

## Identifying Factors Affecting Life Satisfaction of Elderly Adults in the ICT Era

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### **Abstract**

*The present research investigates the factors influencing the elderly adults' life satisfaction in the era of information and communication technology (ICT). Specifically, we examine whether the elderly individuals' digital literacy skills (i.e., ability to use PCs, ability to use mobile devices, and ability to distinguish information) and perceptions (i.e., perceived usefulness of digital technology, self-efficacy in using digital devices, and social interaction) predict their life satisfaction. To answer the research question, we performed a hierarchical multiple regression analysis using the elderly Korean adults aged 55 or older. The results indicate that (1) females (vs. males) are more satisfied with their life; (2) the higher individuals' age, education and monthly household income, the higher their life satisfaction; and (3) their perceived usefulness of digital technology, self-efficacy in using digital devices, social interaction, and ability to distinguish information are positively associated with life satisfaction. The findings provide important implications to enhance life satisfaction of the elderly adults in the ICT era.*

**Keywords:** *Digital Literacy, Perceived Usefulness, Self-Efficacy, Social Interaction, Life Satisfaction, Elderly Adults*

### **1. Introduction**

The coronavirus (COVID-19) pandemic has had profound psychological and social consequences on populations globally. The elderly, in particular, are at significantly higher risk of negative health outcomes and mortality if they contract the virus. Moreover, concerns have been raised regarding the older adults' mental health, given that loneliness and isolation would be exacerbated as lockdown measures were implemented [1]. Issues around isolation and mental health in older adults might be exacerbated by the "digital divide," whereby older people make less use of information and communication technologies (ICTs), for reasons including lack of skills, confidence and accessibility issues [2]. Given that ICTs impact the well-being of both individuals and the collective society, the aging of the earth's population means that more and more elderly people will be using ICTs to maintain their health and well-being [3].

In recent years, scholars have begun to focus on how the digital divide affects life satisfaction or happiness, which is a crucial indicator of measuring the level of individual subjective welfare [4]. In particular, there is a growing interest in how internet use impacts older adults' life satisfaction [5], and the reported findings have

been mixed [6]. Despite older adults lagging behind younger adults regarding internet use [7] and being notably affected by the digital divide [8], studies have reported that the internet is increasingly becoming an essential medium for older people to connect with society and improve their quality of life [9]. The findings generally show positive correlations, and internet use has been shown to improve the quality of life, mental health, and life satisfaction of older adults [10]. However, studies have also reported that internet use shows little benefit for or even a negative impact on older adults' mental health or life satisfaction [11]. Heterogeneous influences of internet use on life satisfaction were also found across age, gender and socioeconomic status [11].

Older adults are the most marginalized group affected by ICTs, and their activities and daily life have become more difficult than ever during the pandemic [12]. Thus, the present research examines the factors influencing the older adults' life satisfaction in the ICT era. In particular, this research focuses on digital literacy skills and perceptions as factors related to the life satisfaction of the elderly adults. Specifically, this research examines whether the elderly individuals' digital literacy skills (i.e., ability to use PCs, ability to use mobile devices, and ability to distinguish information) and perceptions (i.e., perceived usefulness of digital technology, self-efficacy in using digital devices, and social interaction) predict their life satisfaction.

## **2. Theoretical Background and Research Question**

Life satisfaction refers to a person's perception or subjective evaluation of his or her overall life, similar to the meanings of happiness and quality of life [13]. The term digital literacy is defined as an individual's ability to find and evaluate information, use this information effectively, create new content using this information and share and communicate this newly created information using appropriate digital technologies [14]. According to previous studies, the use of digital technology by older adults reduced the symptoms of depression caused by fewer social interactions, and they emphasized that enhanced digital access might have improved the mental health of older adults during the pandemic [15]. In addition, older adults who actively use the internet and other digital technologies are more likely to alleviate social isolation and lead active daily lives [16]. As stated, regarding the impact of digital literacy on life satisfaction, both positive and negative effects of digital use or literacy on life satisfaction are documented in the literature [4, 11]. However, if digital use is positively correlated with life satisfaction, then the digital divide may increase inequalities in subjective well-being. Recent research has indicated that digital divides at all levels, whether digital access divide, digital capability divide, or digital outcome divide, negatively affect life satisfaction or happiness [4].

