Understanding Behavioral Intention for Gerontologic Telehealth Participation: Results from a Senior-Learning-Computer Program in the Philippines

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Abstract

The objective of the study is primarily centered on understanding the polarity of attitudes of the senior toward computers and the internet as correlates of behavioral intention for Telehealth participation among the elderly, post Senior-Learning-Computer (SLC) sessions. The study employed descriptive correlational design to investigate the magnitude and significance of variable relationships. Results showed that the elderly participants have consistent positive attitude towards the computer and the internet based on their perception after the training. Though seniors acknowledged their shortcomings in terms of the competence to use technology for health prior to the session, they are homogeneous in terms of awareness of perceived benefits in using such innovations. This further deliver the society with an assurance that it is possible for our elderly to become equally competent in technology, and are able to occupy their empty space in the realm of computer and networking for health.

Keywords: Telehealth, Gerontology, Attitude towards Technology

Introduction

Population aging, a disproportion of children against an inflated senescent population aging 60 years and above (World Health Organization, 2002), is undoubtedly recognized as both global (Bartlett, 1996; Ingman, Amin, Clarke & Brune, 2010) and local phenomena (Ingman et al, 2010; Ogena, 2006). This worldwide increase shall continue to rise in the near future (Milligan, Roberts & Mort, 2011; Cresci, Yarandi & Morrell, 2010). By the year 2025, a projected total of 1.2 billion people will mature as senior citizens (WHO, 2002). In the Philippines, the older population has grown faster in which growth rate has increased from 2.26 to 2.64 percent in the previous decade (Ogena, 2006).

As elderly population increases, the need for quality elderly-directed healthcare also rises. Measures that help the elderly remain healthy and active is a necessity (WHO, 2002) and an important issue of the 21st century (Boulton-Lewis & Gillian, 2010; United Nations Educational, Scientific and Cultural Organization, 2011). This alarming growth has led to new models of aging research aimed at empowering older adults (Demiris, Doorenbos & Towle, 2009) and the increasing need to support independent functioning of older persons is obvious (Rouhala & Topo, 2003). Previous studies reported declining numbers of family members, who show willingness to provide informal care-giving and those available to undertake paid work (Milligan, 2009). Urbanization leading young people to cities and women entering formal workforce (WHO, 2002) resulted to fewer people available to care for the elderly. Thus, elderly empowerment in the context of functional independence and quality of life among senior citizens is seen as favorable solution for sustainable elderly living may it be in rural and urban spaces.

Reaching out for distant elderly residing mostly in the rural communities remains to be a problem in various countries (e.g. Chanda & Shaw, 2010). One commendable measure is to maximize available technologies to improve gerontologic health. For instance, according to Adewale (2004) telecommunication technologies like Telehealth are enabling delivery of healthcare to remote places and facilitate information exchange, therefore solving geographical health service disparities.

Much has been reported about the benefits of Telehealth. Telehealth systems hold the premise of helping older adults live an independent life (Pountney, 2009; Milligan et al, 2011), empower patients and promote self-management (Johnston, Suter & Suter, 2011) across geographical distance (Demiris et al, 2009; Sorrells, Tsichirch & Liong, 2006). Moreover, the increasing healthcare cost associated with aging creates market opportunities for telehealth (Kun, 2001; DelliFraine & Dansky, 2008). Though it has attracted considerable attention from healthcare providers of the developed counties (Milligan, Roberts & Mort, 2011; Brownsell, 2009), it is perhaps the least developed countries that could benefit most from such technologies (Chanda & Shaw, 2010). The health provision issue is pressing since much of the world elderly population (70%) resides in developing

countries and will continue to rise at a rapid pace (WHO, 2002).

While telehealth can be a promising tool to change the way health sector provides services, previous researchers call for further research and exploration (Pountney, 2009; Brownsell, 2009; Demeris, et al, 2009; Sorrells et al, 2006; Milligan, et al, 2011). Remote delivery of healthcare information to empower the elderly has yet to be fully optimized in the contemporary practice (Glasper, 2011).

From the primeval health provision models to ICT-enabled systems requires major cultural and productive transformations, and technology-enhanced human capacity (Fonseca, 2010). Previous researchers (Carr, 2003; Chigona, Mbhele & Kabanda, 2008) suggested that being able to profit from technology does not depend on their availability, but more on people's preparation and capacity to use such in new and creative ways. How elderly perceive these technologies may also shed light in understanding issues of use and non-use. Exploring the Telehealth technologies for the elderly participants can expectedly offer a crucial primordial step in realizing Telehealth potentials for developing countries such as the Philippines.

