsive interview

questions, and the development of a brief survey. Prior to starting the research,

an Institutional Review Board (IRB) application was completed. The pre-screen

questionnaire had demographic questions and questions about use and non-use

of personal computers, cell phones, and tablet PCs. The responsive interview

questions focused on historical context and engagement with ICTs, usage

patterns, and learning experiences. Interviews, rather than surveys, were chosen

to obtain in-depth data. The use of interviews made it possible to ensure clear

interpretation of the questions being asked, to accommodate any literacy

barriers, and to facilitate deeper dialogue in order to collect personal narratives

from the interviewees. The brief survey was designed to collect data on the

participants' attitudes and perceptions regarding ICTs. All instruments were

delivered in person by the researcher.

The participants of the study all reside in an income-restricted housing

community operated by a non-profit organization. The participants consisted of

Black Americans within the working-class and lower-income social strata, ages

65 and older. Participation in the study was voluntary. The results were analyzed

and synthesized using the narrative research inquiry approach. The participant

interviews were recorded using a Smartphone and transcribed. The

transcriptions were analyzed and coded using thematic concepts. Results from

the study were presented to the participants during a conclusion and gratitude

meeting. During this meeting, participant feedback was collected and added to

the recommendations section. Participants were also given grocery store gift

cards as an incentive for participating in the study. Study results were used as

partial fulfillment for a Doctor of Science degree in Information and Interaction

Design from the University of Baltimore.

Study Limitations

The study limitations were the number of participants and the length of

the study. Therefore the results are suggestive, rather than conclusive. Which

means this study is categorized as an experimental investigation. Although 22

participants initially expressed an interest in the study, only 15 carried through

with the interviews. A larger sample would have allowed for a better

comparison between users and non-users. In addition, a larger sample size

would have allowed for more data analysis on the impact of education and

income levels on use and non-use. The length of the study was also abbreviated

due to time constraints and travel requirements of my full time job. A longer

period of time would have allowed for more observations of participants during

the projected training and learning phases of the research project.

Document Structure

This document is divided into five major sections: Introduction (Chapter

1), Literature Review (Chapter 2), Methodology (Chapter 3), Results (Chapter 4)

and Conclusions and Recommendations (Chapter 5). This chapter (Introduction)

has presented the research problem, provided background information about the

study, synthesized the rationale for the study, and explained its significance. It

has also presented context for the study by exploring the aging population trend,

the development and growth of ICTs and our society's increasing reliance upon them. Chapter 2 will describe the background literature in the following areas: the benefits to adoption, access, and use of ICTs; the barriers to adoption, access and use of ICTs; design and usability of ICTs; and learning experiences and training methodologies associated with ICTs. Chapter 3 will describe the research design, the study participants, and the data collection and analysis processes. Chapter 4 will present the results and findings. Chapter 5 will provide a summary of the study, a conclusion, and recommendations for further research.

Chapter 2: Literature Review

The move toward a knowledge-based and increasingly digital society has had economic and social impacts that threaten to exacerbate existing inequalities and social exclusion (Hick, 2006, p. 54).

Overview

Previous research conducted by Zarcadoolis, Blanco, and Boyers (2009) discusses the minimum attention given to non-mainstream populations with regard to studying and understanding how they use or do not use the Internet. This chapter presents a review of the literature within these focus areas: (1) the benefits of ICTs for older adults, (2) the adoption and use of ICTs by older adults, (3) barriers to the adoption, access, and use of ICTs, (4) principles of design and usability of ICTs for older adults, and (5) theories regarding learning experiences and training with ICTs for older adults. The study's conceptual framework is based on the premise that a more in depth investigation of the socio-cultural factors influencing marginalized populations' use or non-use of ICTs will help counter the creation and deployment of technological innovations that perpetuate social inequities.

Benefits of ICTs for Older Adults
Cognitive, Psychological and Physiological Benefits

For older adults, ICTs have the potential to help mitigate age-driven changes in cognitive, psychological, and physiological abilities that affect quality of life and independence or inter-dependence on others. ICTs may help

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individuals who are struggling with age-related declines and changes by

providing tools and mechanisms that foster increased autonomy, connectivity to

social networks, levels of empowerment and self-efficacy, support for healthy

living, access to health-related information, and options for entertainment (Brey,

2006; Gatto & Tak, 2008; Hill et. al., 2008; Czaja & Sharit, 2009; Jones,

Winegarden, & Rogers, 2009; Jung et al., 2010; Melenhorst, Rogers, & Caylor,

2001; Rosenthal, 2008). ICTs enable the technical infrastructure that supports

tools and systems, such as tele-health and remote monitoring, which allow

individuals to age in place using advanced technologies (Blaschke, Freddolino, &

Mullen, 2009). Aging in place means older adults complete the aging process

within the comforts of their own homes (Gitlin, 2003). Tele-health tools include

passive monitoring systems (e.g., fall and movement sensors), remote exchange

of data (e.g., blood pressure) between patients and health care professionals, and

video conferencing systems that allow patients to interact with family, friends,

and health care professionals (Blaschke et al., 2009).

The processes of aging often have a negative impact on cognition—the

operation of the mind, the thinking process, and memory functions. Leading

gerontology experts, Fisk, Rogers, Charness, Czaja, and Sharit (2009) define

cognition as "the processes by which the brain takes sensory input, whether from

the eyes, ears, or other senses, and transforms, reduces, elaborates, stores,

recovers, and uses that sensory input"(p. 14). Cognitive functionality, which includes intelligence, attention, memory, processing speed, learning, and problem solving, may become impaired in old age. ICTs have the potential to help cognitive declines in memory. Examples of systems and tools that may help older adults' memory challenges include online games to strengthen brain activity, cognitive reminder systems for medication management, and assistive devices that provide tutorials and instructions on how to use electronic devices (Saunders, 2004; Jones, Winegarden, & Rogers, 2009).

Psychological changes—the alteration of emotions, moods, and personality traits—can also be a result of the aging process. Determinants of older adults' psychological well-being include feeling independent and in control and feeling needed and valued (Erikson & Erikson, 1997; Shiovitz-Ezra & Leitsch, 2010). Over the years, researchers have focused on how the use of ICTs helps to combat psychological feelings of loneliness, to provide a sense of belonging, and to foster the independence of older adults. Previous research findings show that the use of ICTs helps older adults build social relationships and networks, contributes to a sense of belonging and independence, helps promote empowerment and self-efficacy, and creates feelings of competence (Melenhorst et al., 2001; Saunders, 2004; Brey, 2006; Jones et al., 2009; Madden, 2010). Research also emphasizes the social benefits of ICTs in contributing to

older adults' sense of connection to the outside world. These social benefits

impact psychological health and well-being by providing instances that counter

depression induced by a lack of community, social interaction, and sense of

belonging (Lee et al., 2011). Using email, participating in online communities,

playing online games, and interacting with social networking tools are all

activities that create opportunities for feeling connected and engaged with

friends and family.

Physiological changes in older adults are the physical changes in body,

psychomotor skills, and sensory functions and abilities (such as vision and

hearing) that result from the aging process. Age-related changes in the body

form generally include a loss of muscle and body mass, weight loss, gradual

reduction in height, a lower metabolic rate, longer reaction time, and decreased

sexual activity (Craik & Salthouse, 2000; Stuart-Hamilton, 2011). Psychomotor

functions—the processes associated with muscular movement and the

production of voluntary movements—are also impacted by aging. ICTs have the

potential to help older adults' physiological declines by aiding those with

mobility challenges, helping to facilitate communication between caregivers and

older adults, and providing help in accessing health-related information (Jones et

al., 2009; Cresci et al., 2010). Older adults with mobility challenges may use ICTs

like the Internet and email to participate in personal communication, deal with

financial matters using online banking, access entertainment such as games, movies and music, and access health-related information (Reisenwitz, Iyer, Kuhlmeier, & Eastman, 2007; Cresci et al., 2010).

ICTs have the potential to help older adults in the areas of cognitive, psychological, and physiological changes and declines. ICTs offer opportunities to improve the quality of life of aging adults by creating instances that promote learning and cognitive development, enable communication channels to promote social activities, and enable remote medical interventions (Brey 2006; Gatto & Tak, 2008; Czaja & Sharit, 2009; Blaschke et al., 2009).

Adoption and Use of ICTs by Older Adults
Rate of Adoption

Adoption and use of ICTs are coupled due to the interdependence of the two. Adoption of ICTs includes not only ownership of physical devices and services but also acceptance of ownership. ICT use refers to utilization inside and outside of the home, and also includes the nature and the quality of use. The rate of adoption and use of ICTs is greater among people with higher levels of education and incomes, and lower among older adults and ethnic minorities (ESA & NTIA, 2010; Nam, 2010; Lim, 2010; Rosenthal, 2008; Czaja & Sharit, 2009; Cresci et al., 2010; Gatto & Tak, 2008; Reisenwitz et al., 2007). Within the older adult population, there is a demographic divide; the sub-population of dominant users consists of individuals who are relatively younger, predominately White

and highly educated, and who also have higher incomes (Reisenwitz et al., 2007;

Cresci et al., 2010). Older adults who have adopted ICTs have been introduced

to them by family members—children and grandchildren, in particular—and

peers (Gatto & Tak, 2008; Hamilton, 2011). Once introduced to ICTs, there are

particular patterns and usage types that are associated with older adults versus

younger adults. Studies suggest the differences in these patterns and usage types

are caused by older adults' attitudes and perceptions and by age-related changes

in physical challenges and declines in cognitive capabilities (Weilenmann, 2010;

Cresci et al., 2010; Hamilton, 2011; Stark-Wroblewski, Edelbaum, & Ryan, 2007).

These barriers are discussed in the "Barriers to Adoption, Access, and Use"

section.

Use Patterns and Classification Types

The use patterns of older adults who have adopted ICTs show that older

adults use ICTs primarily for communication, maintaining or developing

relationships, financial management, shopping, and searching for information

(Craik & Salthouse, 2000; Reisenwitz, et al., 2007; Kim, 2008; Selwyn & Gorard,

2008; Rosenthal, 2008; Hamilton, 2011). Older adults still use the Internet to

access email and look for online news at higher rates than any other user group

(Madden, 2010). The communication channels being utilized by older adults with

family and friends include email, mobile phones, and video conference tools (e.g.

Skype). Security and safety concerns are the main reason adults 65 and over use mobile phones (Pedlow, R., Kasnitz, D., & Shuttleworth, R., 2010). Even though mobile phones have features such as text messaging and browsing, older adults mainly use mobile phones for sending and receiving phone calls (Ji et al, 2010). Older adults are also using social networking platforms (i.e. Facebook and LinkedIn) to manage daily communications (Hamilton, 2011; Zickuhr, 2010; Gatto & Tak, 2008).

Even though older adults make up less than 10% of all active Internet users, they are the fastest growing consumer segment of Internet users and social media platform users (Zickuhr, 2010; Wagner, Hassanein, & Head, 2010). Social media use by older adults showed a significant growth in 2009-2010 compared to younger adults. Between April 2009 and May 2010, social networking use among Internet users ages 50-64 grew by 88% and users ages 65 and older grew by 100% compared to users ages 18-29 whose usage only grew by 18% % (Zickuhr, 2010) (see Table 1).The growth of social media among older adults is attributed to a desire to re-establish relationships, facilitate community, and build support systems.

Social Media Use by Age

■ Ages 65+ ■ Ages 50-64 ■ Ages18-29

76%

86%

25%

47%

13%

26%

April 2009

May 2010
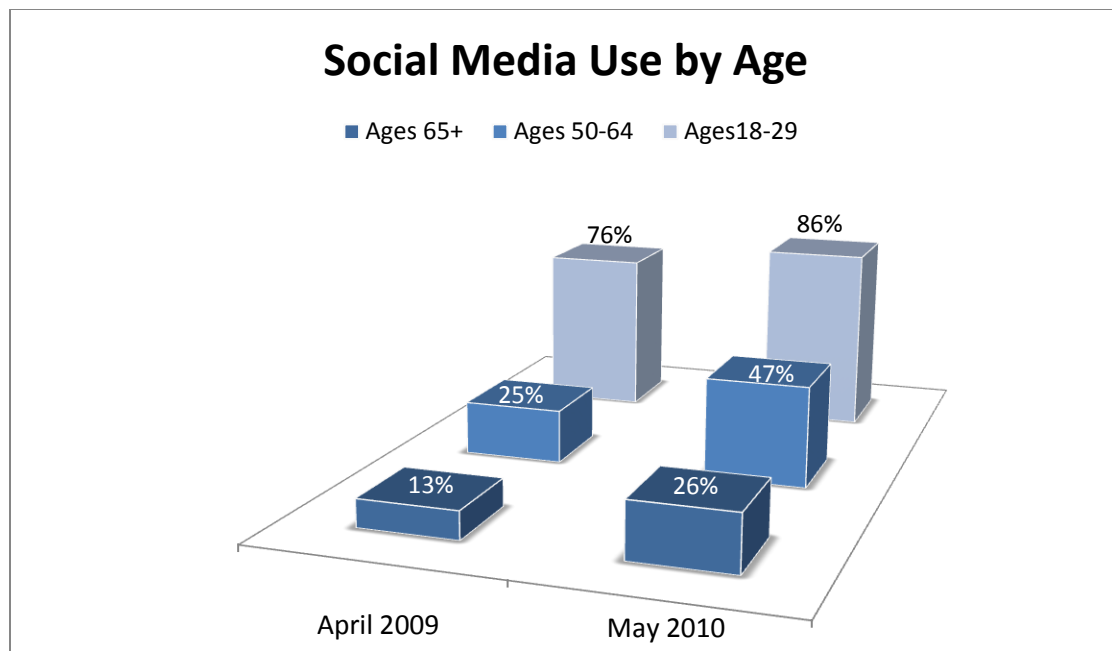
Table 1: Social Media Use for Older Adults 65+, created by Maléka Ingram

Internet users over the age of 55 are driving the growth of social

networking through the mobile Internet (Nielsen, 2011). However, the age cohort

of older adults who use smartphones to access the mobile Internet is typically

younger. According a report produced by Aaron Smith (2011) of the Pew

Research Center, 22% of older adults ages 55-64 use some type of smartphone.

