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Empowering the elderly population through ICT-based activities: An empirical study of older adults in Korea

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Abstract

Purpose – The purpose of this paper is to focus on elderly people who have adopted Information and Communication Technology (ICT) and participated in ICT-based activities, and explore variables associated with their individual and collective empowerment by using data collected by a questionnaire survey.

Design/methodology/approach – A set of 14 questions was developed to measure older adults' perceived psychological empowerment. A factor analysis was conducted to condense 14 individual variables into several large categories. Finally, a set of multiple regression analyses was employed to identify variables associated with the elderly's individual and collective empowerment.

Findings – Three factors, including a sense of meaning; competence/self-determination; and collective empowerment were extracted from the 14 questions. Multiple regression models revealed that elderly empowerment is not a matter of social skills, ICT skills, or complementary skills, but is more likely to result from their being interested in ICT and ICT-based activities. Learning activities in ICT-based activities and participation frequency were found to be predictors of both meaning and competence/self-determination dimensions.

Research limitations/implications – The major finding of this study concerns the development of a measure that assesses three factors of empowerment in older adults, i.e., sense of meaning, competence/self-determination, and collective empowerment. This study represents an initial step in establishing the measure, and therefore, further work is needed to establish its psychometric properties, particularly external validity.

Originality/value – This study is one of the first studies to focus on older people's empowerment construct and its relation to ICT-based activities.

Keywords Behaviour change, Self-efficacy, Information seeking behaviour, IT capability

Paper type Research paper

Introduction

The elderly have traditionally been excluded from the deployment of Information and Communication Technology (ICT). They are frequently described as technophobic. This characterization has fostered a stereotype of the elderly as the age group with the lowest rates of computer and internet usage (Neves and Amaro, 2012; Saunders, 2004). However, the emergence of smartphones has helped the elderly to rapidly change their attitudes toward ICT and the internet (Boontarig *et al.*, 2012). The use of the internet by the elderly has increased rapidly across the world in the last several years. In Korea, internet use among old adults (above 60 years old) increased from 30 percent in 2011 to 71.6 percent by 2013, with half of the elderly users participating in social networking services (SNS), such as Twitter, Facebook, Blogs, etc. (Korea Internet Security Agency, 2013).

Currently, both ICT and SNS have a major effect on the lives of older adults. ICT and SNS faciliate independent living for elderly people with age-specific barriers, such as impaired mobility, vision, and hearing, etc. (Gaßner and Conrad, 2010), allow governments

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to deliver telecare services to older people and their families at home (Hedström, 2007), and enhance their quality of life by electronically connecting them to all corners of society. ICT and SNS are advocated as a means for older people to overcome social exclusion and promote social inclusion (Percival and Hanson, 2006). In this context, ICT-based activities can be described as a potent tool for older adults' individual and collective empowerment.

However, so far, little research has been conducted on older adults' empowerment through ICT-based activities. Many studies have centered on improving their standing in relation to the "digital divide" (Mildward, 2003) by facilitating their internet and SNS engagement (Hill *et al.*, 2008). However, skills permitting older adults to use the internet and SNS effectively, i.e., ICT skills, social skills, and complementary skills, have rarely been assessed in relation to active aging and empowerment. This study focussed on elderly people who have adopted ICT and participated in ICT-based activities, and explored variables associated with their individual and collective empowerment by utilizing data collected by a questionnaire survey.

Literature review

Empowerment

The concept of empowerment arose in relation to a reaction to oppression and inequality within society. Power and powerlessness, as well as oppression and liberation, are key concepts related to this term (Hage and Loresen, 2005). Empowerment is usually described as a multidimensional social learning process of gaining control over one's life by acquiring the necessary knowledge and skills to improve one's life situation (Payne, 1997; Saleebey, 2006). In addition, empowerment is usually examined in the context of both individual and collective aspects (Hur, 2006).