2.0 Review of Related Literature and Studies

The study is an exploration of Telehealth technologies for the elderly which includes assessment of prognosticators of behavioral intention to participate in TeleHealth as a tool in developing empowerment among Filipino elderly, and the identification of community health workers' preferences of an ideal electronic health record. A combination of health behaviors and technology acceptance framework is therefore essential to provide strong theoretical bases for the present undertaking. The study purports to adopt and synchronize the viewpoints of Vankatesh, Morris, Davis and Davis' (2003) Unified Theory of Acceptance Use of Technology (UTAUT) and Rosenstock's (1965) Health Behavior Model (HBM).
Vankatesh et al (2003) integrate eight competing models to propose the Unified Theory of Acceptance Use of Technology (Wang & Shih, 2009; Lee, Yen, Peng & Wu, 2010). According to UTAUT, the individual's behavioral intentions of using a technology had four distinct determinants which include performance expectancy, effort expectancy, social influence and facilitating conditions (Lee, Yen, Peng & Wu, 2010). Therefore, individuals are more likely to demonstrate the behavior when they perceive the usefulness, ease of use, availability and support from significant others. In a similar manner, senior citizens may hypothetically participate in TeleHealth activities if positive perceptions toward the health delivery approach are recognized. Encouragement from the family and members of the healthcare team associated with the technology and care provision may also create an impact for successful implementation of TeleHealth. The theory also postulates the role of key moderator variables: age, gender, experience and voluntariness of use (Al-Gahtani, Hubona & Wang, 2007).

A specific model to account for personal health decisions shows promise of providing a means of explaining preventive health behavior (Rosenstock, 1965). The Health Belief Model (HBM) is by far the most commonly used theory in health promotion (Glanz, Rimer & Lewis, 2002). Based on HBM, the likelihood that someone will take action to prevent illness depends upon four (4) constructs, namely: (1) perceived seriousness/severity; (2) perceived susceptibility; (3) perceived benefits/effectiveness; and (4) perceived barriers (Rosentstock, 1965). Perceived susceptibility refers to the probability that an individual assigns to personal vulnerability in developing a health condition (Redding, Rossi, Rossi, Velicer and Prochaska, 2000). Perceived severity refers to how serious the individual believes the consequences of developing the condition are (Redding et al, 2000). Perceived effectiveness refers to the benefits of engaging in the protective behavior (Redding et al, 2000). Perceived barriers refer to losses that interfere with health behavior change (Redding et al, 2000). Taking these concepts into account, behavioral intention to utilize TeleHealth technologies to enhance functional independence may be associated with the health needs of the elderly. The modus on how they perceive the negative consequences of not participating to a health promotion program and the identified barriers will also predict participation to TeleHealth.

Telehealth Defined

Defining TeleHealth poses a challenging task, since there is a little inconsistency in the universal consensus on the terminology used in various healthcare provision modalities. Stowe and Harding (2010) posited that one of the difficulties in the area of gerotechnology relates to the confusing use of ambiguous terms, which may be used to describe different services by varied authors and equipment manufacturers.

The term telehealth, as a constructive portmanteau of healthcare and remote delivery, can be traced its roots from the field of medicine. Its etiological term Telemedicine first came into use in the 1970s (Moore, 1999 cited in Viegas & Dunn, 1998) which describes the use of electronic information and communication technologies to provide and support healthcare when geographic distance separates the participants (Bashshur & Lovett, 1977; Field, 1996; Craig, 1999). From the broader perspectives, many professionals in the healthcare sector embrace and recognize the term Telehealth as it more

clearly delineates the systematic application of telecommunication technologies in all healthcare activities (Fairchild, 2001) regardless of the type of healthcare provider involved. Meanwhile, terms like Telecare (Rogers, Kirk, Gately, May & Fitch, 2011; Barlow, Bayer & Curry, 2006), Telehealthcare (May, Mort, Williams, Mair & Gask, 2003), Telehomecare (Dineser, Nohr, Andersen, Sejersen & Toft, 2008; Thobaben, 2000), Ehealth (Flynn, Gregory, Makki & Gabbay, 2009), Smart homes (Chan, Campo, Esteve & Fourniols, 2009) and assistive technology (Smith & Devlin, 2005) can be used interchangeably as collective appellation pertaining to TeleHealth.

Regardless of its crossover nomenclature, the continuous existence of Telehealth technologies can be seen from the application of diverse platforms. In a review and meta-analysis conducted by DelliFraine and Dansky (2008), several typologies were familiarized: Telehealth is commonly employed through the use of (1) telephone, (2) internet, (3) data monitor, and (4) video monitor. In some situations, Telehealth environment exists as simple as webcam-to-webcam discussions, yet it can be very complex by amalgamating multiple channels and devices together (Maeder, 2010). Utilization of these technologies enables a Telehealth patient visit or Teleconsulation wherein the healthcare provider is situated in one location, while the patient is at a Telehealth site located elsewhere (Jones et al, 2006). Maeder (2010) observed that Telehealth processes consist of several essential components: (1) healthcare delivery activity, (2) two or more parties cooperating in healthcare delivery, (3) separate location or time, and (4) communication systems or link. It is clearly evident that majority of Telehealth systems employ computers and its use has considerable channel of health related information (Kim, 2009).