However, the percentage decreases to 11% for smartphone users ages 65 and

above. This same trend in the decline of device use by users ages 65 and above is

reflected in the adoption of tablet PCs. According to a research study conducted

by Raine, Zickuhr, Purcell, Madden and Brenner (2012), adults 65 and over, with

lower income and education levels are least likely to consider purchasing a tablet

PC. Within ICT usage patterns of older adults, there are four distinct user types.

Anthea Tinker, a professor of Social Gerontolgy, provides these classifications of the older adult user types: "Digitally Challenged" (people with no experience and no interest in computers), "Technologically Open-Minded" (these are non-users but keen on learning about technology and/or wishing to gain computer skills), "Old-Age Beginners" (those with few computer skills, using a computer less than once a week), and "Experienced Front-Runners" (users with advanced computer skills, using computers at least once a week; as cited in Stuart-Hamilton, 2011). These user classification types are helpful in understanding the spectrum of older adults' use or non-use of ICTs. These user types were used to classify study participants' levels of use or non-use of ICTs. This linkage between study participations and the classification chart is described in Chapter 4.

User Characterization

Even though the gaps between ethnic populations and White Americans have narrowed over the years, Blacks and Latinos still lag behind Whites when it comes to Internet access, broadband connections, and cell phone ownership. In 2010, 65% of Latinos and 66% of Blacks went online, compared to 77% of Whites (see Figure 4). Examining the use of broadband connections shows that 45% of Latinos, 53% Blacks, and 65% of Whites had broadband at home in 2010 (see Figure 5). Regarding cell phone ownership, 85% of Whites owned cell phones in

2010, compared to 76% Latinos, and 79% Blacks (see Figure 6; Livingston, 2011).

In regards to tablet PCs, 21% of Black Americans and Latinos interviewed during

a Pew Research Project owned a tablet PC compared to 19% of white Americans

(Rainie, 2012). However, the numbers decreased based on age, education and

income level. As stated previously, most adults over age 64 with lower levels of

education and income, are very unlikely to own tablet PCs.
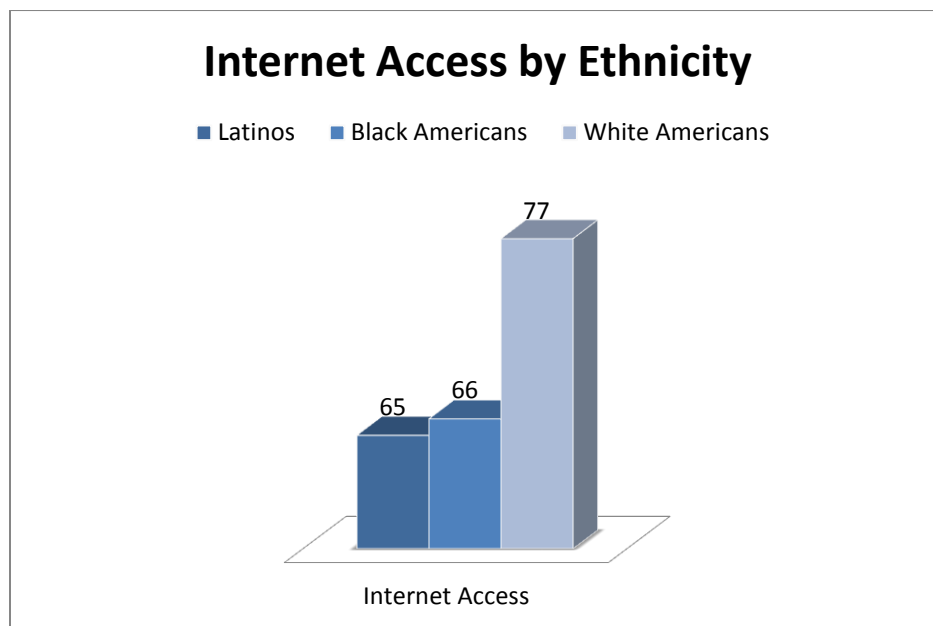
Figure 4: Internet Access by Ethnicity, created by Maléka Ingram

Broadband Access by Ethnicity

■ Latinos   ■ Black Americans   ■ White Americans

83

63.8

45.9

Older Adults 65+
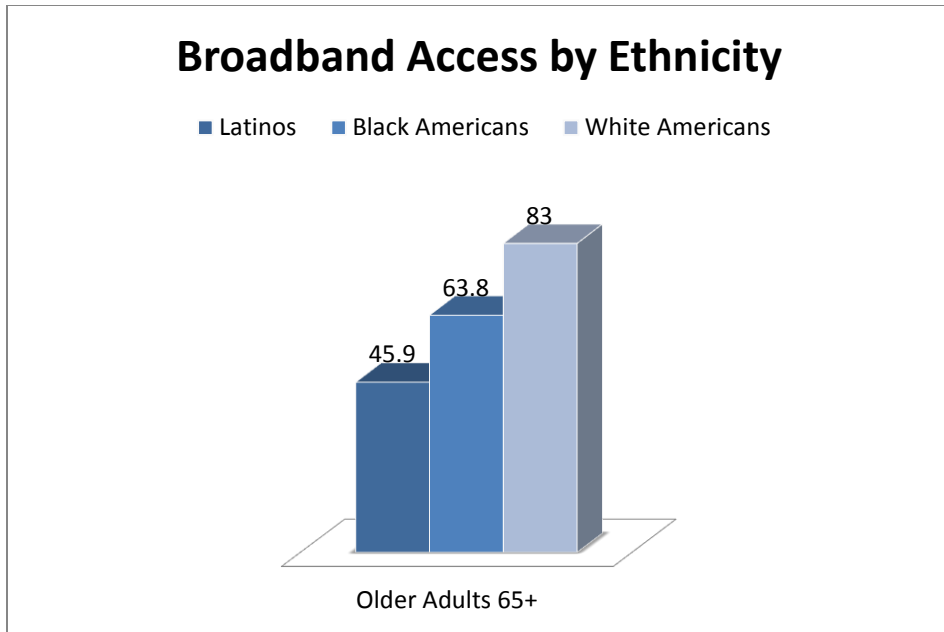
Figure 5: Broadband Access by Ethnicity, created by Maléka Ingram

Cell Phone Owernship by Ethinicity

■ Latinos   ■ Black Americans   ■ White Americans

85

79

76

Cell Phone Ownership
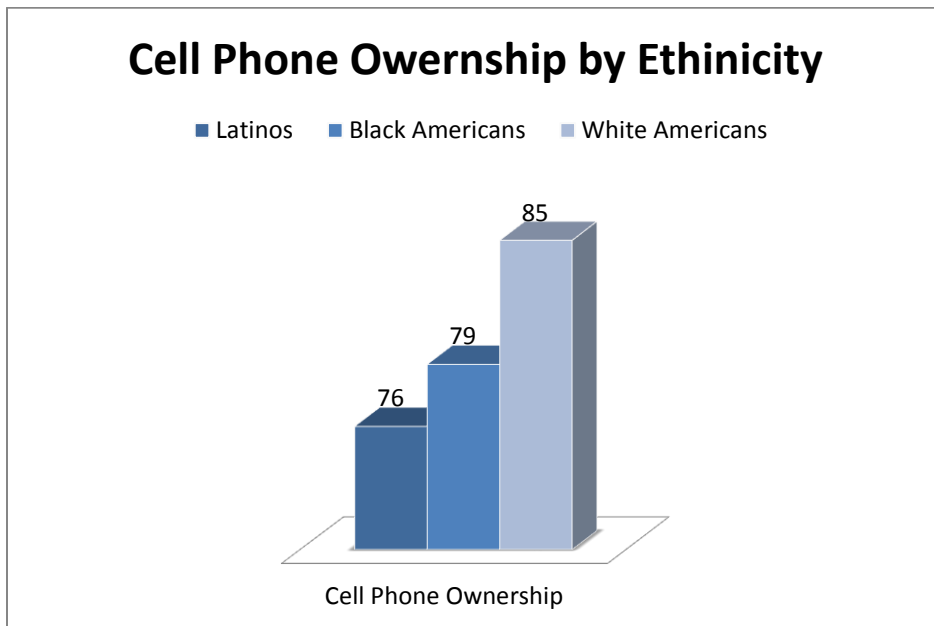
Figure 6: Cell Phone Ownership by Ethnicity, created by Maléka Ingram

Barriers to Adoption, Access, and Use

Historic and Current Barriers

Historically, the adoption, access, and use of ICTs have been inequitable among marginalized groups, particularly among Black Americans and Latinos with lower education and income levels. Studies indicate the lack of access to ICTs is associated with inequalities of income and class, gender, race, and age (Bélanger & Carter, 2009; Halford & Savage, 2010; Hill et al., 2008). For example, individuals with higher incomes are more likely to have better equipment, faster Internet connection speeds, and higher user skills (Zillen & Hargittai, 2009). In contrast, individuals on the opposite end of the income spectrum have either no equipment or outdated equipment and report cost as the main factor in the lack of adoption of ICTs (ESA & NTIA, 2010; Zillen & Hargittai, 2009).

Even though the number of older adults using ICTs has increased over the past several years, there are still barriers to widespread adoption, access, and use of ICTs by marginalized groups. However, there is evidence that these barriers to ICT adoption, access, and use by marginalized groups are being affected by the maturation of the technologies. This was illustrated in the earlier statistics on Internet access, broadband connectivity, and cell phone ownership. The smallest gap between the populations compared was in cell phone ownership. Cell phones have existed for a longer period of time compared to the other forms of

ICTs mentioned. As ICTs become more prevalent and user-friendly, the tools and systems are adopted by more segments of the population.

The inequitable rate of adoption, access, and use by different segments of the population is multi-faceted and has been influenced by these concepts: the digital divide, digital inequity, digital literacy, and the gray divide. Within these concepts are differentials related to physical (equipment and hardware) and mental (skill and knowledge) access based on demographic characteristics such as race/ethnicity, class/socio-economic status, education level, and age.

The *digital divide* focuses on physical access to equipment and services. Once this gap is addressed, the focus shifts to intellectual and psychological access to ICTs. These concepts are termed *digital literacy* and *digital inequity*. As the population of users has changed, the need to study older adults has fostered the concept of the *gray divide*. The gray divide focuses on the specific challenges of an aging population.

Digital Divide

During the mid-1990s, the term 'digital divide' was coined by government agencies, educators and policy makers. It refers to the gap between people from different socio-economic statuses and ethnic backgrounds, and their access, or lack of access, to computers, computer skills, and the Internet (Zarcadoolas et al., 2002; Stanley, 2003; Hill et al., 2008). Study of the digital divide is the study of

relationships between Information and Communication Technologies (ICTs) and marginalized populations (Ferro, Helbig, & Gil-Garcia, 2011; Hanson et al., 2010). The term has been used to bring visibility to the gap between those segments of the population who own, access, and effectively use Information and Communication Technologies (ICTs) and those who do not (Hill et al., 2008).

The investigations of the era when the digital divide first came into focus discovered that those who owned and accessed ICTs were predominately White males within a higher income bracket; those who did not were typically from marginalized groups such as Black Americans, Latinos/ Hispanics, women, and low-income families (Bélanger & Carter, 2009). In an effort to close the gap, government agencies, policy makers, and telecommunications companies banded together to provide access to these under-served communities. The government and other participants served as egalitarian social engineers. Their efforts were comprised of activities like wiring schools with fiber-optic lines for fast-speed Internet connections, donating desktop computers and software to public schools, and setting up Community Technology Centers (CTCs).