Individual empowerment relates to the way that people think about themselves, as well as the knowledge, capacities, skills, and mastery that they actually possess (Staples, 1990). Four dimensions can be discerned from the review of various studies in the extant literature, i.e., a sense of meaning, competence, self-determination, and impact (Spreitzer, 1995, 1996; Hur, 2006; Zhang and Bartol, 2010). A sense of meaning refers to the value of a task's goal or purpose judged in relation to one's ideals or standards (Wang and Lee, 2009). Meaning involves a fit between the requirements of work and life roles and beliefs, values, and behaviors (Spreitzer, 1995, 1996). Competence refers to an individual's ability to perform a job properly. Self-determination is considered to constitute one of the most critical factors in individual empowerment. It refers to a state of autonomy in one's decisions and circumstances. Self-determination reflects an individual's sense of having choice in initiating and regulating action (Deci *et al.*, 1989). Impact refers to an individual's belief that he or she has influenced strategic, administrative, or operating outcomes at work or in society (Hur, 2006).

Collective empowerment reflects psychological cognitions of how a group of people overcomes barriers and gains capacities to change its social position. It refers to a process by which individuals join together, help one another, learn together, and develop skills to engage in collective action (Boehm and Staples, 2004; Fetterson, 2002). Collective empowerment develops when people join in action together to resolve particular social problems and achieve social change. Groups become empowered through collective, collaborative action (Hur, 2006; Moyer *et al.*, 1999; Staples, 1990).

Empowerment is a critical issue not only for the marginalized, but also for any population group that feels a lack of capacity for life and work. This also applies to older adults, because they are frequently marginalized as economically unproductive and psychophysically dependent ones (Green, 1993; Angus and Reeve, 2006). In this

sense, empowerment has been a focus of various disciplines, such as social work and social welfare, education, and management. Many previous studies in these fields proposed that an empowerment construct comprises four dimensions, i.e., meaning, competence, self-determination, and impact, and explored the relationship between these dimensions and active aging (Bowling, 2008), organizational commitment (Kraimer *et al.*, 1999), job satisfaction (Wang and Lee, 2009), and managerial effectiveness (Zhang and Bartol, 2010). Although the empowerment construct has not been challenged, the construct was found to be sensitive to organizational position and gender (Boudrias *et al.*, 2004), and the impact dimension was found not to load strongly on the empowerment construct (Kraimer *et al.*, 1999). In addition, few studies have focussed on the relationship between older adults' empowerment and ICT-based activities.

ICT-based networks and activities

ICT-based networks provide a great development opportunity for marginalized populations, such as the elderly, the disabled, and other vulnerable groups, by disseminating valuable information applicable to their quality of life (Blaschke *et al.*, 2009). The needs and concerns of older adults as computer users appear to differ from those of younger users. The main activities that older adults engage in are (Wagner *et al.*, 2010): communication and social support (Mann *et al.*, 2005); leisure and entertainment (White and Weatherall, 2000); and information seeking (Opalinski, 2001), particularly in the area of health-related information and education. Benefits from the use of computers and the internet include increased contact with family and friends, and health- and education-related information. ICT solutions are increasingly more widely employed as a loneliness-reducing intervention, as well as a means to help older people to help themselves. As a result, access to, and effective use of, ICT-based networks promote the empowerment of elderly people and help them to gain power and control over decisions that determine the quality of their lives (Nugent, 2007).

Not all ICT-based activities necessarily contribute to the alleviation of the digital divide and the promotion of empowerment, although ICT is frequently characterized as a dynamic development tool (Amirtham and Joseph, 2011). For example, individuals have to be interested in ICT and SNS. They also must possess appropriate skills to access ICT-based environments and communicate with others in these environments. In addition, individuals should have proper objectives to gain access to the internet and SNS; otherwise, they could easily contribute to the digital divide. Especially, marginalized individuals, such as the elderly and the disabled, are often excluded from ICT-based social environments, although powerful arguments exist that ICTs can provide them with a greater range of choices (Letch and Carroll, 2008). Digital exclusion often compounds social exclusion (Klecun, 2008). Therefore, overcoming weaknesses and enhancing empowerment through ICT-based activities seem to depend on their ICT-friendly habits and skills, as well as the specific purposes of the SNS activities.