Healthcare delivery at a distance is gaining popularity and reflected to be one of the fastest growing areas in healthcare provision (Ruggiero, Sacile & Giacomini, 1999 cited in Brownsell, 2009). As Glasper (2011) suggested, Telehealthcare patient interventions are likely to proliferate. They have enabled innovative approaches for improving education, assessment, support, and communication (Head, Keeney, Studts, Khayat, Bumpous & Pfiefer, 2010) to patients across the globe. Telehealth technology will undoubtedly play an increasing important role in delivering healthcare and improving the lives of millions of people including the elderly (Pountney, 2009).

The State of Health, Healthcare Delivery and Elderly Welfare in the Philippines

The rate of adoption of technology in health may be influenced by factors related to conventional health services structure (Chanda & Shaw, 2010). The Philippines, in this case, has a health profile that is generally typical of a middle developing country (Healy, Gorgolon & Sandig, 2003). In 2011, the National Statistics Office (NSO) reported that fertility rate is declining intrinsically. The life expectancy in the country is gradually improving which accounts for an increasing number of the senior citizens (Ogena, 2006). Interestingly, one in every five households in the Philippines had at least one senior citizen (NSO, 2000). Though previous literature typifies the population as predominantly young (NSO, 2010; WHO, 2010), elderly welfare is viewed as both auspicious and challenging (Ogena, 2006). In terms of health, prevalence of both communicable and non-communicable diseases is persistent across the population while remaining high fertility rate (Healy, Gorgolon & Sandig, 2003) that is considerably higher when compared to international standards and figures in Southeast Asia (NSO, 2011).

The national Department of Health (DOH) oversees the health service delivery which is decentralized to local government units (LGUs) and administrative regions (Healy, Gorgolon & Sandig, 2003; Gonzalez, 1996). Under this orientation, the LGUs serve as stewards of the local health system and therefore are required to formulate and enforce local policies and ordinances related to health, nutrition, sanitation and related affairs in accordance with national policies and standards (WHO, 2010). The department, however, maintains specialty hospitals, regional hospitals and medical centers. The goals of the health department are aligned with the WHO health systems framework, which primarily centers on better health for the entire population (WHO, 2010). The constitution (Section 15, Article II, 1987) further emphasizes giving priority to the health needs of the unprivileged including the elderly. This is supported by Arquiza and Kho (2003) accentuating the mandatory function of the state to promote and protect the health of the Filipinos by making quality and adequate healthcare available and accessible to everybody, especially the poor senior citizens and the elderly. They also stressed that further research should be done to improve the social, psychological and biological status of the aging people which the present paper purports to advance.

Scientific studies to improve health status of the Filipino elderly are both challenging and a novel task due to the country's archipelagic feature and geographic distribution of senior citizens. The elderly are dispersedly residing across geopolitical regions in the Philippines with low mobility prospect (Ogena, 2006). Their concentration is projected to increase more in rural areas (Nesca, 1993). Omi (2005) also highlights the importance of balanced distribution of human resources for health in attaining quality universal healthcare. Unfortunately, the ratio and maldistribution of healthcare providers which are mostly

concerted in urban localities (NSO, 2010) may hinder the attainment of universal healthcare among the elderly.

ICT towards Universal Healthcare

Using Information Communications Technology (ICT) to make healthcare more efficient is an important aspect of delivering universal healthcare (Angara, 2011; Ona, 2011; Romulo, 2011). Kramer and Dedrick (2001) elaborates that its application to large sectors of the economy determines productivity. Therefore, health technologies are deemed as the backbone of all health systems and are considered essential tools to solve health problems (WHO, 2007).

Network readiness and e-government readiness are two widely accepted ICT indicators that can be used to measure the level of capacity and development within the context of a country (Asian Development Bank, 2011). On the one hand, *networked readiness index (NRI)* provides an international assessment of countries' capacity to exploit the opportunities offered by ICTs. This can be achieved by looking at the extent to increase the utilization of ICT and factors that enables such (World Economic Forum and Center for International Development, 2010). Whereas, the United Nations (2008) defines *e-government readiness* as a systematic assessment on how the government uses ICT to provide access and foster inclusion for all. With a NRI score of 3.51 (world rank of 85) and e-government readiness score of 32.8 (world rank of 69), enabling environment for implementing ICT-enabled health delivery in the Philippines can nurture a promising vivacious future. A noteworthy fact relates with the recognition for the country as among the world's most attractive destinations for ICT having the potential to be a major global service provider (Kearney, 2004). The Philippines reported that almost half of its listed agenda to promote an enabling environment for ICT in the health sector have been implemented (WHO, 2006).