Some theorists argue that the focus of the digital divide was solely on providing hardware, software, and basic computer literacy training. This focus did not provide intermediate and advanced leveling to develop skills, knowledge and competencies. However, these efforts did help make ICTs more

physically accessible to marginalized groups. Between 1998 and 2004, the Bill

and Melinda Gates Foundation installed 42,700 Internet-ready PCs in almost

11,000 libraries across the United States and trained approximately 62,000 library

workers as part of this government-sponsored initiative. These beginning efforts

contributed to narrowing the gaps in access. They also revealed a need to

address other issues: content, language, education, digital literacy, and

community and social resources. This led to the stage of addressing digital

literacy and digital inequity.

Digital Literacy

Digital literacy refers to possessing the knowledge and skills to properly

use ICTs. Gilster introduced the concept of digital literacy and defined it in these

terms: "an ability to understand and to use information from a variety of digital

sources and regard it simply as literacy in the digital age" (as cited by Bawden,

2008). Within digital literacy is the concept of information literacy—the ability of

the user of ICTs to recognize when information can solve a problem or fill a need

and to effectively apply information resources (Bélanger & Carter, 2009). An

example of digital literacy is the ability to research a topic on the Internet,

decipher the source and the validity, and apply the discovered information to a

particular problem. Digital literacy affects the ability of users to fully engage

with ICTs at a certain level of technical competency. Technical competencies are

the skills needed to operate hardware and software, such as typing, using a mouse, and giving instructions to the computer to sort records in a certain way (Bélanger & Carter, 2009).

The lack of digital literacy, information literacy, and technical competence inhibits a person's ability to fully engage in the use of ICTs in meaningful ways. Researchers have found that older, less educated, poor, and minority individuals (specifically Black Americans and Latinos) are more likely to need computer assistance (such as help using the mouse and keyboard, using email, or using word processing and spreadsheet programs). These limitations contribute to the usage gaps between mainstream and marginalized groups.

To improve digital literacy, the U.S. government's NTIA created an initiative to focus on increasing broadband access and digital literacy. The Digital Literacy Campaign was an initiative of the Obama Administration to serve as a valuable resource to practitioners who are delivering digital literacy training and services in their communities. The Digital Literacy Campaign was reminiscent of the effort to set up Community Technology Centers in that the campaign was created to help close the gaps in computer use, knowledge, and skills of marginalized groups. The Broadband Technology Opportunities Program (BTOP) administered this project. The BTOP was started by the NTIA to expand broadband Internet access and adoption in the United States. This effort was

funded by the American Recovery and Reinvestment Act of 2009 (National

Telecommunications and Information Administration, n.d.). Once again, these

efforts helped close the gaps associated with physical access to equipment,

hardware, and high-speed Internet connectivity. However, these initiatives did

not address other barriers related to socio-cultural factors that influence the

adoption, access, and use of ICTs. These types of barriers are referred to as

digital inequity.

Digital Inequity

The concept of digital inequity arose from research on the digital divide

and digital literacy. Digital inequity progresses beyond disparities in access and

skills; it also reflects the ways in which long-standing social inequities shape

beliefs and expectations regarding ICTs and their impact on life's chances

(Kvasny, 2006). As noted by Kvasny (2006), unlike the digital divide, which is

generally concerned with access to computing artifacts, digital inequality is

concerned with equitable access to the benefits derived from Internet and

computer use. Examples of socio-cultural factors contributing to digital

inequality are audiences' perceptions about ICTs, motivation for learning ICTs,

socio-cultural usage patterns, comfort zones, and relevancy.

More recent studies have focused on socio-cultural factors like attitudes,

beliefs, personal characteristics, perceptions, and culture to provide insight into

psychological barriers to access and usage of ICTs (Czaja et al., 2006; Kim, 2008; Hernandez-Encuentra, Pousada, & Gomez-Zuniga, 2009). Some researchers argue that socio-cultural factors and personal characteristics, such as anxiety, motivational indifference, and lack of relevant knowledge, influence use and non-use of ICTs (Peacock & Künemund, 2007; Kim, 2008; Jung et al., 2010).

Stanley (2003) offers additional reasons low-income adults may not use ICTs. These reasons include "relevance," and "self-concept" (p. 407). Relevance refers to the inability of users to perceive that the computer and Internet are relevant or meaningful to their lives. Self-concept refers to the inability of users to identify themselves as computer users.

Gray Divide

For older adults, these types of barriers to adoption, access, and use of ICTs have not changed much. Older adults still report that concepts such as unfamiliarity, fear, trust, lack of skills, missing background knowledge, and inaccessible devices keep them from learning and using ICTs (Rogers, Meyer, Walker & Fisk, 1998; Hamilton, 2011). Additional factors that affect adoption, access, and use of ICTs by older adults are functionality, value, motivation, ability, design, cost, privacy, trust and acceptance, and training opportunities (Jones et al., 2000; Charness & Holley, 2004; Cresci et al., 2010). These concepts

are also influenced by older adults' previous exposure to, experiences with, and attitudes towards ICTs. These factors contribute to the gray divide.

The gray divide refers to the disproportionately lower adoption of, access to, and use of ICTs among older adults as compared to younger adults. The gray divide focuses on barriers associated with age-related changes and declines, barriers based on income and education levels of older adults, and socio-cultural barriers connected to age cohorts.

In addition to the limitations listed previously, there is a particular set of physiological and cognitive impairments associated with the aging process that impact adoption and use of ICTs by older adults (Cresci et al., 2010; Hamilton, 2011; Stark-Wroblewski et al., 2007). Physiological impairments include psychomotor dysfunctions associated with pain and limited movement. Suffering from psychomotor dysfunctions could make it difficult for older adults to type on keyboards and manipulate input devices, such as mice. Psychomotor dysfunctions also impact the ability to interact with small keypads on cell phones.

Cognitive declines that affect usage of ICTs include working memory, text comprehension, spatial ability, and perceptual speed (Craik & Salthouse, 2000). These cognitive barriers experienced by older adults affect their ability to remember steps associated with navigating menu screens and to understand web

and computer jargon (Sayago & Blat, 2009; Hart, Chaparro, & Halcomb, 2008).

These problems may impact older adults' ability to learn and use ICTs.

Income and education disparities also contribute to the gray divide.

Several researchers have noted that the majority of computer users are younger,

more affluent, and more educated compared to older adults (Gatto & Tak, 2008;

McMurtrey, Zeltmann, Downey, & McGaughey, 2011). These differences could

be attributed to significant changes in American society over the course of the

twentieth century that altered the nature of job opportunities and access to

education, resulting in lower lifetime incomes and lower levels of education for

those born earlier in the century. Retirement from full-time employment is

another factor that typically decreases the income of older adults as compared to

younger adults. This change in income may plunge many older adults into the

low-income bracket. Even though more people have access to computers, cell

phones, and tablet PCs, older adults with incomes of less than $20,000 a year still

go online less than other citizens. This is a result of the fact that the cost of

computers and Internet services is still too high for people categorized within the

low-income bracket (Chu, Huber, Mastel-Smith, Cesario, 2009).

Socio-cultural factors that affect older adults' acceptance, adoption, and

usage of ICTs are personal attitudes, perceptions, experiences, and relevancy in

relation to themselves (Jung et al., 2010). In particular, perceiving (or failing to

perceive) the advantages or benefits of ICTs, identifying as a computer user (or non-user) based on technological eras, and having (or lacking) interest in ICTs are important contributing factors in determining whether older adults will accept, adopt, and use ICTs. Studies reveal that older adults must see the value or benefits of ICTs in order to actively engage and use ICTs (Melenhorst et al., 2001; McMurtrey et al., 2011).

Part of how older adults relate to and come to understand ICTs is guided by their connections and experiences within technological eras. Technological eras include the mechanical era (before 1930), the electro-mechanical era (c. 1930 to c. 1960), and the digital software era (after c. 1960) (Lim, 2010). The technological era in which a person grew to adulthood could affect the person's relationship to, perceptions of, and attitudes about computers, cell phones, and tablet PCs. If older adults cannot make the connection between the technology of their youth and the present day form of technology, they may be resistant to adopting and using it. In addition, the prevalence of age-related prejudices regarding the ability to use computers (the widespread perception among younger adults that older adults are "too old" to learn to use computers) may also have a psychosocial effect on older adults' willingness to use ICTs.

The various barriers associated with the gray divide work together to contribute to one of the key reasons for non-adoption and non-use of ICTs by

older adults: a lack of interest in ICTs (ESA & NTIA, 2010; Hanson et al., 2010).

This disinterest prevents older adults from fully engaging with ICTs and

participating in the digital culture, which could lead to the social exclusion of

older adults.

Social exclusion is a disconnection in the social bond between the

individual and mainstream society (Letch & Carroll, 2008). The possibility of

social exclusion increases as society becomes more dependent on ICTs. This

social exclusion will have a disproportionate impact on those affected by the

various "divides" described above. Non-users of ICTs will have less consumer

power and fewer economic opportunities; their prospects for high-quality

healthcare will be reduced; their chances of learning from the many existing

Web-based sources will be limited; and they will have fewer social interaction

opportunities through the Internet's communication systems (Rosenthal, 2008).

In essence, social exclusion as a result of non-use of ICTs will have a negative

impact on the quality of life for those affected by it. For older adults who are

already addressing quality-of-life issues as a result of aging, the results of social

exclusion have the potential to become an increasingly significant problem.

Design and Usability of ICTs: Designing Usable ICTs for Older Adults
Defining Design and Usability

Design and usability are concepts focused on the creation of ICTs that are

usable and understandable by a specified audience. Usability refers to methods

for improving ease-of-use during the design process. Design and usability are

part of human factors research. The science of human factors is "the study of

human beings and their interactions with products, environments, and

equipment in performing tasks and activities" (Czaja, 1997, p. 17). Human factors

play a major role in helping older adults use new technologies. Included in the

following section are universal design principles that may be applied to the

creation and development of user-friendly ICTs for older adults.

Age-Related Factors to Consider in Design and Usability

Due to the nature of aging and the cognitive, psychological, and

physiological changes experienced, design and usability are important

components to consider when developing ICT products and services for older

adults. As stated earlier, ICTs have the potential to help older adults in the areas

of health, communication, social connections, and information gathering. With

the increase in both the aging population and the popularity of ICTs, researchers

have been studying how to effectively design and deliver new technologies to

accommodate older adults.

To accommodate the memory difficulties of older adults, Fisk et al. (2009)

suggests designing experiences that are similar to or make a connection with past

experiences. The goal is to build ICT products that capitalize on what people

expect. This reduces the amount of working memory needed to comprehend and

use the technology. Another way to address memory-related problems is to design ICTs in which product procedures, steps, and activities are easy to follow. The use of a simplified, menu-based system versus a command-based system is an example of an interface design that supports the memory challenges of growing old (Craik & Salthouse, 2000 & Hassan & Nasir, 2008). This supports recognition of steps as opposed to recalling information.

The psychological changes experienced during the aging process are related to emotional well-being, mood, outlook on life, thoughts, and feelings. In addition to personal perspectives about "growing older," images within society, and the ways in which people view and respond to aging individuals, could affect perceptions of self-worth. Another psychological aspect of aging to consider is personal attitude about using ICTs. In his book, *Emotional Design*, Norman (2005) discusses how a user's predisposition and attitude affects the user's experience with the technology. Positive affect reduces cognitive overload to enable mental space for problem-solving. Unpleasant experiences will cause a negative attitude, which may affect the end user experience (Klein, Moon, & Picard, 2002). Klein et al. (2002) conducted a study in which emotional interaction with computer systems was explored. During that study, a system was built that addressed user frustration by providing active emotional support through text and graphical images. This technique could be utilized in the design

of software applications for older adults. One of the reasons given for lack of use

of ICTs by older adults was "frustration." Incorporating an active emotional

support system may help counter negative feelings and perceptions experienced

by other adults due to emotional states of frustration.

Suggestions for ameliorating the effect of aging-related declines in motor

skills involve modifying input devices, such as the mouse. Craik and Salthouse

(2000) suggest adjusting the speed of mouse acceleration (known as "gain

adjustment") to medium slope. The gain adjustment is the ratio of the pixels to

the mouse movement. "With high gain ratio, fast mouse movements result in

relatively larger movements in space, whereas with lower gain ratio, increasing

speed of movement has less influence on spatial movement" (Craik & Salthouse,

2000, p. 567). Additional equipment recommendations include designing larger

buttons on devices that click when pressed to compensate for decreased dexterity

(Hassan & Nasir, 2008 & Lim, 2010). Other interface design solutions that

compensate for age-related declines in movement control are the creation of

visual on-screen images and graphics for which, as the mouse pointer nears the

image, the mouse speed slows down; the addition of visual cues around target

areas as the mouse pointer nears. It is also recommended that larger on-screen

targets work better for older adults who are experiencing declines in

psychomotor abilities.