Perceived usefulness of digital technology is the extent to which digital technology is believed to improve performance [17]. Self-efficacy is a judgment about confidence in performing a particular task [18]. Considering the characteristics of older adults, their perceived usefulness of digital technology and technological self-efficacy have the potential to influence their psychological and emotional well-being [19, 20]. Social interaction refers to an interpersonal action or a relationship between an individual and others [21]. Prior studies have shown that people with higher social interaction have higher levels of life satisfaction [22]. Social interaction is considered a vital determinant of well-being among older adults, as it can significantly affect their physical and mental health and life satisfaction [6, 11, 16].

Building on the previous studies, this research examines whether elderly people's select factors such as digital literacy skills and perceptions affect their life satisfaction in the ICT era. Specifically, this research investigates whether the elderly individuals' digital literacy skills (i.e., ability to use PCs, ability to use mobile devices, and ability to distinguish information) and perceptions (i.e., perceived usefulness of digital technology, self-efficacy in using digital devices, and social interaction) predict their life satisfaction, controlling for the effects of demographic variables.

### 3. Method

#### 3.1 Data Collection

This research utilized data from the 2022 Digital Divide Survey (DDS), which was sponsored by the Ministry of Science and ICT and conducted by the National Information Society Agency (NIA) in South Korea. The DDS is a nationwide study of the Korean population aged 7 and older, which has been conducted every year since 2002 to investigate the digital information gap of vulnerable groups. The data are collected through a multi-stage stratified sampling method for general consumers in 16 metropolitan areas in South Korea. There are many discrepancies in determining the age above which people can be called the elderly. Some researchers call people aged 55 or over “senior”, while others indicate that it is the age of 60 years and over, while, according to the United Nations suggestion, only people over 65 should be considered as seniors. This research chose an age cut off 55. Hence, among the data, the sample size of elderly people aged 55 or older was 2,300.

Specifically, the total sample ( $N = 2,300$ ) was composed of 1,182 women (51.4%) and 1,118 men (48.6%) who ranged in age from 55 years and older ( $M = 65.56$ ,  $SD = 7.172$ ). The age profile was as follows: 55 to 64 years = 49.1%; 65 to 74 years = 37.9%; 75 to 84 years = 12.0%; and 85 years and older = 1.0%. Majority of the respondents had a high school education only (51.5%) and less than high school graduation (34.6%), and 13.9% with college/university degree or postgraduate degree. Regarding the monthly household income, 9.1% of the respondents reported income of less than \$1,000; 16.8% fell within an income range of \$1,000 to \$1,990; 20.5% were in the \$2,000 to \$2,990 range; 17.5% were in the \$3,000 to \$3,990 range; 13.0% were in the \$4,000 to \$4,990 range; 9.7% were in the \$5,000 to \$5,990 range; 7.2% were in the \$6,000 to \$6,990 range; 3.0% were in the \$7,000 to \$7,990 range; and 3.2% reported income exceeding \$8,000.