The increasing prevalence of ICT application to community services has led a plethora of researches to investigate its general application to healthcare delivery in both developed (e.g. Pountney, 2009; Brownsell, 2009) and developing countries (e.g. Chanda & Shaw, 2010; Glasper, 2011; Kun, 2001). However, a small number of these researches are associated in the context of gerontology.

Computers, Internet and the Elderly

Parallel growth between population ageing and computers has been witnessed in recent years. As the number of seniors increase, the penetration of computers in various disciplines becomes apparent. Researches centered on the interesting association between the elderly and computer use correspondingly showed that the internet milieu appears to be the most promising area of inquiry. Older adults are reported to be one of the fastest growing internet users group (Adams, Oye & Parker, 2003; Fox, 2004; Nahm, Resnick & Gains, 2004), likewise with negative stereotypes branded to them as being avoidant of technology become an outdated notion (Braody, Chan & Caputi, 2010). Heterogeneity among senior users and benefits for users are revealed in the study of Cresci, Yarandi and Morrell (2010). In contrast with other senescent groups, Internet-inclined elderly or *Pro-Nets* were revealed to be physically younger and have greater optimism with lesser chance of acquiring lifestyle related diseases.

In this perspective, elderly is viewed as having the potential to be equally effective in using computers and become computer literate as younger age groups with proper encouragement and clear explanation of potential benefits (Broady et al, 2010). Previous studies (e.g. Cresci et al, 2010; Kim, 2008) stressed the need for developing social interventions that would address non-computer users to become engaged in technology. Notable examples are the provision of formalized computer training, internet-accessible educational materials, online social support, and computer-mediated information (Gatto & Tak, 2008; Carpenter & Buday, 2007). While evidence on learning by trial and error is observed among elderly, accepting the challenge of learning a new skill gives them a sense of accomplishment and feelings of confidence after computer training (Gatto & Tak, 2008).

Interestingly, Carpenter and Buday (2007) mapped the way on how the elderly population uses computers and internet into two (2) broad dimensions, namely: (1) solitary-social, and (2) obligatory-discretionary. On the one hand, they viewed that solitary-social dimension reflects the degree to which computer use involves maintaining contact with other people. Solitary activities are self-focused undertakings such as playing games and managing finances while social activities are visible when the elderly compose letters and send electronic mail. On the other hand, computer activities that are more purely pragmatic and functional referred to as obligatory-discretionary. At the obligatory end, tasks include using computers for work and shopping, whereas discretionary activities consist of using the computer and do travel-related research.

Personal computers and Internet are indeed seen as having the potential to improve quality of life and well-being of older adults in a variety of ways (Dickinson & Gregor, 2006). They provide a neutral plateau where individuals can engaged in topics that interest them (Karavidas, Lim & Katsikas, 2005). An extensive review by Wagner, Hassanein and Head (2010) further substantiate this

concept when the five (5) interesting themes on reasons why older adults use computers were revealed, namely: (1) communication and social support (McMellon & Schiffman, 2010; Opalinski, 2001; Mann, Belchoir, Tomita & Kemp, 2005; Thayer & Ray, 2006; Alexy, 2000; Morrell, Mayhorn & Echt, 2004), (2) leisure and entertainment (McMellon & Schiffman, 2000; Opalinski, 2001; Campbell, 2008), (3) information-seeking help (Tak & Hong, 2005; Flynn, Smith & Freese, 2006; Campbell, 2008; Macias & McMillan, 2008), (4) information-seeking education (McMellon & Schiffman, 2000; Opalinski, 2001; Dorin, 2007), and (5) productivity (White & Weatherall, 2000; Campbell, 2008). Behind the fact that technology use among older adults poses a multidisciplinary topic, studies focusing on health have recently gained momentum (Wagner, Hassanein & Head, 2010). Internet communication tools such as electronic mail, instant messaging and video conferencing, as promising tools for Telehealth, remains to be unexplored.

Though computer and internet use creates significant benefits for the ageing population, a number of seniors may still not readily enjoy its benefits. Research findings that computer complexity (Carpenter & Buday, 2007), lack of access (Peacock and Kunemund, 2007), cost (Saunders, 2004), physical limitations (Carpenter & Buday, 2007), fear of hardware being outdated quickly (Saunders, 2004), and lack of interest and motivation (Morris, Goodman & Brading, 2007; Peacock & Kunemund, 2007) contribute as factors to non-use of computer and internet among the elderly. The latter is further supported by previous literatures indicating that the older the individual, the less computer knowledge and interest they likely to possess (Karavidas, Lim & Katsikas, 2005; Ellis & Allaire, 1999; Wagner, Hassanein & Head, 2010).