In addition to changes in psychomotor functions due to aging, vision changes may occur. Vision impairments associated with age change the way older adults see the world. The pupil changes size and the lens becomes thicker and less transparent, taking on a yellow color (Charness & Holley, 2004; National Institute on Aging, 2009). These vision changes cause impairments that include less sensitivity to light, poorer visual acuity, and a corresponding change in color vision.

Advancements in monitor technology, like cathode ray tube monitors and crystal display monitors, offer functional adjustments that help balance light and color contrast on the screen interface. The user can personalize the view to adjust to his or her vision level. As the lens of the eye becomes thicker and less transparent, the scattering of light increases, which makes light take on the characteristic of a luminous fog. As explained by Charness and Holley (2004), "scattered light is directly related to reductions in contrast sensitivity, visual acuity, and increased susceptibility to glare and, more than likely, has a large negative impact on viewing even a well-lighted display" (p. 421). Being able to adjust the contrast of color monitors addresses this vision impairment as well.

To improve readability for vision challenges, the National Institute on Aging and the National Library of Medicine (2002) advise following these guidelines for on-screen content: use sans serif typeface, 12 to 14 points, with

medium or bold type weight; present body text in upper and lower case letters with double spacing between lines of text, left justified; avoid yellow, blue and green colors in close proximity; use dark type or graphics against light background; and avoid patterned backgrounds. Also, in order to address changes in vision, older users need the option of resizing on-screen text and windows. Changing color schemes and modifying the sizes of images may also help address vision impairments and changes experienced by older adults (Kim, 2008).

Inclusive Design

Inclusive design has been suggested in the development of ICTs focused on the older adult user. Inclusive design is the design of products and services intended to be easily usable by as many people as possible, aiming particularly at meeting all the needs of people who have been unable to use mainstream products because of age or disability (Lim, 2010). Inclusive design considers the needs of the audiences as the design cycle progresses. This type of design process not only allows for considerations of the age-related cognitive, psychological, and physiological changes, but also provides an opportunity to incorporate generational technology connections. This means that an understanding of users' prior knowledge could be utilized to make products less complex for them and therefore less difficult to use (Lim, 2010).

Learning Experiences and Training: Designing Training for Older Adults
Barriers to Learning ICTs

Cognitive, psychological, and physiological age-related declines have major implications for how older adults learn to use ICTs. ICT use and non-use is directly related to learning experiences and training opportunities. Barriers to learning to use ICTs are anxiety or stress, lack of self-confidence, and lack of personal support (Kim, 2008; Rosenthal, 2008; Zillien & Hargittai, 2009). Studies show older adults who receive training have a more positive attitude about ICTs (Kim, 2008). A more positive attitude represents a willingness to learn and use ICTs. Researchers address the barriers associated with learning ICTs through a combination of adult learning theory, situated learning theory, instructional design methodology and social environmental support.

Adult Learning Theory, Situated Learning Theory and Instructional Design Methodology

Similar to the factors under consideration for design and usability, age-related cognitive, psychological, and physiological changes and declines are challenges in the development and delivery of learning experiences and training programs for older adults. To adjust for cognitive declines, learning experiences must be designed to accommodate memory loss. To adjust for psychological changes, learning experiences must be designed to incorporate social engagement and interaction, promote self-efficacy, and counter anxiety. To

adjust for physiological changes, learning experiences must be designed to support motor, vision, and auditory impairments.

Particular learning theories and principles, such as Malcolm Knowles' adult learning theory and Jean Lave's situated learning theory, may be applied to the study of older adults who are learning and using ICTs. The adult learning theory developed by Malcolm Knowles and Jane Vella is based on the idea that adults learn best when they can use their life experiences in the learning process. This theory is focused on six primary elements, that may or may not be incorporated simultaneously: (1) a need to know, (2) a responsibility for one's own learning, (3) the role of experience as a resource in one's learning, (4) the readiness or applicability of the information to one's life situation, (5) the motivation to learn, and (6) problem-centered learning with real-life problems (Mitchell & Courtney, 2005). Adult learning theory is based on the premise that adults are more receptive to learning new concepts and information when there is a personal connection, benefit, and a sense of relevancy. In addition to using life experiences to learn about ICTs, learning in a social context may benefit older adults as well. This is the basis of the situated learning theory.

Situated learning theory emphasizes that instructional elements are conveyed using practical, real-life examples. Situated learning theory is based on the idea that learning is not an individual activity; rather, learning is a social

practice embedded in particular contexts (Kim & Merriam, 2010). This theory promotes the belief that social interaction and collaboration are essential components of the learning process. This concept is of particular importance when teaching older adults who rely on family members and peers for guidance and support in building self-confidence, efficacy, and positive attitudes about the learning experience. Prior research about how older adults learn to use ICTs suggests that older adults learn better when divided into small groups versus being divided into large groups or being trained alone (Craik & Salthouse, 2000). Other studies conducted on the best methods for teaching older adults how to use ICTs suggest having personal one-on-one instruction and peer-mentors (Gatto & Tak, 2008). Study participants criticized past training experiences in which large group learning was the delivery format. The criticism was large-group learning did not allow time for the instructor to help learners when they were behind or did not grasp a concept. Participants suggested having smaller group sessions that would enable one-one guidance and coaching. Support from teachers and peer mentors can also help to combat the anxiety and inadequacy older adults may feel when learning about ICTs. In addition to adult learning theory and situated learning theory, instructional systems design may be used to improve training techniques for older adults.

Instructional systems design is the science of identifying learning needs and developing training solutions and learning programs or instruction to address those needs. Merrell (2002), a leader in the instructional design field, outlines five principles of design that should be considered in the design and delivery of training programs targeting older adults:

1. Learning is promoted when learners are engaged in solving meaningful problems.

2. Learning is promoted when relevant previous experience is activated.

3. Learning is promoted when the instruction demonstrates what is to be learned.

4. Learning is promoted when learners are required to use their new knowledge or skill to solve problems.

5. Learning is promoted when learners are encouraged to integrate new knowledge or skills into their everyday life (as cited by Fisk et al., 2009, p. 91).

Using instructional design principles for older adults learning ICTs would entail conducting an analysis of the learner to identify the cognitive, psychological, and physiological considerations and then designing and developing instruction based on the findings. For example, knowing older adults' short term memory declines with age, instruction should be designed that allows for repetition. Instructional considerations include the curriculum or topics being taught, the materials and support resources, and the delivery format. The analysis phase of instructional systems design helps identify topics relevant and of importance to

the learner. During the interviews, study participants were asked about challenges with past computer training classes. A large number of participants stated the training curriculum included information that was not relevant or of interest to them and too detailed. Study participants commented that more specific topics like how to send an email or how to view an attachment to an email would be more beneficial.

Using instructional design principles enable the design and development of materials to accommodate the learners. Manuals and instructional aids provide supplemental support for older adults when learning about ICTs (Rosenthal, 2008). Paper-based job aids, reference sheets, and other instructional materials should include text accompanied by graphical illustrations; for example, providing screen shots next to the instructions or task list. Morrell and Echt (1996) conducted a study on computer training for older adults and concluded that the most successful training appears to be that which reduces cognitive (i.e., working memory) demands for the learner (as cited in Craik & Salthouse, 2000). Because of their experiences in earlier technology generations, some older adults may be more comfortable with paper-based materials, such as step-by-step procedural printed instructions. However, a study conducted by Rosenthal (2008) reported resources used the most by older women computer learners were people-focused, rather than manuals, books or online help.

In addition to the curriculum and instructional materials' format, the delivery mechanism and frequency of training should be considered. The delivery format refers to the mechanism used to facilitate teaching and learning (for example face-to-face instruction or online learning) and environmental structure. A training environment that mitigates physical limitations and creates a supportive environment that combats feelings of anxiety and inadequacy, provides human support and encouragement, and provides paper-based job aids and reference sheets is ideal for older adult learners (Kim, 2008; Lam & Lee, 2006; Rosenthal, 2008; Xie & Bugg, 2009; Zhou, Yasuda, & Yokoi, 2007). Training environments can accommodate physical limitations by providing interfaces that have been adapted to the needs of older adults, as described in the section "Design and Usability of ICTs: Designing Usable ICTs for Older Adults." A supportive environment can be created by incorporating interactive emotional support into training materials and software, as described the same section. Another method of creating positive emotions toward ICTs—and therefore better learning—is the use of games to teach basic skills. When asked about the previous computer training classes, many study participants mentioned the trainings were too infrequent. The previous computer training model consisted of a tutor providing training one day a week in the evenings. Study participants suggested meeting two to three days a week to help them master the skills being

taught. Participants also mentioned spending more time on a topic and having actual homework to practice concepts in between scheduled classes.

Adult learning theory, situated learning theory, and instructional systems design can be combined in the creation of learning experiences for older adults. Common themes of each area include learners relying on life's experiences to help comprehend new information, learners having a personal investment or motivation to learn, and instruction based on real-life situations that require problem-solving skills. A learning experience designed with these three concepts may look like the following. The learning objective is to teach older adults how to navigate the Internet to access information. The real-life situation is the older adult needs to use the Internet to access social security information in order to complete a form to receive benefits. The instructional environment would be a small-group setting in a computer lab. The instructional delivery would consist of the instructor demonstrating the steps to access the Internet and the website. After the demonstration, participants would walk through the steps using supplemental materials and guidance from the instructor. The participants would repeat the steps a number of times until the level of comfort and confidence of completing this activity individually, without much assistance, was reached. Supplemental materials would include screenshots of important steps in the process and text instructions written in a large font. In addition to paper-

based resources and materials, peer-to-peer learning would be facilitated by placing the older adults in pairs. Applying adult learning and situated learning theories with instructional systems design principles allows for a comprehensive approach in the creation of learning experiences that consider the cognitive, psychological, and physical needs of older adults.

Social Environment and Learning ICTs

In addition to the scientific methodologies described above, researchers have also investigated the role of the family and social support in regards to older adults learning how to use ICTs informally and formally. Studies show that in environments in which grandchildren are present, older adults use more functions of cell phones (Mori, 2010). These functions include receiving text messages, taking pictures and changing internal settings. Research conducted about social support suggests social support and connectivity with others improved the likelihood that older adults would continue in computer training programs and learn to use ICTs informally (Mori, 2010; Lin, Wen-hui, & Feng-Yang, 2012). This information is important when considering design models for training and learning experiences of older adults in relation to ICTs.

Chapter 3: Methodology

"Demographic disparities in Internet access and technological skills lead to unequal distribution of technology resources, amplification of voices by the affluent and well-educated, and further marginalization of the underprivileged" (Nam, T., 2010).

Overview

This study examines engagement patterns, learning experiences, and behavioral transference in relation to ICTs. The methodology used in this study is described in this chapter. The chapter is divided into these sections: the population and sample of the individuals, the instrument and the data collection process, the administration of the interviews and surveys, and the data analysis techniques. This study used narrative qualitative research methodology.

Population and Sample

The population selected for this study was composed of older Black Americans, age 65 and older, within the working-class and lower-income social strata. The sample included older adults residing in a mixed-income housing community located within a major metropolitan city. The residential community is part of an affordable housing program owned and operated by a consortium of faith-based communities and a development corporation. The community consists of four high-rise apartment buildings. Each building has a computer lab and wireless Internet connectivity on the main lobby levels. The researcher contacted the executive director and site coordinator to solicit residents'

participation in the study. The introductory meeting agenda is located in

Appendix A. The sample included a total of 15 participants: 12 women and 3

men. The demographic information for each participant is represented in the

table below:

Participant	Age	Gender	Education Level	Employment	Income
Participant 1	71	Female	Middle School	Retired	< 10K
Participant 2	81	Female	Elementary School	Retired	< 10K
Participant 3	83	Male	Some High School	Retired	10K-20K
Participant 4	72	Male	High School Diploma	Retired	10K-20K
Participant 5	81	Female	High School Diploma	Retired	10K-20K
Participant 6	75	Female	High School Diploma	Retired	21K-30K
Participant 7	71	Female	High School Diploma	Retired	10K-20K
Participant 8	76	Male	Some High School	Retired	10K-20K
Participant 9	73	Female	GED	Retired	< 10K
Participant 10	66.5	Female	Some College	Working	< 10K
Participant 11	74	Female	Associate Degree	Retired	10K-20K
Participant 12	68	Female	Some High School	Retired	21K-30K
Participant 13	69	Female	Some High School	Retired	10K-20K
Participant 14	77	Female	Some High School	Retired	< 10K
Participant 15	72	Female	Some College	Retired	10K-20K

Table 2: Demographic Information for Interview Participants

The Instrument

As a precursor to this study, a pre-screen questionnaire was developed to

obtain demographic information and identify users and non-users of ICTs. The

pre-screen questionnaire contained questions about ethnic identity, age,

education level, income level, gender, employment status, and use or non-use of

computers, cell phones, and tablet PCs. A set of responsive interview questions

was developed, focusing on use and non-use of the ICTs listed above. Interviews

were chosen for the in-depth data collection in order to ensure clear

interpretation of the questions being asked, to accommodate any literacy

barriers, and to facilitate deeper dialogue in order collect personal narratives

from the interviewees. After each interview, the interviewer also conducted a

brief survey related to perceptions and attitudes about ICTs. A copy of the pre-

screen questionnaire is located in Appendix B. A copy of the interview questions

is located in Appendix C. The survey questions (with results) are located in

Chapter 4.