Some authors argue that only some particular habits and skills can promote elderly empowerment. Selwyn (2004) suggested several factors that may promote empowerment, including individual interest in ICT, ICT skills, and social skills. Of these three factors, Selwyn emphasized the primacy of the first factor. Newholm *et al.* (2008) added three additional factors, i.e., complementary skills, feasability, and available time. Of the three factors, complementary skills has frequently received attention in the fields of management and leadership studies. Complementary skills refers to capabilities through which one facilitates the absorption of the other or compensates for the deficiency of the other (Cooney, 2004). Hill *et al.* (2008) suggested

four factors, i.e., perceptions, culture, interpersonal relationships, and operational skills. Perceptions refer to attitudes toward ICT; whereas, operational skills represent ICT skills. Interpersonal relationships indicate social skills. All of these habits and skills are advocated as instruments that promote self-efficacy in ICT-based activities. Of these factors, ICT skills, social skills, and complementary skills seem to most frequently receive attention from researchers. However, few studies have investigated the habits and skills that are significantly associated with older people's empowerment.

Individuals have different reasons to engage in ICT-based activities. Some individuals engage in these activities to collect information (Campbell, 2008); whereas, others do so to build social relations (Thayer and Ray, 2006). In addition, individuals sometimes access the internet for the purposes of online learning and shopping (White and Weatherall, 2000; Dorin, 2007). Hence, older adults' empowerment may be promoted by particular objectives of participating in ICT-based activities. These objectives can be summarized as improvement of social relationships, information collection, learning, shopping, and promoting job/business activities. Of these activities, learning has been identified as a factor associated with elderly empowerment (Selwyn, 2004). The information collection variable also has been described as a factor associated with elderly empowerment, especially the elderly with health problems (Marschollek *et al.*, 2007). However, few studies have explored the relationship between older adults' empowerment and its relationship with objectives of participating in ICT-based activities.

Previous studies on the elderly's empowerment through ICT-based activities

The field of gerontology has focussed on ICT and SNS since the emergence of new social networking methods around the late-1990s and the early-2000s, such as MySpace, LinkedIn, and Facebook. Most studies in this field have focussed on the elderly's use of ICT and the internet, the use of ICT and the internet in elderly care (Marschollek *et al.*, 2007; Melander-Wikman, 2007), and social inclusion of the elderly in online communities (Gamberini *et al.*, 2008; Klecun, 2008). Older people's adoption of ICT needs to be treated as more than merely a question of usability improvement (Hernández-Encuentra *et al.*, 2009); it also has to be directed toward empowerment building.

Broadly speaking, research on elderly people's empowerment through ICT and SNS, if any, has been primarily involved with: the elderly's digital empowerment; and their psychological, socioeconomic, and political empowerment. The former has focussed mainly on empowering elderly people's usage and acceptance of ICT and SNS (Benoit *et al.*, 2009; Neves and Amaro, 2012) and playing and learning through ICT and SNS (Downes, 2004). The latter has focussed on elderly people's connectivity with others through ICT-based activities (Ianculescu and Parvan, 2011), digital inclusion of elderly people (Ramos *et al.*, 2005), and social relationships among the elderly (Eggermont *et al.*, 2006). Some of these studies (e.g. Neves and Amaro, 2012) may have even misinterpreted or improperly used the term "empowerment."

A recent study was conducted based on the theoretical frameworks of individual and collective empowerment in online communities (Petriča and Petrovčiča, 2014). However, this study overlooked the dimensions of individual and collective empowerment. This study did not focus on a specific population group, although the patterns of empowerment can differ in accordance with the characteristics of a given population group. Empowerment as a construct may be sensitive to some population groups (Boudrias *et al.*, 2004).

ICT policies for older adults extend beyond their digital empowerment, and focus on empowering independence, quality of life, and aging, as well as individual and

collective empowerment. Participating in ICT-based activities can build empowerment and improve the aging process. These activities can assist elderly people to remain independent and active at work or in their community (Gaßner and Conrad, 2010). However, only few empirical studies have addressed these activities.

Methodology

Target population

This study focussed on older adults' empowerment as a construct and its relationship with ICT-based activities. Its target population comprised individuals who have participated in continuing education programs provided by general social welfare centers and elderly welfare centers in Seoul, Korea. Continuing education programs consisted of foreign language classes, such as English, Chinese, and Japanese; computer and internet classes; sports dance classes; health and fitness classes; and culture classes.

Individuals older than 60 years of age were eligible to participate in the continuing education programs. In Korea, general social welfare centers have been established to provide an array of welfare services, varying from poverty relief for the poor and job training programs to domestic abuse, health issues, and social care for community members, etc. Elderly welfare centers are partially financed by local governments to provide care to the elderly population.