Attitude towards Computers and the Internet

Given the pervasiveness of computer with its associated technologies in the society, it is likely that most individuals have developed some attitudes toward these machines (Shaft, Sharfman & Wu, 2004). Understanding users' attitude toward computer and the Internet is crucial to the success of internet-based computer interventions and viewed as one of the most challenging issues in research (Davis, Bagozzi & Warshaw, 1989) for it predicts computer-related behaviors and choices (Ajzen & Fishbein, 1977). As further supported by Galleta and Lederer (1989), it also provides people with a framework to interpret the world and integrate new experiences. Consequently, a positive attitude towards computers is linked to the development of computer literacy, acceptance and satisfaction with computer-based information systems (Shaft, Sharfman & Wu, 2004; Delcourt & Kinzie, 1993). Shaft et al (2004) reviewed and discovered three (3) related concepts related to attitude towards computers: (1) computer anxiety, (2) user information satisfaction, and (3) technology acceptance. The most related construct pertains to computer anxiety. He also posited that attitude is a trait rather than state variable. However, evidence suggests that it intervenes between demographic and attitudes towards computers (Igbara & Parasuraman, 1989) and therefore these two are considered as distinct constructs.

Numerous instruments have been developed to quantitatively assess individuals' attitudes toward computer which operate at different levels with specific focus across various disciplines (e.g. Young, 2000; Jones & Clarke, 1995; Jay & Willis, 1992; Gattiker & Hlavka, 1992). These research tools have emerged after the theoretical link between attitude and behavior become well accepted (Ajzen & Fishbein, 1977 cited in Shaft, et al, 2004). Though a heap of these tools was valid and reliable for the general population, few research applications were done in context of the elderly.

Shedding light from the aforesaid discussions, this study proposes the following questions:
Research Question 1a: *What defines the polarity of the attitude of the elderly toward computers?*
Research Question 1b: *What defines the polarity of the attitude of the elderly toward the Internet?*
Research Question 2a: *Is elderly attitude toward computers significantly associated with behavioral intention to participate in TeleHealth sessions?*
Research Question 2b: *Is elderly attitude toward the Internet significantly associated with behavioral intention to participate in TeleHealth sessions?*

Accordingly, this study argues that:
H1a: The elderly has a positive attitude toward computers.
H1b: The elderly has a positive attitude towards the Internet.
H2a: Elderly attitude toward computer is positively associated with behavioral intention to participate in TeleHealth sessions.
H2b: Elderly attitude toward the Internet is positively associated with behavioral intention to participate in TeleHealth sessions.

3.0 Research Method

3.1 Research Design

The researchers employed descriptive correlational design to describe behavioral intention for telehealth participation, attitudes toward computers and the internet; and measure interrelationships between them. Correlational analyses were proven meritorious in investigating the magnitude and significance of variable relationships (Prematunga, 2012).

3.2 Subjects and Research Site

One-hundred subjects were recruited randomly from the total registered senior population in a rural local government unit in the Philippines. Names from the database were transferred to Microsoft Excel and linked to online random selector.

3.3 Instruments

A three-part questionnaire was devised to gather data relevant for the study as discussed below

3.3.1. *Respondents' Robotfoto* – coined from the Dutch term for cartographic sketch, it assesses age, gender, and civil status serving as baseline demographic descriptions of the respondents

3.3.2. *Perceived Computer Literacy Scale* – researcher-made questionnaire based from the wealth of literature in the field. It contains four computer literacy constructs items scaled from 1 (poor) to 5 (excellent). The scale produces a reliability coefficient of 0.92.

3.3.3. *Computer Attitude Scale and Web Attitude Scale* - Assessing computer and internet attitudes remain a challenge for contemporary researchers. The proliferation of various metrics created from varied constructs since the launch of the first personal computer in 1978 (Garland & Noyes, 2007) is tantamount to a wide range of choices for use in technology-related studies. In view of the appropriateness to the present subjects, the researchers selected the 32-item tool developed by Loyd and Loyd (1985). It highlights items related to anxiety, confidence, liking and computer usefulness, which are deemed necessary in assessing attitude towards an object (Ajzen & Fishbein, 1977). Questionnaire items were scaled from 1-7 with anchors ranging from strongly disagree to strongly agree. In a study of Liaw (2002), CAS and WAS yielded a commendable Chronbach's alpha score of 0.90. The researchers followed the six-phase translation process (Raholm, Thorkildsen & Lofmark, 2010) to ably convert the tool into local language. The product yields chronbach's alpha scores of 0.95 and 0.97 for CAS and WAS respectively.

3.3.3 *Behavioral Intention for Telehealth Participation* – This section contains 3 items adapted from the original Universal Theory of Acceptance and Use of Technology by Ajzen and Fishbein in 1977, measuring the intention to use telehealth in the next 12 months. It was scaled from 1 (strongly disagree) to 7 (strongly agree).

The questionnaire was formatted and uploaded to the internet via SurveyMonkey website for easy administration and processing.