Data Collection Process

Prior to collecting data, the researcher completed a proposal for research

on human subjects. This proposal was submitted to and approved by the

university's Institutional Review Board. Once the pre-screen questionnaire,

interview questions, and survey were refined and finalized, the researcher

contacted the mixed-income housing community. The researcher met with the

development corporation's director of senior services and housing service

coordination administrator for an introductory meeting. During this meeting, the

researcher introduced herself, provided her professional background and work

experiences, and presented a hard copy of a document outlining the research

overview, the proposed methodology for data collection, and a high-level

timeline of major milestones and activities. A copy of this document is located in

Appendix D. The researcher developed a flier to advertise the research study.

Hard copies of the flier were placed strategically throughout the housing

community's apartment buildings to attract potential study participants. A copy

of this flier is located in Appendix E. Interested parties attended an information

session. During this session, the researcher introduced herself, provided an

overview of the research study, and asked participants to complete the pre-

screen questionnaire. The researcher worked closely with the housing service

coordination administrator to advertise the event, reserve the room, and identify

potential study participants. Refreshments were served during the introduction

meeting.

Administration of the Interviews and Survey

Although 25 individuals expressed an interest in participating in the

study, attrition over time resulted in only 15 participants actually taking part in

the study. During the data collection phase of this project, the researcher called

individuals to schedule appointments to conduct the interviews. The

appointments were scheduled for one-hour blocks of time. The interview

locations varied, based on the participant's preference. Some interviews were

conducted in the on-site community rooms, while others were conducted in the

participant's apartment. Before the interviews, the researcher reviewed a

participant consent form containing these sections: the purpose of the study, the subject's understanding, a confidentiality clause, and researcher contact information. Once the confidentiality form was signed, the researcher asked the interview questions and conducted the survey. The interview was recorded using a smartphone, with the exception of participants who opted out of being recorded. Video footage was taken of one participant demonstrating the use of a personal computer. At the end of the interview and survey, the researcher reiterated the idea of a follow-up interview to address additional questions or clarification of answers.

Confidentiality Form

Participants signed a confidentiality form. The form included the purpose of the study, the subject's understanding, the researcher and committee chair contact information, and the confidentiality agreement. One copy of the agreement was given to the participant and one copy was given to the researcher.

Data Analysis Techniques

The researcher prepared and organized the data for analysis. The audio recordings were transcribed and compared to the hand written notes captured during the interviews. The researcher reviewed and analyzed answers to the interview questions and identified themes. The themes were used to organize the data into meaningful clusters of information and to create inductive

codes. These codes were developed by the researcher through direct examination of the data. A narrative qualitative format was used to draw conclusions and present the data. Pseudonyms were used to protect the identities of the participants. The researcher structured the narrative based on the key themes, the presentation of a summary of responses, followed by the researcher's analysis and observations.

Summary

A review of the literature in chapter two revealed a gap in the knowledge base of research on socio-cultural factors that impact the use or non-use of ICTs by working-class older Black Americans. Hence the study was designed to examine the historical time-period and socio-cultural factors that influence use or non-use of personal computers, cell phones, and tablet PCs by marginalized individuals. The sample was drawn from a population of older Black Americans, 65 and over, within the working-class and lower-income social strata, residing in a mixed-income housing community in a metropolitan area.

Instruments were developed to identify participants, to collect in-depth data on participants' use or non-use of ICTs, and to survey participants' perceptions and attitudes about ICTs. The first instrument, the pre-screen questionnaire, contained demographic data and questions related to use and non-use of computers, cell phones and tablet PCs. This questionnaire was used to

identify participants based on the study's population criteria. Interviews, rather than surveys, were chosen to obtain in-depth data. The use of interviews made it possible to ensure clear interpretation of the questions being asked, to accommodate any literacy barriers, and to facilitate deeper dialogue in order to collect personal narratives from the interviewees. The data was collected, analyzed and synthesized using narrative qualitative research methodology. This methodology was chosen based on the ability to provide a sociological perspective to the study. Results from the analysis and findings are reported in Chapter 4.

Chapter 4: Results

As mentioned earlier, previous studies of older adults' use and non-use of

ICTs focused on individuals with higher income and education levels.

Historically, there has been inequitable access to ICTs among marginalized

groups; in particular, Black Americans with lower education and income levels.

In order to understand the socio-cultural factors that influence use or non-use of

ICTs, a narrative inquiry approach was employed to answer the following

research questions: *What socio-cultural factors influence use and non-use of ICTs*

among older, working-class Black Americans? What are the engagement patterns,

learning experiences, and behavioral transference among older Black Americans within

the lower-income and working-class economic strata with ICTs? The interviews were

structured around a protocol which consisted of open-ended questions within

these ICT categories: computer users and non-users, cell phone users and non-

users, and tablet PC users and non-users, and blended users (a combination of

technology usages). At the end of each interview, participants were asked to

"agree" or "disagree" with survey statements related to attitudes and

perceptions about ICTs.

One discovery did have an impact on the projected structure of the study:

only one participant used any type of tablet PC (this participant used a Kindle to

read books and play games). Therefore, analysis on the use of tablet PCs has

been largely omitted. When asked about tablet PCs, most participants had an idea of what an iPad was and associated a high cost with acquiring and owning an iPad.

Interview Findings

This study focused on an examination of socio-cultural factors that influence use and non-use of ICTs among older, working-class Black Americans. In addition to the socio-cultural factors, engagement patterns, learning experiences, and behavioral transference were also studied and analyzed. As defined earlier, socio-cultural factors are personal attitudes, perceptions and experiences that impact the ways people act and develop within their environments. Engagement patterns are the ways in which people interact or do not interact with ICTs; learning experiences refer to the methods used to acquire knowledge, skills, and competencies related to ICTs; and behavioral transference is the voluntary and active participation in using ICTs outside of the home environment for consumer activities. Before exploring each area, it is important to note the study participants' user types. Understanding the user types provides insight into the participants' responses to the interview questions and the analysis of the findings.

User Types

Tinker's chart of older adult user types (as described in Chapter 2) was utilized to classify participants' levels of use and non-use of ICTs (see Table 4).

Understanding the user type provides insight into the participants' responses to the interview questions. To review, the user types are as follows: "Digitally Challenged" (people with no experience and no interest in computers), "Technologically Open-Minded" (these are non-users but keen on learning about technology and/or wishing to gain computer skills), "Old-Age Beginners" (those with few computer skills, using a computer less than once a week), and "Experienced Front-Runners" (users with advanced computer skills, using computers at least once a week; as cited in Stuart-Hamilton, 2011).

		User Classifications			
	Participant No.: Age, Income, Education	Digitally Challenged	Technologically Open-Minded	Old-Age Beginners	Experienced Front-Runners
Participants	Participant 1: 71, <10K, Middle School			X	
	Participant 2: 81, <10K, Elementary School	X			
	Participant 3: 83, 10K-20K, Some High School		X		
	Participant 4: 72, 10K-20K, High School Diploma				X
	Participant 5: 81, 10K-20K, High School Diploma				X
	Participant 6: 75, 21K-30K, High School Diploma, Licensed Practical Nurse Certificate				X
	Participant 7: 71, 10K-20K, High School Diploma			X	
	Participant 8: 76, 10K-20K, Some High School		X		

Participant No.: Age, Income, Education	User Classifications, continued			
	Digitally Challenged	Technologically Open-Minded	Old-Age Beginners	Experienced Front-Runners
Participant 9: 73, <10K, GED in progress			X	
Participant 10: 66.5, <10K-Some College				X
Participant 11: 74, 10K-20K, Associate Degree				X
Participant 12: 68, 21K-30K, Some High School				X
Participant 13: 69, 10K-20K, Some High School			X	
Participant 14: 77, <10K-Some High School		X		
Participant 15: 72, 10K-20K, Some College			X	

(Left vertical label: Participants)

Table 3: Participant User Type Classification

Based on the user classifications, participants with lower income and education levels had fewer computer skills and used the computer less frequently than participants with higher incomes and education levels. This finding is similar to existing literature about middle and higher income people, that states people with higher income and education levels have greater access and more advanced usage of ICTs. The significance of this finding is within the working-class population there are additional layers of classification based on education, occupation, and income that influence individuals' interaction and engagement patterns with ICTs. This means researchers must consider the layers when investigating this population by closely examining the variables that influence frequency and type of use. In addition to income and education levels,

prior exposure to ICTs impacted the user type. For example, the participants who had careers in which they used computers on a daily basis reported varied and advanced uses of the computer. These participants used the computers not only for entertainment but also for educational purposes and banking services. One participant, classified as a more advanced user (Experienced Front-Runner), described her first experiences with online banking. As she became more comfortable with online banking, she became more interested in using the computer for other online transactions. Once her computer was no longer functioning, she could not wait to replace it so she could feel connected again to her online life she had created through banking and paying her bills online.

> *Experienced Front-Runner, age 68*
> That was when I, I couldn't wait to get to Best Buy to buy another one. Because I felt like I've lost connection.
>
> I do my car payment, BG and E. I do three things, car payment, oh car insurance […]

More advanced participants used the Internet to research health-related information, send and receive emails, pay bills online and access the news. One participant described paying bills online. This more advanced use of ICTs was not demonstrated by participants with lower income and education levels who had not been exposed to computers in work situations. The inference is that earlier exposure, combined with this participant's level of interest in technology, equips the participant with a level of self-confidence and self-efficacy, which

facilitates more advanced levels of usage. Additional insight into the user types

is evidenced in the findings in the following sections.

Socio-cultural Factors

The literature states socio-cultural factors that affect older adults'

acceptance, adoption, and usage of ICTs are personal attitudes, perceptions,

experiences, and relevancy in relation to themselves. As reported in the literature

review, additional psychosocial barriers that influence their use and non-use of

ICTs include low self-confidence, fear, and lack of trust. These barriers were

illustrated during the interviews as participants described their reasons for not

using computers and their experiences with personal computers related to

paying bills online and using computers that were located in the computer lab or

that belonged to a family member. These reasons are discussed in the

Engagement Patterns section.

Low self-confidence was associated with education attainment for a few

participants. As evidenced during one interview, a participant retold the story of

when she was a little girl and broke her leg. Her family kept her at home for 24

hours before they took her to the doctor. Her leg never healed properly, and she

missed several days of school. This participant connected this early inability to

pursue an education with her inability to learn about computers and cell phones

in a more advanced and sophisticated way. Fear was also given as a main reason

non-computer had not tried use a computer. Participants who expressed fear as a

major barrier did not believe they were "educated" enough to use the computer

in both basic and advanced forms.

Technologically Open-Minded, age 83

Yes, ma'am. I had it in mind, but temporarily, I think I was more afraid of it, myself. [. . . .] When computers first come out I thought about it, but education slowed me down, backed me up, because I was afraid that I wasn't capable of doing it at that time.

This participant equated having an education with having the ability to learn to

use computers. In other examples, participants expressed a fear of breaking the

computer.

Technologically Open-Minded, age 77

And we have computers here, but I wouldn't dare to attempt to go and try to work the computer, because I'm not going to break somebody else's computer.

This participant's fear was not associated with education but rather with the

activity of doing something wrong or incorrect that would cause damage to the

equipment. The approaches to counter and address feelings of fear are discussed

in Chapter 5. Computer users also expressed sentiments of discomfort, fear, and

lack of trust when describing their experiences; which means these sentiments

are not relegated only to non-users or users with lower income and education

levels. There are varying degrees and meanings of the sentiments. One

participant, a more advanced user, was able to setup a Facebook account, but

expressed a lack of trust about hidden costs that might be associated with using

certain features on Facebook, like instant chat.

> *Experienced Front-Runner, age 68*
>
> I can set up an account, but then after I do it, I get scared. I think when I set things up they are going to send me a bill. [. . . .] I still hadn't gotten in my mind that this is all free, connected to the computer, la la. There is some things I would like, there is more things I would like to do on Facebook, but I don't know how.

This participant's lack of trust of hidden cost hindered her for completing

exploring and experimenting with advanced features of the social media tool.