Data collection

A questionnaire was developed to measure both individual and collective empowerment among elderly people who have participated in the continuing education programs. The objective of this study was to identify factors that predict improvements in older people's empowerment. The study was carried out with the cooperation of social workers in charge of the continuing education programs offered in the welfare centers. A questionnaire was sent to the social workers in 30 centers via e-mail. The social workers distributed the questionnaire to the participants of the continuing education programs. Out of approximately 900 participants of the continuing education program, 246 responded to the questionnaire survey.

The average age of the 246 respondents was 69.4, ranging from 60 to 85 years of age. Of the 246 resondents, 63.3 percent had a high school diploma or a high school certificate. Only 10 percent graduated from a community college, and 14.7 percent graduated from a four-year college. The sample comprised 30.3 percent males and 69.7 percent females. More females than males tended to participate in the continuing education programs offered in the welfare centers. Of the respondents, 83.6 percent were unemployed, and 6.9 percent were employed. The rest, or 9.5 percent, had part-time jobs. The term, "unemployed," may not be appropriate for older adults, because many of them have retired. This study was interested in whether or not older people's economic activities, regardless of part-time or full-time, have a relationship with their individual and collective empowerment.

Dependent variables

In this study, a set of multiple regression models was employed to explore significant predictors of individual and collective empowerment. Using the extant literature on empowerment theories, such as Spreitzer's (1995) psychological empowerment, a set of 14 questions, as shown in Table I, was developed to measure older adults' perceived

Items for empowerment	Individual empowerment: Meaning	Individual empowerment: Competence/Self-determination	Factor 3: collective empowerment	α
Understanding the meaning of life	*0.649*	0.582	0.364	0.950
Understanding the meaning of daily life activities	*0.726*	0.426	0.472	
Finding attractiveness in daily life activities	*0.690*	0.502	0.424	
Having confidence in daily life activities	0.578	*0.592*	0.439	0.972
Having self-assurance in the performance of daily life activities	0.393	*0.765*	0.424	
Having confidence in newly formed daily life activities	0.374	*0.776*	0.390	
Having capabilities of expressing the self	0.332	*0.814*	0.362	
Having capabilities of selecting better alternatives	0.370	*0.631*	0.576	
Having capabilities of making decisions on particular problems	0.358	*0.770*	0.437	
Having capabilities of making relations with others	0.443	0.358	*0.740*	0.970
Having capabilities of working together with others	0.330	0.465	*0.732*	
Having capabilities of building teams with others	0.253	0.360	*0.861*	
Having capabilities of building coalitions	0.321	0.346	*0.851*	
Having capabilities of solving problems with others	0.328	0.375	*0.813*	

Table I. Rotated component matrix: individual and collective empowerment

psychological empowerment. These questions related to one of four components of individual and collective empowerment (i.e. meaning or awareness of limited potential, competence, self-determination, and collective empowerment).

Each question was measured on a seven-point scale, with 1 = entirely unchanged, 2 = rarely changed, 3 = slightly changed, 4 = moderately changed, 5 = mostly changed, 6 = almost entirely changed, and 7 = entirely changed. For instance, respondents were asked to give a rating of "1" if a particular pattern of life, such as "capabilities of self-expression," remained "entirely unchanged" after participating in ICT-based activities for a certain period, give a rating of "4" if their pattern of life "moderately changed," or give a rating of "7" if the pattern "entirely changed."

A factor analysis was conducted to condense 14 individual variables into several large categories. As can be seen in Table I, three factors were extracted from the 14 questions. Factor 1 consisted of three questions, and it could be characterized as the meaning factor. The reliability coefficient (α) of Factor 1 was 0.950, showing strong internal consistency among the three variables. This meaning variable, representing a dimension of individual empowerment, represents an awareness of an individual's limited potential to change the circumstance (Robbins *et al.*, 1998).

Factor 2 consisted of six questions and represented the competence/self-determination factor. The reliability coefficient of Factor 2 was 0.972, also exhibiting strong intercorrelations among the six variables. In previous studies (Hur and Im, 2013), the first three questions were condensed into the competence dimension of individual empowerment, and the latter three into the self-determination dimension

of individual empowerment. Factor 3 consisted of five questions characterized as collective empowerment. Its reliability coefficient was 0.970, showing strong internal consistency among the five variables.