3.4 Data Collection Procedure

After securing permission from the local government and health department, letters of invitation to participate were sent to the respondents through the help of Office of Senior Citizens' Affairs (OSCA) personnel. Eighty-two (82) seniors responded with the intent for participation, and underwent the basic computer and internet training for Telehealth at the nearest educational facility for ten (10) consecutive working days. On the last day of the program, the elderly were tasked to accomplish the online questionnaire with the guidance of the instructor.

3.5 Data Analysis

Data were extracted from the online survey and processed using the Statistical Package for Social Sciences version to date.

4.0 Results

4.1 Respondent Profile and Perceived Computer Literacy

The study achieved 82% compliance from the random sample of 100 elderly subjects. Their demographic status and perceived computer literacy were primarily obtained.

Table 1. Respondents' Characteristics (n=82)

Variable	*f*	*%*
Gender		
Male	23	28
Female	59	72
Age		
60 - 66	52	63
67 - 73	24	29
74 - 80	6	7
Civil Status		
Single	6	7
Married	51	62
Widowed	25	30
Computer/Internet ownership		
Computer only	21	26
Computer with internet	34	41
No computer	27	33

Note. n = samples; f = frequency; % = percentage

As Tables 1 indicates, majority of the participating seniors were female (72%), between 60 to 66 years old (63%), and living with their partners (62%). More than half (67%) owns a personal computer. Of this percentage, less than

half (41%) has internet access. Further, the respondents perceived their overall computer literacy as 'poor' (X=1.22; SD=0.50) as shown in Table 2. The findings direct that computer ownership may provide an opportunity, but not an assurance to achieve computer competency.

Table 2. Perceived Computer Literacy (n=82)

Computer Literacy	*x*	*SD*	*I*
Using Computer	1.29	0.53	Poor
Maintaining Computer	1.16	0.48	Poor
Using internet	1.23	0.50	Poor
Using Computer Application	1.18	0.47	Poor
Overall	1.22	0.50	Poor

Note. n = samples; X = mean; SD = standard deviation; I = Interpretation

4.2 Attitude toward Computers and the Internet

Table 3. Elderly Attitude toward computers and the internet (n=82)

Factors*	Elderly Attitude towards Computer			Internet		
	X	*SD*	*I*	*X*	*SD*	*I*
Confidence	6.09	1.20	A	6.32	0.74	SA
Liking	6.30	1.01	SA	6.15	1.03	A
Serenity	6.22	0.96	SA	6.53	0.61	SA
Usefulness	6.32	1.09	SA	6.61	0.53	SA
Total	**6.23**	**0.71**	**SA**	**6.40**	**0.45**	**SA**

Note. X = mean, SD = standard deviation, I = interpretation, SA = strongly agree, A = strongly agree; *constructs from Computer Attitude Scale (CAS) and Web Attitude Scale by Loyd and Loyd (1986)

Table 3 shows that the senior participants answered each computer attitude constructs with response mean ranging from 5.68 to 6.65. As to factors related to attitude toward computers, 'confidence on the use of computers' received the lowest mean of 6.09 (SD=1.20) with overall interpretation as 'agree', while 'computer usefulness' had the highest (X=6.32, SD=1.09) inferred as 'strongly agree'. Responses were most consistent on the items under the factor 'serenity' (X=6.22; SD= 0.96). It is interesting to note that same polarity results were seen on the constructs of Web Attitude Scale but with higher mean scores ranging from 5.82 to 6.68 and lower standard deviation marks of 0.53 to 1.03. Items on the factor 'Liking' received less consistent (SD=1.03) scores with a mean of 6.15 interpreted as 'agree', while 'internet usefulness' obtained a more consistent (SD=0.53) but higher scores (X=6.61) interpreted as 'strongly agree'. Overall, data revealed a summative mean of 6.23 (SD=0.71) and 6.40 (SD=0.45) for attitudes toward computer and internet respectively, both interpreted as 'strongly agree'. Results in this area showed that elderly participants have positive attitude toward computers and the internet.

4.3 Demographic differences in attitude toward computer and the Internet

At 0.05 level of significant (2-tailed), Table 4 showed that no significant differences were noted in attitude toward computer and the Internet when the respondents were grouped based on their age (P_{CAS}=0.90, P_{WAS}=0.96); gender (P_{CAS}=0.77, P_{WAS}=0.20); civil status (P_{CAS}=0.13, P_{WAS}=0.45); computer ownership (P_{CAS}=0.71, P_{WAS}=0.29); internet subscription (P_{CAS}=0.72, P_{WAS}=0.72); and perceived computer literacy (P_{CAS}=0.32, P_{WAS}=0.40).