The advance features, like instant chat, promotes the establishment of online

social connections. This is one of the benefits of ICTs for older adults mentioned

in the literature review. This benefit helps counter the feelings of loneliness and

isolation often experienced by older adults. A possible solution to counter

feelings of distrust is to include clear instructions within the application of which

features have charges associated with them and which do not. Additional

solutions for raising awareness about tools and the various functions include

creating relevant experiences and exposure to ICTs. These solutions are covered

in greater detail in Chapter 5.

Engagement Patterns

Acquisition and Adoption

Engagement patterns include the acquisition, adoption, and use of ICTs.

When asked how participants acquired ICTs several reported receiving personal

computers and cell phones from their family members. The personal computers

and cell phones from family members were usually passed down when family

members purchased new equipment. Participants stated cell phone were either

given to them or obtained by them for the purpose of security and safety and

communication with family and employers. These reasons for acquiring a cell

phone are the same reasons provided by older adults 65 and over in other

research studies. One interviewee described a situation of having car troubles

that motivated her to acquire a cell phone for safety.

> *Experience Front-Runner, age 75*
>
> Oh, I have had my cell phone for years because what happened,
> well, the kids got it for me at first, my children, because I got stuck
> in the snow one time with no means of communicating with
> anyone.

While another interviewee explained how having a cell while driving and away

from home made her feel safe and secure.

> *Experienced Front-Runner, age 68*
>
> So as long as I got my phone, my doors are locked, I felt like I was
> safe.

In both instances, the participants expressed a need to feel safe and secure.

Having a cell to help older adults feel safe and secure may address psychological

changes, like maintaining independence. The need may be attributed to feeling

more vulnerable in a society in which older adults are viewed as weaker

individuals. Three participants described attaining cell phones after public pay

phones became unavailable. The two participants who had cell phones for work, served in capacities in which the phones were distributed as a means to check-in with the employer about reporting to the job. The cell phones were used for sending and receiving calls only.

> *Old Age-Beginner, age 73*
>
> I had a cell phone when I was working downtown. My employer, she got me a cell phone just to keep up with me if I'm running late or if they were running late on work, because I do childcare in people homes. That is what I used to do.

Even though this participant was exposed to cell phones through her job, her use was limited to the sending and receiving calls. Her mental model of the cell phone was established based on her early use. This mental model has not evolved to keep pace with the expanding functionality of cell phones. For example, the government issued phone she has, has the text messaging and a camera. She does not use either of these functions.

In some cases the Internet and cell phone plans were paid for by family, while in other cases the older adults were responsible for paying these bills. Only a few participants had high speed Internet connections in their homes. There was a split between remaining participants who had dial-up connections and those who did not have the Internet inside their homes.

Those who had not acquired computers and cell phones from their family members acquired the technologies either from government-sponsored

programs, not-for-profit organizations, or friends. In these cases, the equipment was refurbished or used. The refurbished cell phones are part of a government-sponsored program that provides cell phones to lower-income individuals. Although the cell phones typically have the basic flip design with small buttons on the keypad and a small screen, there are various manufacturers. This means there is not a standard display and list of functions. Each phone has a different set of instructions for accessing features. The fact has implications for training. It is more difficult to train on the various functions of each phone in a whole group setting. This makes it challenging to create standard instructional materials. The cell phones include standard features like voice mail, calendars, calculators, games, text messaging, and Internet access. The cell phone plan consists of 250 free minutes a month. There is a charge for text messaging and Internet access with the government-issued cell phones.

There were a few participants that did not own personal computers due to costs. This finding is consistent with research presented in the literature review about person computer ownership. These individuals used the computers in the community computer labs. However, the labs are only opened during office hours and on weekdays which posed a challenge for some participants due to their daily schedules. In addition to limited time, participants stated the computers do not work properly. Possible solutions to address the availability of

the computer labs and the computer functioning properly are captured in the

recommendations Chapter 5.

Use and Non-Use

The ICT usage patterns of study participants mirror national trends

focused on how older adults use ICTs. National usage patterns include:

researching medical/health-related information, playing games, listening to

music, watching movies, and paying bills, with the use of cell phones being

mainly to send and receive phone calls. Participants in the study listed these

same usages. A difference, however, between the study participants and

mainstream society was the level of advanced usage and comprehension. This

was evidenced in study participants' descriptions of usage and their expression

of low levels of comfort and confidence with computers. For example,

Participant 1 reported that even though she took computer training, she is still

not confident in her abilities and identifies herself as having limited knowledge

and use of the computer.

> *Old Age Beginner, age 69*
>
> That is all I do know how to do, is go to the email. And I know how
> to play cards, though.

This participant attended trainings offered for free or at low cost facilitated by

volunteers in Community Technology Centers (CTS) for short periods of time.

Historically, CTS were designed to teach basic and remedial level computer skills. If given access to training programs with more advanced curriculum, offered consistently and for an extended period of time, this participant may be able to utilize her computer skills and feel more confident in her abilities.

There were a few instances in which study participants described a higher level of engagement with personal computers. According to the literature, this higher level of engagement is characteristic of people with higher education and income levels. However, Participant 6's usage patterns challenge this idea. Her level of engagement could be influenced by her career as a nurse in which she used computers for data entry. This is an example in which the historical time-period a person first experienced computer technology may positively impact her ability to use personal computers for higher levels of engagement later in life.

Experienced Front-Runners, age 75

> Yeah, usually when I go at the time [to the computer lab] I'm looking up things that maybe I've seen, maybe on TV, that I want to look up for information about medical things, my diabetes. I'm a diabetic, and sometimes I like to look up recipes or different things like that. And then one of my granddaughters has a daycare center, and I wanted to look up and see her daycare center and whatnot. Just informational type thing going.

This same concept of historical time period is evidenced by Participant 12, a former teacher's aide who has been using computers since the 1980s. Participant 12 described using the computer to check her bank account, participate in social

media activities like Facebook, and produce desktop publishing materials.

Participant 4 commented that he makes online purchases. His most recent

purchase was a set of headphones to connect to the cell phone or home phone.

Regarding cell phone usage, all participants interviewed had experience

using a cell phone. The usage was basic: sending and receiving phone calls. This

basic use and understanding of cell phones by older adults was summed up by

Participant 1, a female, age 71: "Old people don't know nothing about no cell

phones. Nothing but cut it on and cut it off, and I thought it was the greatest

thing." Most participants reported using cell phones to send and receive calls.

This limited use of cell phones may be attributed to the design and usability of

the devices. As stated in the literature review, there are particular physical and

tactical design considerations that could help older adults' use cell phones in

more advanced ways. The majority of the participants' cell phones were either

flip phones or slider phones. These phones had small screens and buttons that

were challenging to view and maneuver. Design recommendations are covered

in Chapter 5.

There were a few participants who had learned to take pictures with their

cell phones. These participants reported not being about to retrieve the pictures

once taken. This item in addressed in the learning experiences section. Only one

participant reported using the text message feature on her phone. This

participant did not continue using text messaging due to the additional cost

associated with adding this service to her current phone plan. However, the

participant has made the connection of email and texting to communicate with

family and friends. This is an example in which the participant is knowledgeable

about the concept, but does not know how to apply it.

> *Old-Age Beginner, age 71*
> I have, but texting, you have to buy special minutes. I have a very
> limited budget and I can't do all these things that I would probably
> like to do, so I don't do any texting now. That's why I want to really
> get into the email thing. All of my people have a computer or
> access to one, so why not email?

The application of ideas and concepts is part of the learning experience. The

learning experience refers to how users acquire the knowledge, skills, and

competencies required to utilize ICTs.

Learning Experiences

Family and Social Support Systems

Previous research conducted by Gatto and Tak (2008) and Hamilton

(2011), as captured in the literature view, states older adults' learning experiences

are highly influenced by their social support systems. The social support systems

consist of family members and peer networks. In the study, these same family

members and peers provided a significant amount of technical support.

Additionally, the desire to learn more about ICTs is driven by personal interest

and the idea that older adults will be left behind. This desire is reflective of

previous research conducted on mainstream older adults regarding the factors that motivate them to learn and use ICTs.

Consistent with prior research conducted, the family and social support systems are important variables in how older adults learn to use ICTs. Several participants stated either their children or grandchildren taught them how to initially use their personal computers and cell phones.

> *Old Age Beginner, female, age 71*
>
> Well, I think it was curiosity of my grandchildren and what not, asking me to learn to get into it. So when they would come over to visit, we have computers here in the various buildings, and I would ask them questions, and we would go down and check around and mess around, and I got into it a little bit and I wanted to learn more, so I took the first class that was offered by the [residential location] and then it just progressed from there.

The role of grandchildren helping older adults learn how to use computers and cell phones may be attributed to trust of the individuals and the notion of participating in an activity with the grandchildren. This composition may produce a less threatening environment and atmosphere that allows the older adult be feel more comfortable and secure in learning something new. Further recommendations are discussed in Chapter 5. In addition to relying on family support, individuals also depended on social support to learn how to use and troubleshoot ICTs.

> *Old Age Beginner, age 69*
> I do this phone and I get it all messed up, and then I have to go to

> [Resident Administrator], when I call her, to get me… I have to go to her. She says, "What did you do?" I say, "I tried to get this off and tried to find this." She says, "Give it here," and she'll bring it back to reality again, because I got it off in left field. But I don't know.

This reliance on social support may also be attributed to feelings on trust and comfort by older adults to seek out help knowing there will not be judgment for seeking help.

Family and peers provided technical support for the majority of the participants. This support was evidenced in setting up equipment and troubleshooting technical issues. Equipment setup for personal computers consisted of connecting the hardware, installing software, and, in cases where the Internet was to be used, connecting the modem and activating services. Cell phone set-up consisted of entering contact names and phone numbers. This task was often performed by grandchildren. Participants, who did not have grandchildren, relied on other family members and community members to help them complete cell phone functions such as retrieve a message, delete a message and turn off the sound. Receiving support can be a challenge for people who do not have family and peers. The absence of support could discourage a person from using ICTs.

Interest in Learning More

All of the participants who were identified as users and two of those identified as non-users expressed an interest in learning more about ICTs. This desire to learn more encompassed a variety of interests, but all were based on increasing the ability to connect with family members and to stay abreast of modern trends related to technology. Participants expressed interests in learning "the basics" about computers; learning how to email, use Microsoft Office, and type; learning the latest jargon like "Twitter" and "Facebook"; learning how to retrieve voicemail messages, send text messages, and add contacts to a cell phone; and learning how to take and retrieve cell phone pictures. One participant takes a 25-minute drive to her cousin's house to retrieve voicemail messages. The desire to learn more about computers and cell phones has not been abundantly reported in the literature. As expressed by the Participant below there is a desire to learn more advanced level computer skills and applications. Learning about things of personal interest may counter the socio-cultural barriers like fear that keep people from using personal computers.

> *Experienced Front-Runner, age 66.5*
>
> I can play games on it. Yeah, games have kept me up to 2 o'clock in the morning, but this is really what I don't want to do is the games. Ah, I really want to do like PowerPoint and Microsoft Works. It's a Windows 7.

Another driving factor in the desire to learn to use ICTs revolved around the idea of wanting to be a part of the modern world of technology and not be left behind. This idea was expressed mainly by non-users of ICTs. One non-user, Participant 14, appeared flustered as she talked about societal demands to locate information or turn in forms using the Internet. At one point in our interview she commented, "Internet this and Internet that. Everybody doesn't have a computer."

In regards to how participants learned to use and manipulate personal computers and cell phones, the majority learned the basics from family members, mainly grandchildren and children. Once introduced to the basic concepts, participants signed up for formal computer training classes. However, there were two participants, Participant 10 and Participant 15, who sought out computer training programs during their earlier years in life. When asked about first memories and experiences with personal computers, these participants told stories of personally seeking out computer training.

Participant 12, female, age 72 was an exception to all other participants. Participant 12 was exposed to computers in the 1980s during her career as a public school teacher's aide. She learned how to use a computer on her own, first by playing games, and later by researching medical information about her mother's health condition. This participant was motivated to learn to the

computer based on a real need, researching medical information; this made

learning the computer relevant. As shown in previous studies, marginalized

groups often do not see the relevancy in ICTs. Included is her recount of

learning to use a personal computer:

> Well now, it is about 30 years ago I guess. They had the one with the big body. I will never forget [Person X], I asked him, he was our computer teacher at Booker T at the time, and I asked him to teach me how to use it, and he says, "I will not." I can hear him now, "Get on it and play with it, [Person Y]." Naturally, I think everybody, when they see a computer; they go straight to the games, whether you put them on there or not. I found the games and I played with them, and he said, "[Person Y], stop playing the games, learn the computer." I said, "Well, like what?" My mother was sick at the time. Momma had started going to different doctors, she had retired, and then she became, she had trouble with arthritis, rheumatoid arthritis, and I looked it up. He said, "Look it up. Find out what it is about."