#### 3.2 Measures

This research includes items relevant to respondents’ digital literacy skills and perceptions, and life satisfaction (see Table 1). Specifically, regarding the respondents’ digital literacy skills (i.e., ability to use PCs, ability to use mobile devices, ability to distinguish information) and perceptions (i.e., perceived usefulness of digital technology, self-efficacy in using digital devices, and social interaction), all the variables are assessed with a 4-point Likert scale and endpoints strongly disagree to strongly agree, except for one variable (i.e., ability to distinguish information) assessed with a 5-point Likert scale and endpoints strongly disagree to strongly agree. In this study, life satisfaction is defined as a cognitive judgment of the positivity of one’s life as a whole (i.e., global life satisfaction) [23]. The global life satisfaction scale consists of five items and utilizes a 4-point Likert-style response format (1 = strongly disagree to 4 = strongly agree). Finally, demographics (gender, age, education, monthly household income) is measured. Gender is dummy coded (0 = male, 1 = female); age is assigned 1 for “55-64”, “65-74” is assigned 2, “75-84” is assigned 3, and “above 85” is assigned 4; education level is measured using four categories: (1) less than middle school, (2) middle school, (3) high school, and (4) college/university or postgraduate; for monthly household income, 11 categories are provided: (1) less than \$1,000 and (11) \$10,000 or more.

#### 3.3 Data Analysis

After checking the dataset’s suitability through the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett’s Test of Sphericity, this research used exploratory factor analysis (EFA) to examine the underlying structure of multi-item scales. To execute the EFA, this research conducted principal axis factoring (PAF) analysis with direct oblique (oblimin) rotation ( $\Delta = 0$ ) on all items to estimate empirically the

number of factors extracted. For the items, the KMO measure was .954, indicating that the sample was adequate for EFA. The Bartlett's test for sphericity was significant (56198.483,  $p = .000$ ), indicating that EFA was appropriate. Based on the results, seven factors were labelled as ability to use PCs (7 items), ability to use mobile devices (6 items), ability to distinguish information (3 items), perceived usefulness of digital technology (4 items), self-efficacy in using digital devices (3 items), social interaction (5 items), and life satisfaction (5 items). Factor loadings for all the items are shown in Table 1.

Based on the results of EFAs, reliability (internal consistency) was assessed through Cronbach's alpha. The Cronbach's alphas exceeded a cut-off value of 0.70, supporting the reliability of the measurement items used for each variable. In summary, the results of EFAs and reliability analyses correspond to a theoretical definition of the items of each variable under investigation. Consequently, factor scores were calculated for all the determined factors and utilized as independent and dependent variables for further analyses. Descriptive statistics, reliabilities, and correlations between the variables are shown in Table 2.

Since all the data were collected through a single method, i.e., survey, from the same respondents at one point in time, the potential for common method biases thus needed to be addressed. This research employed the Harman's single factor test [24]. In this test, all the items used for this study were entered into a principal component analysis (PCA) with unrotated factor solution to identify if a single factor emerges or one general factor accounts for more than 50% of the covariation. The results under the condition of extracting one factor showed that the factor loadings explained only 39.441% of the variance and not the majority. This indicated that common method biases were not a likely contaminant of the results.

**Table 1. Measurement scales and factor loadings for variables**

Variable/ items	Measurement scales	Factor loading
Ability to use PCs		
Item1	I can install/delete/update the necessary software programs on my PC.	.771
Item2	I can connect my PC to wired/wireless internet on my own.	.791
Item3	I can set the environment I want in the web browser (e.g., pop-up window blocking, text size settings, security and startup homepage settings, etc.)	.896
Item4	I can use various external devices (digital cameras, printers, scanners, USB external hard drives, etc.) by connecting them to my PC.	.906
Item5	I can send files from my PC to others over the Internet.	.821
Item6	I can scan/repair computer malware.	.876
Item7	I can create documents or materials using a PC.	.842
Ability to use mobile devices		
Item1	I can configure settings such as display/sound/security/alarm/input method on smart devices.	.800
Item2	I can set up a wireless network on smart devices.	.764
Item3	I can send files/photos on smart devices to others.	.830
Item4	I can install/delete/update the necessary apps on smart devices.	.731
Item5	I can scan/repair malware on smart devices.	.461
Item6	I can create documents on smart devices.	.584
Ability to distinguish information		
Item1	I can distinguish credible information in search results from other sources.	.821
Item2	I can use reference materials or sites to distinguish false and manipulated information.	.952
Item3	I can change settings to filter out harmful information.	.846
Perceived usefulness of digital technology		
Item1	Digital technology is useful.	.696
Item2	Digital technology makes my life convenient.	.712