Table 4. Demographic differences in Attitude toward computer and the Internet (n=82)

Demographic	f	Elderly attitude toward Computer		Internet	
		X	SD	X	SD
Age					
60 – 66	52	6.21	(0.65)	6.40	(0.22)
67 – 73	24	6.27	(0.20)	6.42	(0.18)
74 – 80	6	6.18	(0.68)	6.36	(0.23)
P-value		*0.90*		*0.96*	
Gender					
Male	23	6.27	(1.19)	6.50	(0.20)
Female	59	6.23	(0.26)	6.36	(0.20)
P-value		*0.77*		*0.20*	
Civil Status					
Single	51	6.30	(0.23)	6.44	(0.18)
Married	6	6.55	(0.11)	6.40	(0.22)
Widowed	25	6.01	(1.13)	6.33	(0.26)
P-value		*0.13*		*0.45*	
Computer Ownership					
Yes	55	6.25	(0.22)	6.38	(0.19)
No	27	6.19	(1.13)	6.44	(0.24)
P-value		*0.71*		*0.29*	
Internet Subscription					
Yes	34	6.27	(0.19)	6.42	(0.17)
No	48	6.21	(0.74)	6.39	(0.23)
P-value		*0.72*		*0.72*	
Perceived Computer Literacy					
Poor	74	6.20	(0.54)	6.41	(0.20)
Fair	7	6.48	(0.15)	6.25	(0.21)
Average	0*	-		-	
Good	1*	6.88	(-)	6.88	(-)
Very Good	0*	-		-	
P-value		*0.32*		*0.40*	

*Removed from the list (intent to treat)

4.4 Correlation between elderly attitude toward computers and the internet and behavioral intention for Telehealth participation

Correlational Analysis revealed significant positive relationship between (a) behavioral intention for Telehealth participation and attitude toward computers (r=0.28, p=0.012), (b) behavioral intention for Telehealth participation and attitude toward the internet (r=0.37, p=0.001), and (c) attitude toward computers and attitude towards the internet (r=0.51, p=0.031) as shown in Figure 1.

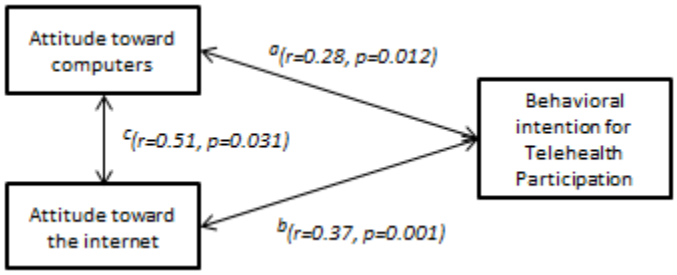

Figure 1. Relationship between Elderly Attitude and Behavioral Intention

5.0 Discussion

5.1 Respondent Profile

The researchers initially sought to describe the demographic sketch of the respondents in terms of age, gender, and civil status. Since the sample was obtained from a randomized approached, findings revealed patterns mirroring the general portrait of the elderly population in the Philippines. Ogena (2006) posited the preponderance of younger married female seniors in the country. Based on former research texts, married seniors are predicted to be more likely to use computers (White, McConnell, Branch, Sloane, Pieper & Box, 2002).

Findings on computer ownership, internet subscription and perceived computer literacy of the subjects also showed noteworthy results. More than half of the respondents have computer system (most with internet access) at home divergent to the earlier notion that majority of the senior population do not own computers (Selwyn, Gorard, Furlong & Madden, 2003) or even privileged to access and use the internet (Lenhart, Rainie, Fox, Horrigan & Spooner, 2000; Encuentra, Pousada & Zuñiga, 2009; Fox, 2006). Increasing computer ownership across the population may be attributed to the lowering cost of computers (The Economist, 2000). However, findings revealed perception of poor computer literacy among the respondents. Same results were obtain from the study of Lagana (2008) with approximately half of the senior sample owns a computer but have limited computer skill. Findings communicate that computer ownership may provide an opportunity, but not an assurance to achieve utilization and computer competency. Indeed, providing access to technology does not automatically lead to increased use (Chigona, Mbhele & Kabanda, 2008; Cuban, 2001); and generating profit from technology is more dependent on a person's capacity to use them. Henceforth, it is parsimonious to infer that respondents were digitally deprived (Anthony & Padmanabhan, 2010) and have experienced an adverse phenomenon conceptually labeled as the cognitive divide (Fonseca, 2010).

Bridging the cognitive gap among the elderly is equally important as to understanding of the reasons for non-use among seniors. Previous literature claimed complexity and absence of technical assistance as significant factors prohibiting computer-equipped seniors for using technology (Carpenter & Buday, 2007; Mann, Belchoir, Tomita & Kemp, 2005). While provision of computer and internet equipment remains to be a problem for technology-driven interventions in developing countries (Gupta, Dasgupta & Gupta, 2008), empowering older people to use technology is deemed to be far more challenging. This task is considered achievable through community training centers (Redsell & Nycyk, 2010); quality technical connections and social support (DiMaggio & Hargittai, 2001; Broady, Chan & Caputi, 2010).