Therefore, the original set of 14 questions was divided into three factors, which stand for the dimensions of both individual and collective empowerment. Two of the factors correspond to individual empowerment, and the last factor stands for collective empowerment. Each of the three factor scores was utilized as a dependent variable in this study.

Independent variables

Independent variables were selected from three areas: individual habits and skills in ICT-based environments; objectives of participating in ICT-based activities; and demographic information. The first area, i.e., individual skills and habits in an ICT-based environment, could be divided into an interest in what ICT can deliver, ICT skills, social skills, complementary skills (Carreira and Potowski, 2011), discretionary time (Ronan, 2011-2012), and participation frequencies. The second area, or objectives of participating in ICT-based activities, could be categorized into the improvement of relationships (Magnier-Watanabe *et al.*, 2010), information collection, enhancement of learning (Callaghan and Bower, 2012), and promoting work/business activities (Hur and Im, 2013).

As seen in Table II, six independent variables assessing individual skills and habits in ICT-based environments were measured on a seven-point scale, with 1 = extremely low, 2 = very low, 3 = low, 4 = moderate, 5 = high, 6 = very high, and 7 = extremely high. Each variable was measured with a single item. For instance, respondents, in answering questions, were asked to indicate "7" when their social skill was extremely high, and "2" when their complementary skill was very low. Five independent variables assessing the objectives of participating in ICT-based activities were also measured on a seven-point scale, with 1 = never, 2 = rarely, 3 = occassionally, 4 = sometimes, 5 = frequently, 6 = usually, and 7 = every time participate in ICT-based activities. Each factor was also measured with a single item. For instance, respondents were asked to indicate "6" when they "usually" participated in ICT-based activities for learning and "3" when they "occasionally" participated in such activities to gather information. This study included demographic information on age, education, and employment.

Statistical analysis

A set of multiple regression analyses was employed to identify variables associated with the elderly's individual and collective empowerment. Each of the three factors extracted from the factor analysis, i.e., meaning, competence/self-determination, and collective empowerment, was utilized as a dependent variable in the multiple regression analysis in this study. The first two equations predicted individual empowerment, and the last one predicted collective empowerment. A multicollinearity test was performed to diagnose a phenomenon in which two or more independent variables are highly correlated.

Results

Overview

A set of three multiple regression analyses was conducted to explore variables associated with two dimensions of individual empowerment, i.e., meaning and competence/self-determination, and collective empowerment. As seen in Table III, no models were exposed

Independent variables		Measurements	
Individual skills and habits in ICT-based environments	An interest in what ICTs deliver	7-point scale	1 = Extremely low;
	ICT skills	7-point scale	2 = Very low;
	Social skills	7-point scale	3 = Low;
	Complementary skills	7-point scale	4 = Moderate;
	Discretionary time	7-point scale	5 = High; 6 = Very
	Participation frequencies	7-point scale	high; 7 = Extremely high
Objectives of participating ICT-based activities	Improvement of relationships	7-point scale	1 = Never;
	Information collection	7-point scale	2 = Rarely;
	Learning	7-point scale	3 = Occasionally;
	Shopping	7-point scale	4 = Sometimes;
	Promoting job/business activities	7-point scale	5 = Frequently; 6 = Usually; 7 = Every time
Demographic information	Age	Age	
	Education	1 = elementary, 2 = middle, 3 = high, 4 = college, 5 = graduate level	
	Employment	0 = unemployed, 1 = part-time, 2 = full-time	

Table II. Individual variables and their measurements

to multicollinearity problems. None of the VIF values in the three models exceeded 10. Each individual model revealed a different set of variables that contributed to the improvement of elderly empowerment.

As seen in Table III, the predictors of the competence dimension were divided equally into all three areas of independent variables, i.e., perceived individual skills and habits, objectives of participating in ICT-based activities, and demographic variables. However, the predictors of the competence/self-determination dimension included the variables of the objectives of participating in ICT-based activities and demographic variables. The predictors of self-determination and collective empowerment included perceived individual skills and habits in ICT-based environments, as well as the objectives of participating in ICT-based activities.