Beyond relevancy, the participant's career was pivotal in her initial

exposure to personal computers. This early exposure allowed her to gain

experiences that were meaningful and positive. Given this participant is also the

only participant that had ever used a tablet PC, it may be concluded that early

exposure and history with technology influenced her self-confidence and self-

concept in seeing herself as a computer user.

Behavioral Transference

Behavioral transference is the voluntary and active participation in using

ICTs outside of the home environment for consumer activities. This concept was

explored briefly. Study participants were asked questions to gage attitudes and

perceptions about ICTs in public spaces, such as self-checkout kiosks in grocery

stores and Automated-Teller-Machines (ATMs). In the collection of this data,

participants were asked to "agree" or "disagree" with statements related to

personal computers, cell phones, ATMs and grocery store self-checkout stations.

The numbers represent the number of participants who agreed or disagreed with

the statements. Here are the results:

Users' Responses		
Statement	Agree	Disagree
Q1: I see myself as a computer user.	10	1
Q2: Computers are easy to use.	8	3
Q3: I see myself as a cell phone user.	8	3
Q4: Cell phones are easy to use.	10	1
Q5: ATMs are trust worthy.	6	5
Q6: The idea of using a computer is scary to me.	1	9
Q7: I think cell phones are dangerous.	3	8
Q8: I think using self-checkout is hard.	3	7
Q9: I think using a computer has a positive impact on my life.	10	1
Q10: I would miss using a computer if I did not have access to one anymore.	7	4

Table 4: Users' Perceptions about ICTs

Non-Users' Responses		
Statement	**Agree**	**Disagree**
Q1: I see myself as a computer user.	2	2
Q2: Computers are easy to use.	1	3
Q3: I see myself as a cell phone user.	4	0
Q4: Cell phones are easy to use.	4	0
Q5: ATMs are trust worthy.	1	1
Q6: The idea of using a computer is scary to me.	1	3
Q7: I think cell phones are dangerous.	2	2
Q8: I think using self-checkout is hard.	1	1
Q9: I think using a computer has a positive impact on my life.	1	2
Q10: I would miss using a computer if I did not have access to one anymore.	1	3

Table 5: Non-Users' Perceptions about ICTs

Despite the variance in perspective by users and non-users, both groups reported

similar reasons why participants did not use self-checkout, such as "do not want

to put someone out of a job", "did not have time to learn", and "do not want to

make mistakes." The majority of participants reported not using ATMs or self-

checkout. The reasons given for not using ATMs included safety and lack of

knowledge on how to use. Participants who used ATMs tended to be classified

as the *Experienced Front-Runners* and reported using during daylight hours.

Reasons provided for not using the self-checkout was lack of knowledge and

interest to learn how to use the equipment. One participant, categorized as an

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Experienced Front-Runner stated she would use the self-checkout if she knew

more about how to use it. More discussions are needed to draw factual

conclusions around behavioral transference. Based on the current data, it appears

that a few of the *Experienced Front-Runners* used ICTs outside of the home

compared to the other user types. However, more questions on various ICTs

outside of the home are needed, such as the experiences with self-service kiosk in

airports and movie theaters, electronic sign-in monitors in doctors' offices, and

touch screen directories in airports, hotels and malls.

Summary

This study was designed to understand the socio-cultural factors that

influence use or non-use of ICTs by economically disadvantaged older Black

Americans. The study instruments—a pre-screen questionnaire, interview

questions, and a brief survey—were designed to collect data relating to the use or

non-use of ICTs by this group. The data collected contributed to the field by

answer the question "w*hat are the engagement patterns, learning experiences, and*

behavioral transference among older Black Americans within the lower-income and

working-class economic strata with ICTs?"

Tinker's user type matrix was used to classify participant user levels. This

exercise, combined with the interview responses, was helpful in drawing

conclusions about study participants' use and non-use of ICTs. There appears to

be a direct correlation with historical time-period (technology era), prior experience and exposure to ICTs, and income and education levels.

Participants who were exposed to computers in the workplace during the late 70s and early 80s possessed higher comfort, skill, and knowledge levels about ICTs. These participants also tended to have more years of education than the other participants. The irony of these participants is that, even though the participants used computers in the workplace, two out of three of these participants did not identify themselves as computer users. These two participants did not equate today's version of a computer to the computers they used in the 1970s and 1980s for data entry.

Education and income levels also impacted use or non-use of ICTs. Participants with higher levels of education and income used computers and cell phones more than those with fewer years of education and lower income. The activities and tasks conducted on computers and cell phones were also more advanced. Participants with greater use of and function with ICTs reported using them to pay bills online, research medical information, listen to music, and email family and friends. Participants with more basic levels of understanding and usage did not participate in these types of activities. The impact of education and the feeling of self-efficacy and confidence in relation to use of ICTs was evidenced in some of the participants' reflections on their use and non-use of

ICTs. Other participants who expressed fear and hesitation about using computers and learning more about cell phones had attained minimal education. One participant even stated that there were computers in the office buildings he used to service as the maintenance man, but he never used the computers.

The engagement patterns of study participants focused on how participants acquired and used ICTs. Participants either acquired equipment from family members, federal programs or not-for-profit organizations. The ICT usage patterns of study participants mirror national trends focused on how older adults use ICTs. National usage patterns include: researching medical/health-related information, playing games, listening to music, watching movies, and paying bills, with the use of cell phones being mainly to send and receive phone calls. The difference, however, is in the frequency and magnitude of use. This is influenced by socio-cultural factors and larger systematic issues such as the divide threads: the digital divide, the digital literacy divide, the digital inequality divide, and the gray divide. The lack of access to updated equipment, high-speed Internet connections, and on-going training, and the lack of programs to address socio-cultural factors, such as fear and anxiety, impact the degree and levels of use and non-use of ICTs by study participants.

Family members and peers played a key role in the learning experiences of study participants. Several participants reported learning how to use personal

cell phones and computers from their children and grandchildren. Others

expressed the value of peer support from members of the community. In

addition to human influences, several participants offered ideas about how to

create learning environments and experiences that promote learning and will

enhance the learning experience. These ideas, coupled with the researcher's

suggestions are captured in the recommendations section of Chapter 5.

As noted previously, behavioral transference was hard to determine based

on the study questions and participant answers. From the data collected, there

appears to be a connection between user types categorized as *Experienced Front-*

Runners and use of ICTs outside of the home. The conclusions and

recommendations provide further insight on the findings.

Chapter 5: Conclusions, Recommendations, and Summary

Discussion and Conclusion

As noted in the literature review, ICTs have the potential to help mitigate age-driven changes in cognitive, psychological, and physiological abilities that affect quality of life and independence or inter-dependence on others by older adults. However, there are barriers that impact older adults' ability to participate fully in these benefits. These barriers include functionality, value, motivation, ability, design, cost, privacy, trust and acceptance, technical support, training opportunities and learning experiences. For older Black Americans, ages 65 and over, within the working-class and lower-income social strata, there are additional barriers such as digital literacy, digital inequity, and socio-cultural factors that limit access and use of ICTs by this audience.

According to the results of this study, the participants have an interest in and a desire to adopt, learn, and use ICTs. However, the degree and magnitude to which this occurs is dependent on further sub-classifications of age and socio-economic status within this grouping. The sub-classifications of age refer to the age cohorts of "young-old," "old-old," and "oldest-old." These age cohorts were defined in the "Key Terminology" section. The sub-classifications within socio-economic status refer to the level of education, employment, and income.

Participants in the study who could be classified as "young-old" were generally further along in their acceptance and use of ICTs. In addition to

acceptance and use, this group also displayed more positive attitudes about ICTs. This was evidenced in responses to the interview questions in which participants described their ideal usage of ICTs and responses to the survey on perceptions and attitudes. On the other end of the spectrum were the "oldest-old," who had no interest in learning or using ICTs.

The socio-economic criteria of level of education, employment, and income were separated into categories. Education levels included this range: grade school, some high school, GED, high school diploma, some college, and associate's degree. Employment included the categories "currently working" and/or "retired." Even though there were no questions that asked for the participant's occupation, employment history information was indirectly collected during the informal discussions either before or after the interviews were completed. During these discussions, it was revealed that the majority of the participants held blue-collar and service positions. These included jobs such as clerical workers, caregivers, and building maintenance personnel. There were two exceptions in which the participants held professional jobs: a teacher's aide and a licensed practical nurse. The income level range was divided into the following groups: less than $10K, $10K to $20K, and $21K to $30K. None of the participants made more than $30K annually.

The age cohort and socio-economic sub-categories were compared with the user types of the study participants. Referring back to Tinker's classification, "Technologically Open-Minded" study participants (non-users who would like to learn) had less education, reported lower income levels, and worked in non-professional careers. These participants stated that their reasons for not using a computer were time, fear, and self-confidence. "Old-Age Beginners" (infrequent users with few computer skills) also had less education, lower levels of income and worked in non-professional environments. "Experienced Front-Runners" (more frequent users with relatively more advanced computer skills) had higher levels of education, more professional jobs, and higher levels of income; they also exhibited a greater level of competency and were generally earlier adopters of ICTs.

In addition to age cohort and socio-economic status, family and peer support and learning opportunities were major factors contributing to the magnitude and depth of use and knowledge of ICTs. Several participants stated that family members and peers played a major role in the initial acquisition and use of ICTs. Regarding learning opportunities, several study participants mentioned learning to use personal computers and cell phones under the tutelage of children and grandchildren. However, participants also stated that family members did not have time for on-going support and training. Often

participants expressed disappointment due to the time constraints of family

members in providing ongoing help and tutoring on how to use ICTs. Study

participants stated if more training were offered for longer periods of time,

participants would be encouraged to learn more about ICTs and how to use

them. Participants expressed frustration with past computer training experiences

in which classes were only offered once a week for a three month cycle.

Participants did not think this was enough time for them to master the content

before a new topic was introduced to the class and before the sessions were over.

Participants also felt there was not enough practice time provided to learn the

concepts being taught.

As an outsider looking in, it is easy for me to think this population is

being left behind during this programmatic transition into a more digitally

dependent culture. It was interesting to hear this same concern vocalized by the

study participants. The majority of the participants were keenly aware that there

is a growing dependence of computer technology and if they did not learn about

ICTs and how to navigate in a digital society, they would be left behind.

Implications for Practice

The data revealed that within marginalized groups, there are additional

barriers that contribute to full adoption and use of ICTs. These barriers are

rooted in socio-cultural factors, design challenges and learning experiences, and economics.

Addressing Socio-Cultural Factors

Increased exposure to ICTs and how ICTs are relevant to the lives of this population could help address some socio-cultural factors. For example, one socio-cultural factor expressed during the study was fear of "breaking" the computer. Providing more opportunities to gain exposure to computers may address this fear, potentially easing participants' minds about "breaking" the computer. It is not enough to provide exposure, there has to be a deliberate cultivation of relationships between the human and the technology. This means defining a holistic approach to identifying the audience needs, evaluating the socio-cultural factors, and designing learning and social experiences to minimize or alleviate these barriers. Another area of focus that could be targeted to encourage feelings of relevancy is specific training on how to research information related to the concerns of older people, such as Social Security, Medicare, and health related information. The delivery format could consist of information sessions in which an instructor leads a demonstration on how to research information using the Internet. This format would provide exposure the technology and application of a real-life scenario.

Addressing Design Challenges and Learning Experiences

Usability and design are directly related to training and learning experiences. Typically, the more user-friendly a system is, there is less training required. Therefore it is recommended that designers of ICTs design products that consider the cognitive, psychological, and physiological age-related declines in older adults. For cognition, designers should focus on designing products that capitalize on what people expect and what is easy to remember. During the study, participants mentioned not knowing where to start for different activities like composing and sending an email. Participants also mentioned how today's computers' interface are more complex than systems in the past. A more user-centered design would consist of an interface that list common tasks performed by the user group. These tasks may include "Check Email", "Write a Letter", "Use the Internet". Current email tools have visual noise (such as Ads, contacts, and calendars) that may be distracting and create cognitive overload for some audiences. A more user-friendly email system would consist of a more simplified interface, without ads, that contained clear instructions outlining the process to compose and send an email.

The learning experiences of the study participants occurred both in computer lab settings and informal settings with family members and peers. Challenges with computer lab training included content that was not relevant,

groups that were too large, user experience levels that were too varied, classes

that were held too infrequency, and courses that were too short. Employing adult

learning theory and instructional design principles could address these

challenges. Developing computer lab training with relevant content and

delivering that content through the presentation of information in small, targeted

areas of focus would address relevancy. During the interviews, participants were

asked what topics they would want to learn about. One possible next phase of

this research study could be to develop a learning program focused on the topics

identified. The issues of computer training groups being too large and too

diverse in experience, sessions being too short, and classes not occurring

frequently enough might be address by the following recommendations:

- Conduct small-group training sessions with clear levels of
  experience grouped together.