Item3	Digital technology is good for me.	.756
Item4	I want to use digital technology more.	.723
Self-efficacy in using digital devices		
Item1	I am confident in learning digital devices.	.802
Item2	I am confident in using digital devices.	.697
Item3	I can quickly figure out how to use new digital devices.	.752
Social interaction		
Item1	Interacting with people makes me feel connected to the larger world.	.683
Item2	Interacting with people makes me feel connected to everyone in the world.	.701
Item3	I am willing to spend time on community activities.	.606
Item4	Interacting with people allows me to communicate with new people.	.769
Item5	Interactions always allow me to meet new people.	.753
Life satisfaction		
Item1	Most of the time, my life is close to my ideal.	.740
Item2	The conditions of my life are excellent.	.660
Item3	I am satisfied with my life.	.635
Item4	So far I've gotten the important things I want in life.	.625
Item5	If I lived my life over again, I wouldn't change almost anything.	.737

**Table 2. Reliabilities, descriptive statistics, correlations among the variables**

	1	2	3	4	5	6	7
1. Ability to use PCs	-						
2. Ability to use mobile devices	.719	-					
3. Ability to distinguish information	.607	.573	-				
4. Perceived usefulness of digital technology	.440	.502	.479	-			
5. Self-efficacy in using digital devices	.486	.494	.594	.583	-		
6. Social interaction	.275	.289	.324	.423	.417	-	
7. Life satisfaction	.238	.237	.336	.315	.412	.273	-
Mean	1.76	2.30	2.01	2.66	2.13	2.57	2.53
S.D.	0.79	0.84	0.98	0.63	0.74	0.58	0.51
Cronbach's $\alpha$	.959	.921	.922	.859	.888	.836	.820

Note:  $p < .001$  for all correlations.

#### 4. Results

As stated, this research examines whether the elderly individuals' digital literacy skills and perceptions influence their life satisfaction, controlling for the effects of demographic variables. A hierarchical multiple regression analysis was performed to answer the research question. As noted, factor scores for each of the variables were used as independent and dependent variables in the regression equation. First, the control (demographic) variables (i.e., gender, age, education, and monthly household income) were entered as the first block (Step 1). Then three independent variables concerning the respondents' perceptions (i.e., perceived usefulness of digital technology, self-efficacy in using digital devices, and social interaction) were entered as the second block (Step 2). For the third step (Step 3), the three independent variables regarding the respondents' digital literacy skills (i.e., ability to use PCs, ability to use mobile devices, and ability to distinguish information) were included. All Variance Inflation Factors (VIFs) are lower than 3, suggesting that multicollinearity should not be a problem for this study.

Results from the hierarchical regression analysis are summarized in Table 3. In Step 1, control (demographic) variables alone explain 11.2% of variance ( $F(4, 2295) = 72.419, p = .000, R^2 = .112$ ). Specifically, age ( $\beta$