Four of the six independent variables of the individual skills and habits in an ICT-based environment were not associated with any of the dependent variables. Both ICT skills and complementary skills were expected to be associated with competence/self-determination, but this was not the case in this study. The social skills variable was expected to be a significant predictor of collective empowerment, but this hypothesis was not supported either.

Two of the five variables of the objectives of participating in ICT-based activities were not associated with any of the dependent variables. The improvement of relationship variable was expected to be a predictor of collective empowerment, and the information collection variable was expected to be a predictor of the competence/self-determination. However, no such evidence was found in this study.

Suprisingly, all three variables of the demographic information area were associated with at least one of the three dependent variables. Elderly people's employment situation, such as unemployed, part-time, or full-time, predicted a sense of meaning; age and education predicted competence/self-determination; and education predicted collective empowerment.

Table III.
Analyses of the predictors of individual and collective empowerment

Independent variables		Individual empowerment: Meaning B	Meaning t	Meaning p	Competence/self-determination B	Competence/self-determination t	Competence/self-determination p	Collective empowerment B	Collective empowerment t	Collective empowerment p	VIF
Constant		0.233	0.167	0.868	−3.574	−3.396	0.001	−0.963	−2.703	0.008	–
Individual skills and habbits in ICT-based environments	An interest in what ICTs deliver	0.197	1.902	0.060*	−0.031	−0.310	0.757	0.250	2.705	0.008**	4.267
	ICTs skills	0.126	1.377	0.172	−0.085	−1.077	0.285	0.029	0.302	0.763	2.659
	Social skills	−0.171	−1.374	0.173	−0.017	−0.156	0.877	0.088	0.667	0.500	4.653
	Complementary skills	−0.122	−0.999	0.320	0.084	0.795	0.429	0.020	0.160	0.873	5.177
	Discretionary time	0.037	0.362	0.718	−0.034	−0.381	0.704	−0.092	−0.861	0.392	4.282
	Participation frequencies	0.145	1.812	0.073*	0.132	2.692	0.008**	−0.045	−0.432	0.667	4.403
Objectives of participating in ICT-based activities	Improvement of relationship	−0.096	−1.151	0.253	−0.033	−0.464	0.644	−0.050	0.575	0.567	2.725
	Information collection	0.074	0.508	0.613	−0.012	−0.096	0.924	0.051	0.340	0.735	9.171
	Learning	0.198	2.756	0.007**	0.197	3.681	0.000**	−0.092	−0.701	0.485	6.503
	Shopping	−0.124	−2.250	0.027**	0.126	2.659	0.009**	0.015	−0.185	0.853	2.576
	Promoting business activities	−0.043	−0.546	0.587	0.043	0.620	0.537	0.229	3.876	0.000**	3.408
Demographic information	Age	−0.024	−1.383	0.170	0.028	2.047	0.044**	−0.006	−0.322	0.748	1.147
	Education	−0.195	−1.047	0.229	0.279	1.918	0.058*	−0.312	−1.882	0.063*	1.254
	Employment situation	0.104	2.342	0.021**	−0.055	−1.186	0.239	−0.042	−0.692	0.491	1.368
ANOVA: F (Sig.)		$F = 8.436$ (0.000)			$F = 13.279$ (0.000)			$F = 6.550$ (0.000)			

Notes: *$p \leq 0.10$; **$p \leq 0.05$

Variables associated with the meaning dimension

Five of the 14 independent variables were significantly associated with the meaning dimension. Three variables were individual skills and habits in an ICT-based environment, two were the objectives of participating in ICT-based activities, and one was a demographic variable. Contrary to expectations, neither perceived social skills, ICT skills, nor complementary skills predicted the meaning dimension. Consistent with Selwyn's (2004) observations, this study showed a significant association between the variable "an interest in what ICTs deliver" and the meaning dimension. Being interested in ICT was a positive predictor of a sense of meaning for the elderly. The frequency of participation variable was also a significant predictor of the meaning dimension. The more frequently elderly participated in ICT-based activities, the greater was their sense of meaning.