- Offer training classes that meet at least three times a week. The
  more frequently the classes are held, the less time elapses in
  which participants might forget the content that was learned in
  the previous session.

- Offer training sessions over a nine- or twelve-month period.
  This would give participants longer periods of time to learn,
  practice, and apply knowledge and skills.

- Offer training curriculum that has clear milestones and incentives to keep participants interested and encouraged.

Challenges within informal settings with family members and peers were based on time constraints. Participants also stated they preferred learning from peers and people closer in age. This is a part of the situated learning theory in which learning takes place collectively. Participants stated that younger people "go too fast" and make assumptions about prior knowledge. One recommendation to address these issues is to identify more advanced-level users within the community to serve as peer trainers. A train-the-trainer model could be used in which an outside expert trains the peer trainers and provides the peer trainers with the curriculum and resources required to facilitate the training sessions. Another approach to facilitate social learning is the creation of ICT "social clubs" in which communities of older adults meet on a regular basis to share learning experiences, best practices, and challenges. This could also serve as a level of technical support.

Addressing Economics

In addition to addressing socio-cultural factors and learning experiences, the economic issues associated with the deployment of ICTs must be addressed. There is a need for affordable programs that not only consider the price of hardware and software, but also consider the education and policies necessary to

equip and empower older Black Americans on the margins to become more engaged participants in the transformation to a digital culture. This need is encapsulated in a Kaiser report that older Americans with an annual family income of less than $20,000 are less likely to be able to go online, because personal computers are priced too high for low-income populations. Consequently, these groups are largely excluded from the benefits of Internet health resources, producing a gap between older Americans who have the privilege of Internet access and those who do not (Chu, Huber, Mastel-Smith, & Cesario, 2009). Beyond making new equipment and Internet services monetarily affordable, there are programmatic considerations that can be implemented by policy makers, businesses, organizations and government agencies. For example, resist the urge to move all forms and business transactions online; make this optional. In an effort to maximize the benefits of convenience, efficiency and cost-reduction, many businesses and organizations request patrons to schedule medical appointments online, complete forms online and access information online or via voice user interface. Continue to offer human to human services and paper-based options in which individuals may call to schedule appointments and may submit forms via traditional, non-electronic mechanisms.

Recommendation for Further Study

In order to truly understand the complexity of the determining factors that influence use or non-use of ICTs by older, working-class Black Americans, an extensive, in-depth analysis on the socio-cultural variables is recommended. In addition to this analysis, observations of hands-on use and application of ICTs is recommended. There are larger, systemic challenges and barriers within society that supersede the natural, age-related declines and changes that impact use or non-use of ICTs. The innovation-decision process is a tool that may be useful in starting this analysis.

In his book, *Diffusion of Innovations*, Rogers describes the innovation-decision process in reference to the adoption and use of new technologies: "The innovation-decision process is the process through which an individual (or other decision-making unit) passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of the decision" (1995, p. 20). Using the innovation-decision process could help in identifying barriers to use and adoption.

Summary

As ICT technologies advance and our population ages, the importance of physical, intellectual, and psychological access to ICTs for older Americans cannot be overestimated. This access may be particularly challenging for older

members of disadvantaged populations. This study was designed to understand the socio-cultural factors that influence use or non-use of ICTs by older Black Americans within the working-class and lower-income social strata. The following research questions were asked: *What socio-cultural factors influence use and non-use of ICTs among older, working-class Black Americans? What are the engagement patterns, learning experiences, and behavioral transference among older Black Americans within the lower-income and working-class economic strata with ICTs?*

The literature on the subject suggests that older people face age-related difficulties when using ICTs as a result of cognitive, physical, and psychological changes. The socio-economic and psychosocial barriers experienced by ethnically diverse populations may exacerbate difficulties in accessing and using ICTs. Designing hardware, software, instructional materials, and learning environments to meet the needs of older adults may help ameliorate these problems.

In order to study the use and non-use of ICTs among disadvantaged older Black Americans, a sample population living in mixed-income affordable housing was identified. A pre-screen questionnaire, interview questions, and brief survey were designed to collect data. Ultimately, 15 subjects participated in the study. Narrative research inquiry was used to analyze the data.

The data collected revealed the socio-cultural factors of fear, trust, and self-perception that influence use and non-use of ICTs by the target audience. The study results also high-lighted the engagement patterns of the target audience. The engagement patterns provide insight in the acquisition, adoption, and use patterns. The results of this study indicate that older, working-class Black Americans within the lower-income socio-economic stratum either use ICTs or have an interest in using ICTs. Even though participants' current usage is on a basic level of tasks and activities, participants expressed a desire to learn more, to become more comfortable, and to do more with ICTs. Providing opportunities for education and awareness would help move study participants beyond a basic level of understanding and use.

The differences in usage by age cohort, education, and socio-economic status revealed interesting facts about ICT use and non-use. Fundamentally, education is a main factor. Study participants with more education had more self-confidence and were more open, not only to wanting to learn about ICTs, but also to taking the initiative to learn about ICTs.

Family members and peer play an important role in the learning experiences of older adults. This finding is consistent with literature focused on how older adults acquire computer and cell phone skills. The opportunities for improving learning experiences are based upon using adult learning theory,

situated learning theory, and social support systems. Improvements in this

population's access to up-to-date ICTs, as well as better training, focused on the

needs of older adults, may help prevent the widening of the gap that threatens to

keep disadvantaged older adults from participating fully in a digital society.

Further study of the complex psychosocial factors that discourage ICT use in

ethnically diverse groups may provide more detailed information about steps

that can be taken to improve ICT use among older adults in these groups.

APPENDICES

APPENDIX A: Housing Community Introductory Meeting

Maleka Ingram, Doctoral Candidate at the University of Baltimore | May 3, 2012 | Committee Chair, Dr. Kathryn Summers

Research Overview:

An exploration of factors that influence use or non-use of Information and Computer Technologies (ICTs) by older African Americans from working-class and lower-income socio-economic statuses. Specific ICTs include personal computers, cell phones, grocery store self-checkout kiosk, and possibly tablet PCs.

Research Methodology Overview:

- Participant Identification Survey
- Computer Attitude/ Perception Questionnaire
- Individual Participant Interviews and Observations (if applicable)

High Level Timeline:

- Data Collection: May 21 – June 30
- Data Analysis and Writing: July 1 – Aug 31
- Draft Due: Sept 10

Contact Information for Maleka Ingram:
Phone: 503.332.4187
Email: mningram@gmail.com

APPENDIX B: Pre-screen Questionnaire

The purpose of this questionnaire is to identify users and non-users of Information Communication Technologies (ICTs). The survey components include demographics and usage.

Question	Answer
1. What is your age?	
2. What is your ethnicity?	☐ African American ☐ Caucasian/ White ☐ Hispanic/ Latino ☐ Native American ☐ Asian American ☐ Other: Please list.
3. What is your gender?	☐ Female ☐ Male ☐ Other: Please list.
4. What is your education level?	☐ Grade school ☐ Some high school ☐ GED ☐ High School Diploma ☐ Some College ☐ Associates Degree ☐ Bachelor's Degree ☐ Master's Degree ☐ Professional or Doctorate Degree

Question	Answer
5. What is your employment status?	☐ Working ☐ Retired
6. What is your income level?	☐ Less than $10,000 a year ☐ $10,000 - $20,000 a year ☐ $21,000 - $30,000 a year ☐ $31,000 - $40,000 a year ☐ $41,000 and above a year
7. Do you use a computer?	☐ Yes ☐ No
8. Do you use a tablet PC (i.e. an iPad or something like an iPad)?	☐ Yes ☐ No
9. Do you use a cell phone?	☐ Yes ☐ No

APPENDIX C: Interview Questions

Participant Name:

Interview Date:

Interview Time:

Interview Location:

Computer Users

Objective: Identify exposure
Q1: What is your earliest memory of using a computer?
Q2: Do you have your own computer? If yes, what kind is it (laptop, desktop)? Why did you get a computer?
Q3: When did you get your first computer?

Objective: Describe access and experience
Q4: Where do you go to use a computer?
Q5: Tell me what you use the computer for.
Q6: How did you learn to use it?
Q7: Are there other activities you would like to do with the computer (email, shop, play games)?

Tablet Users

Objective: Identify exposure
Q1: What is your earliest memory of a tablet?
Q2: Do you have your own tablet? If yes, what kind is it? Why did you get a tablet?
Q3: When did you get your first tablet?

Objective: Describe access and experience
Q4: Where do you go to use a tablet?
Q5: Tell me what you use the tablet for.
Q6: How did you learn to use it?
Q7: Are there other activities you would like to do with the tablet (email, shop, play games)?

Cell Phone Users

Objective: Identify exposure
Q1: What is your earliest memory of using a cell phone?
Q2: Do you have your own cell phone? If yes, what kind is it? Why did you get a cell phone?
Q3: When did you get your first cell phone?

Objective: Describe access and experience
Q4: Do you use your cell phone at home, in public, anywhere?
Q5: Tell me what you use the cell for (make phone calls, receive phone calls, texting, access web).
Q6: How did you learn to use your cell phone?
Q7: Are there other activities you would like to do with the cell phone?

Computer Non-Users

Objective: Identify non-use rationale
Q1: Have you ever thought about using a computer?
Q2: Why did you decide not to use a computer?
Q3: How do you feel about computers?
Q4: Can you tell me a little more about problems or bad experiences you have had with computers?
Q5: Has anyone ever tried to get you to use a computer?
Q6: Are there any reasons you would consider using a computer?

Tablet Non-Users

Objective: Identify non-use rationale
Q1: Have you heard of a tablet? If yes, have you ever thought about using a tablet?
Q2: Why did you decide not to use a tablet?
Q3: How do you feel about tablets?

Cell Phone Non-Users

Objective: Identify non-use rationale
Q1: Have you ever thought about using a cell phone?
Q2: Why did you decide not to use a cell phone?
Q3: How do you feel about cell phones?
Q4: Can you tell me a little more about problems or bad experiences you have had with cell phones?
Q5: Has anyone ever tried to get you to use a cell phone?
Q6: Are there any reasons you would consider using a cell phone?

APPENDIX D: Project Timeline

Doctoral Candidate: Maléka Ingram, contact 503.332.4187

Institution: University of Baltimore

Document: Timeline of Key Dates and Activities

Friday, May 18, 2012: Kick-Off Activities
o Visit community o Distribute confidentiality form and pre-screen questionnaire o Identify study participants
Monday, May 21 – Friday, May 25: Data Collection
o Preliminary data collection o Contact participants from pre-screen questionnaire o Meet and do introductions individually o Conduct preliminary discussion about the project o Discuss dates and times for continued discussions and data collection
Monday, May 28 – Tuesday, May 29: Data Collection
o Meet with participants for continued discussions and data collection
Monday, June 4 – Friday, June 22: Data Collection and Analysis
o Continue to have conversations with participants o Draw themes and conclusions o Begin summarizing findings
Computer and Technology Training Sessions *(Proposed Dates – dates may change based on information collected and training curriculum defined.)*
o Tuesday, June 12- Evening o Tuesday, June 19 - Evening o Tuesday, June 26 - Evening o Tuesday, July 3 – Evening o Thursday, July 5 – Evening o Tuesday, July 10 – Evening o Thursday, July 12 – Evening o Tuesday, July 17 – Evening o Thursday, July 19 – Evening o August – TBD o September – TBD o October – TBD o November – TBD o December -- TBD

Detail Timeline

Activities	Dates to Work	Status
Draft Outline of Study Components	Wed, June 27 – Sat, June 30	
Data Collection	May, June, Early July	In Progress
Data Transcription (Text Files)	Sun, July 1 – Sun, July 8	Planned
Data Transcription (Audio Files)	Tues, June 26 – Fri, July 27	In Progress
Data Analysis	Sun, July 1 – Tues, July 31	Planned
Write First Draft of Study/ Findings	Wed, Aug 1 – Fri, Aug 31	Planned
Review Draft *Comment: I will submit various components/chapters in stages*	Mon, Sept 3 – Mon, Sept 17	Planned
Revise Draft Copy	Wed, Sept 18 – Sun, Sept 30	Planned
Review Version 1 Copy	Mon, Oct 1 – Mon, Oct 15	Planned
Revise Version 1 Copy	Tues, Oct 16 – Wed, Oct 31	Planned
Submit Final Version	Thurs, Nov 1	Planned
Committee Final Review	Mon, Nov 5 – Mon, Nov 12	Planned
Defend Research	Fri, Nov 16	Planned
Graduate	Mon, Dec 17	Planned

APPENDIX E: Flier

Do You Use a computer, cell phone, or eReader?

☑ YES

☑ NO

Whether you checked yes or no, we want to talk to you.

Join us Friday, May 18th at 6:00 pm as we talk about how you use or don't use computers, cell phones and eReaders. Light snacks will be served.

Sign up today on your boards!
For questions, ask Ms. Alda James.

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