= .091,  $p = .000$ ), education ( $\beta = .231$ ,  $p = .000$ ), and monthly household income ( $\beta = .206$ ,  $p = .000$ ) are significant predictors of life satisfaction. In Step 2, the addition of three variables results in a significant increase in  $R^2$  ( $\Delta F(3, 2292) = 106.420$ ,  $p = .000$ ,  $\Delta R^2 = .109$ ). When controlling for demographic variables, perceived usefulness of digital technology ( $\beta = .059$ ,  $p = .015$ ), self-efficacy in using digital devices ( $\beta = .298$ ,  $p = .000$ ), and social interaction ( $\beta = .096$ ,  $p = .000$ ) are positively associated with life satisfaction. In addition, it's possible that the results could yield suppression effect for gender in the prediction of life satisfaction ( $\beta = .049$ ,  $p = .010$ ). The final Step 3 results in a significant slight increase in  $R^2$  ( $\Delta F(3, 2289) = 6.398$ ,  $p = .000$ ,  $\Delta R^2 = .006$ ). The full regression model in Step 3 shows that regarding the digital literacy skills, only ability to distinguish information is positively associated with life satisfaction ( $\beta = .112$ ,  $p = .000$ ). In sum, for the elderly adults, gender, age, education, and monthly household income are positively associated with life satisfaction. That is, female (vs. male) individuals are more satisfied with their life. The higher individuals' age, education and monthly household income, the higher their life satisfaction. Moreover, the elderly individuals' perceived usefulness of digital technology, self-efficacy in using digital devices, social interaction, and ability to distinguish information are positively associated with life satisfaction.

**Table 3. Results of hierarchical regression analysis (N = 2,300)**

Independent variables	Dependent variable: life satisfaction					
	Step 1		Step 2		Step 3	
	B	$\beta$	B	$\beta$	B	$\beta$
Gender (female)	.057	.031	.089*	.049*	.090**	.049**
Age	.114***	.091***	.197***	.157***	.196***	.156***
Education	.239***	.231***	.115***	.112***	.115***	.111***
Monthly household income	.089***	.206***	.065***	.151***	.064***	.146***
Perceived usefulness of digital technology			.057*	.059*	.056*	.057*
Self-efficacy in using digital devices			.287***	.298***	.261***	.271***
Social interaction			.095***	.096***	.092***	.093***
Ability to use PCs					-.048	-.052
Ability to use mobile devices					-.020	-.021
Ability to distinguish information					.106***	.112***
$R^2$	.112		.221		.227	
$\Delta R^2$	.112		.109		.006	
$\Delta F$	72.419***		106.420***		6.398***	

Note: B = unstandardized coefficients;  $\beta$  = standardized coefficients; \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

## 5. Conclusion

The current research investigates the factors influencing the elderly adults' life satisfaction in the ICT era. In particular, this research focuses on digital literacy skills and perceptions as factors related to the life satisfaction. Specifically, we examine whether the elderly individuals' digital literacy skills (i.e., ability to use PCs, ability to use mobile devices, and ability to distinguish information) and perceptions (i.e., perceived usefulness of digital technology, self-efficacy in using digital devices, and social interaction) predict their life satisfaction, controlling for the effects of demographic variables. To answer the research question, we conducted a hierarchical multiple regression analysis using the elderly Korean adults aged 55 or older. The results indicate that gender, age, education, and monthly household income are positively associated with life

satisfaction. That is, females (vs. males) are more satisfied with their life. The higher individuals' age, education and monthly household income, the higher their life satisfaction. In addition, the elderly individuals' perceived usefulness of digital technology, self-efficacy in using digital devices, social interaction, and ability to distinguish information are positively associated with life satisfaction.

The findings of this research contribute to a comprehensive understanding of the factors affecting life satisfaction among the elderly, not only supplementing previous research but also providing a theoretical basis for systematic research on digital literacy and perceptions leading to life satisfaction in the elderly. We propose the following practical implications to enhance life satisfaction of the elderly. First, it is important to teach elderly adults the perceived usefulness and practical benefits of ICT [25]. Second, it is necessary to actively encourage and support elderly adults to use ICT to improve their self-efficacy. Third, extensive socialization can give older adults increased opportunities for recreation and communication, access to more benefits and resources, and an increased sense of perceived connection and interpersonal trust. Finally, it is necessary to develop the ability of elderly adults to discern information. In future studies, it would be meaningful to carry out a comparative analysis including samples from other countries to generalize the research findings. It will also be necessary to examine other factors affecting elderly adults' life satisfaction in the ICT era.

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