Two of the five variables measuring the objectives of participating in ICT-based activities were significantly associated with the meaning dimension. Learning and shopping variables were both significantly affiliated with the meaning dimension. Participating in ICT-based activities for learning could improve the meaning dimension among Korean elderly people. However, shopping was negatively associated with a sense of meaning. The use of ICT for shopping was associated with a smaller reported change in empowerment. However, this may not be equivalent to actual decreases in meaning.

The other three variables of the objectives of participating in ICT-based activities, specifically, improving relationships, gathering information, and promoting business activities, were not associated with the meaning dimension. The employment variable was a significant predictor of the meaning dimension among the elderly in Korea. In other words, the better the employment situation, the greater the sense of meaning. However, age and education did not predict the meaning dimension for the elderly population studied.

Variables associated with the competence/self-determination dimension

Five of the 14 independent variables were significantly associated with the competence/self-determination dimension. One of the six variables from the area of perceived individual skills and habits in ICT-based environments was identified as a significant predictor of the competence/self-determination dimension. The more frequently the respondents participated in ICT-based activities, the greater were the levels of the competence/self-determination dimension. However, three major skills in the ICT-based environment, i.e., ICT skills, social skills, and complementary skills, were not significant predictors of elderly collective empowerment.

Two of the five variables measuring the objectives of participating in ICT-based activities were identified as significant predictors of elderly competence/self-determination in Korea. Both learning and shopping variables were positively associated with the competence/self-determination dimension. Participating more frequently in ICT-based activities for learning and shopping contributed to the improvement of elderly competence/self-determination. However, more frequent participation in ICT-based activities for business purposes did not increase their competence/self-determination.

Both age and education variables were significant predictors of elderly competence/self-determination. In a sample of older ICT users, younger age is associated with lower competence/self-determination and older age with higher competence/self-determination. The education variable predicted elderly competence/self-determination. Higher education was associated with greater competence/self-determination in the elderly. However, the employment variable was not a predictor of elderly competence/self-determination.

Variables associated with collective empowerment

Only three of the 14 variables were significantly associated with elderly collective empowerment. "An interest in what ICTs deliver" predicted elderly collective empowerment. Being interested in ICTs was a positive predictor of a sense of collective empowerment among the elderly. However, three major skills in an ICT-based environment, i.e., ICT skills, social skills, and complementary skills, were not associated with elderly collective empowerment.

Of the five variables measuring the objectives of participating in ICT-based activities, only one variable was associated with older people's collective empowerment in Korea. More frequent participation in ICT-based activities for the promotion of business activities increased their collective empowerment. However, learning and shopping were not significant predictors of elderly collective empowerment. They were, however, significant predictors of elderly competence/self-determination, as well as their sense of meaning for living. ICT-based activities aimed at improving realtionships and gathering information did not predict collective empowerment either.

One of the three demographic variables was associated with elderly collective empowerment. The improvement in elderly collective empowerment was associated with the employment situation variable. Higher education was associated with greater elderly collective empowerment.

Summary

From theoretical perspectives, psychological empowerment comprises four dimensions, i.e., meaning, competence, self-determination, and collective empowerment. However, the empowerment construct was sensitive to this older group. In the current study on older people's empowerment in Korea, two dimensions of individual empowerment, i.e., competence and self-determination, were condensed into one psychological empowerment dimension. Competence refers to an individual's ability to perform jobs properly; whereas, self-detemination refers to a state of understanding of what to do to resolve problems. In the factor analysis, this study revealed that the elderly understood the two dimensions as a set of abilities to know what to do to perform jobs properly. For older people, self-determination is connected positively with the capabilities of activity, mental agility, and self-esteem; whereas, the lack of self-determinatioin is linked to hopelessness and depression, which represent incapabilities or limited competence (Hellström and Sarvimäki, 2007). However, the meaning dimension of elderly empowerment was extracted independently, as it was done in other population groups (Spreitzer, 1995, 1996; Wang and Lee, 2009; Zhang and Bartol, 2010).

ICT-based activities have contributed to the promotion of elderly people's perceived individual and collective empowerment, although the improvement was only slight-to-moderate. ICT-based activities contributed to individual empowerment more than did collective empowerment. These results demonstrated that older adults are valued as competent and autonomous individuals while they are trying to integrate ICT into their lives. The experiences of older people being valued, or individually empowered, seem to constitute a starting point for pleasing each other, as well as others.