5.2 Attitude toward Computers and the Internet

Previous studies showed that aging has negative influence on interest (Karavidas, Lim & Katsikas, 2005) and attitude towards technology (Wagner, Hassanein & Head, 2010). Interestingly in the present study, the senior respondents were discovered to have consistent positive attitude toward computers and the internet. Morrell, Mayhorn & Bennett (2000) seem to agree when they professed the abundance of surveys showing the preponderance of older adults who are excited about computers and the internet. It is interesting to note that behind seniors' self-perception of poor computer knowledge; they still have a positive attitude towards computers and internet. This may be due to an established reason that elderly attitude towards technology can be successfully modified through proper training (Dyck & Smither, 1994; Charness, Schumann & Boritz, 1992); or because of training facilitators' influence (Sokoler & Svensson, 2007).

Results of the study provided promising results. In a previous study comparing elderly attitude with their younger counterpart, it was discovered that senior participants showed more positive attitude and liking towards technology (Dyck & Smither, 1994). This may indicate acceptance of one's weakness, yet hopeful to

achieve competence on computer utilization through obedience to training. As Withnall (2000) exposited in a study of Boulton-Lewis and Gillian (2010): "learning in life may consist of individual reflection and life review which may lead to greater self-understanding and individual insight".

Since interaction with technologies such as the computer and internet is driven by positive attitude (Encuentra et al, 2009; Delcourt & Kinzie, 1993), a study on actual computer and internet use under volitional control (Winter, Chudoba, Gutek) among the respondents is an interesting follow-up inquiry.

5.3 Demographic differences in attitude toward computer and the Internet

No significant differences were found on the responses of the seniors when clustered according to demographic variables. That is, there is universality in attitude toward computer and the internet when respondents are referenced according to age, gender, civil status, computer ownership, internet subscription, and perceived computer literacy as proposed groupings. This scheme to cluster responses based on their profile is employed to evaluate consistency of responses. The statistics showed no significant difference which suggests consistent answers, and perhaps reflects the status quo among the senior participants.

Results confirmed that elderly attitude for technology is not significantly different in terms of age sorts (Czaja & Sharit, 1998; Ansley & Erber, 1988; Mitra, Lenzmeier, Steffensmeier, Avon, Qu & Hazen, 2000); but provided new blind spots for further scrutiny with reference to gender comparison studies (e.g. Cambell, 2004; Rideout, Neuman, Kitchman & Brodie, 2005). Finally, there is a call for further studies to confirm significant differences on technology attitude as to computer ownership, internet subscription, and perceived computer literacy.

5.4 Correlation between elderly attitude toward computers and the internet and behavioral intention for Telehealth participation

Significant correlation exists between attitude toward the computer and the internet based on the result of the study. To the researchers' knowledge, the figures obtained are highly connectible since the constructs defining the attitude towards these technologies are uniformly phrased capturing the same aspects (Winter, Chodoba & Gutek, 1998). Given the maximization impact of internet when integrated to computer functions, it is not surprising for the attitude outcomes to show substantial correlates.

The results of the study also depict positive correlations between attitude toward computer and the internet technologies and behavioral intention for Telehealth participation. This finding is consistent with Ajzan & Fisbein's (1977) theoretical position which gradually extends to outcomes of previous researches in education (Teo, 2011; Lai, Wang & Lei, 2012; Teo & Schaik, 2012) and marketing (Lee, 2006). This outcome, consistent with plethora of research articles, suggests that knowledge and skills acquired by the respondents through the training and personal experience may seem to moderate the relationship between attitude and intention for use (Winter, Chodoba & Gutek, 1998; Wilkie, 1994; Lawton, 2001; Segrist, 2004. Scientific papers showing senior individuals use computers and the internet for health-related empowerment causes (e.g. Cresci, Yarandi & Morrell, 2010; Hogeboom, McDermott, Perrin & Osman, 2010) may also convey added explanations.

6.0 Conclusion

Though seniors acknowledged their shortcomings in terms of the competence to use technology for health, they are homogeneous in terms of awareness of perceived benefits in using such innovations. This may provide with the driving force to participate in informatics society. This further deliver the society with an assurance that it is *possible* for our elderly to become equally competent in technology, and are *able* to occupy their empty space in the realm of computer and networking for health. To effectively bridge this gap, implementors must consider the *availability* of machines as only secondary to the *ability* of seniors to use them. Healthcare and information societies must provide equal chances but age-specific training to our elderly to ensure utilization of available computers and the internet, and foster their positive attitude towards these technologies which may eventually lead to their intention to participate and actual behavior. Future investigators might consider the depth and breadth of elderly attitudinal responses to technology through various training approaches, and the inclusion of other variables that might be associated with intention to use technology.

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