However, not all ICT-based activities predicted elderly people's empowerment. Contrary to the expectation, three major skills for active ICT-based activities, i.e., ICT skills, social skills, and complementary skills, did not predict elderly empowerment. This was an unconvincing result, since the three skills above have been frequently described as an instrument for digital inclusion and self-efficacy (Cooney, 2004; Selwyn, 2004; Allison, 2005). According to a model of older people's internet engagement which

offers a more sophisticated instrument for understanding the issue of the digital divide and digital inclusion, three stages applicable to older people are theorized: internet adoption, or ownership of household internet connections; internet access, or access to the internet inside and outside of the home; and internet use, or the usage of the internet inside and outside of the home (Hill *et al.*, 2008) The above mentioned three skills do not always seem to lead older adults to internet use, but rather to stage two in many cases. Further studies are needed to clarify this issue.

Only one of the six variables measuring the area of individual skills and habits in the ICT-based environments could be considered as a predictor of individual and collective empowerment, specifically, "an interest in what ICTs deliver." For the elderly respondents, being interested in ICTs was a positive predictor of a sense of meaning and collective empowerment. The frequency of participation in ICT-based activities was also a predictor of individual empowerment, including a sense of meaning and competence/self-determination. An interest in what ICTs deliver seems to promote participation in ICT-based activities, and ultimately, older people's individual empowerment.

In terms of the objectives of participating in ICT-based activities, ICT-based activities for learning and shopping predicted a sense of meaning and competence/self-determination; whereas, the activity "promoting business" predicted only collective empowerment. However, goal-oriented ICT-based activities, such as "improvement of relation" and "information collection," predicted neither individual empowerment nor collective empowerment.

In most cases, demographic information, such as age, education, and employment situation, was predictive of elderly empowerment. In a sample of elderly ICT users, the sense of meaning increased with better employment. Younger age was associated with lower competence/self-determination, and older age was associated with higher competence/self-determination. Higher education was associated with greater elderly competence/self-determination and elderly collective empowerment.

Conclusion

The major finding of this study concerns the development of a measure that assesses three factors of empowerment in older adults, i.e., sense of meaning, competence/self-determination, and collective empowerment. This study represents an initial step in establishing the measure, and therefore, further work is needed to establish its psychometric properties, particularly its external validity. The application of this measure is potentially broad when modifications are made based on older people's empowerment settings. This measure can be utilized with older adults in other countries, as well as in other programs outside of ICT and levels of care (e.g. exercise programs, assisted living facilities, etc.).

In a sample of older ICT users, sophisticated ICT skills and social skills may not serve as an effective instrument for the promotion of older adults' empowerment in Korea. In other words, older people's psychological empowerment, as shown in this study, is not a matter of skills, i.e., ICT skills, social skills, or complementary skills, but is more likely determined by their level of interest in ICT and ICT-based activities. Therefore, a simple and easy ICT familarity program may constitute a potent tool for older adults to be psychologically empowered by encouraging them to become interested in ICTs and ICT-based actitities.

A sense of meaning among older adults is directly connected to an intrinsic interest in life and work, and a fit between the requirements of a life role and behaviors (Spreitzer, 1995, 1996). For older adults, a sense of meaning can be enhanced by

arousing their interest in what ICTs deliver and by promoting ICT-based learning activities. However, caution should be exercised in the case of online shopping because it was found to be a negative predictor of a sense of meaning. In addition, elderly adults may feel more empowered when they are better situated in job markets, since their employment situation was positively associated with a sense of meaning.

Based on this study's findings, older adults' competence/self-determination, described as a set of abilities to perform life and work activities and a sense of having choice in initiating and regulating actions, can be strengthened by ICT-based learning and shopping activities. It is easier to enhance competence/self-determination among elderly people with higher education, since education was positively associated with the enhancement of elderly competence/self-determination.

Collective empowerment refers to how a group of people gain capacities to change its social position. Based on this study's findings, elderly collective empowerment, described as the potential of individuals to join together, help one another, learn together, and work together, can be improved by arousing the elderly's interest in what ICTs can deliver and by promoting ICT-based work-related activities. Finally, it is easier to achieve collective empowerment among the better-educated elderly population.

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Further reading

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