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Factors Influencing the Use of Technology in Geriatric Care: A Case Study of Suphanburi Province

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Abstract

The purposes of this study were to examine the influence to use on the technology in geriatric care in Suphanburi Province, Thailand. Purposive sampling was used to select 400 subjects. The instruments for this study included personal factors, a perceived usefulness scale, a perceived ease of use scale, an attitude toward use scale, a behavioral intention to use scale and a technology usage behavior in geriatric care questionnaire. Data were analyzed by regression analysis. The main findings were as follows:

Standard regression analysis indicated that perceived usefulness, perceived ease of use, attitude toward use, and behavioral intention of use together explained 51.20 percent of the variance in technology usage behavior in geriatric care. Perceived usefulness, perceived ease of use, attitude toward use and behavioral intention to use predicted use of technology behavior in geriatric care with beta (β) values of -.298, .219, .174 and .501, respectively.

Keywords: geriatric care, technology, use of technology

บทคัดย่อ

การวิจัยครั้งนี้เป็นการศึกษาอำนาจการทำนายของปัจจัยในด้านการรับรู้ประโยชน์ต่อการใช้เทคโนโลยี ด้านการรับรู้ความง่ายต่อการใช้เทคโนโลยี ด้านทัศนคติต่อการใช้เทคโนโลยี ต่อความตั้งใจต่อการใช้เทคโนโลยีต่อการใช้เทคโนโลยีเพื่อการดูแลสุขภาพของผู้สูงอายุ จังหวัดสุพรรณบุรี กลุ่มตัวอย่างที่ใช้ในการศึกษาเป็นผู้สูงอายุจำนวน 400 คน การเลือกกลุ่มตัวอย่างแบบเจาะจง เครื่องมือที่ใช้ในการวิจัยประกอบด้วยแบบสอบถามข้อมูลทั่วไป ในส่วนของแบบสอบถามแบบเลือกตอบเป็นข้อคำถามเกี่ยวกับการรับรู้ประโยชน์ต่อการใช้เทคโนโลยี การรับรู้ความง่ายต่อการใช้เทคโนโลยี ทัศนคติต่อการใช้เทคโนโลยี ความตั้งใจต่อการใช้เทคโนโลยี และการใช้เทคโนโลยีเพื่อการดูแลสุขภาพของผู้สูงอายุ โดยมีค่าความเชื่อมั่นเป็น .954, .953, .954, .953 และ .957 ตามลำดับ สถิติที่ใช้ในการวิเคราะห์ข้อมูล คือการวิเคราะห์ถดถอย (standard regression)

ผลการวิจัยพบว่าผลการวิเคราะห์ถดถอย แสดงให้เห็นว่าการรับรู้ประโยชน์ต่อการใช้เทคโนโลยี การรับรู้ความง่ายต่อการใช้เทคโนโลยี ทัศนคติต่อการใช้เทคโนโลยี และ ความตั้งใจต่อการใช้เทคโนโลยี สามารถทำนาย



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ตัวแปรตามคือการใช้เทคโนโลยีเพื่อการดูแลสุขภาพของผู้สูงอายุ ได้อย่างมีนัยสำคัญทางสถิติที่ระดับ .001 โดยมีความแปรปรวนร่วมกับตัวแปรการใช้เทคโนโลยีเพื่อการดูแลสุขภาพของผู้สูงอายุ ร้อยละ 51.20 มีค่าสัมประสิทธิ์ถดถอย (β) ต่อการใช้เทคโนโลยีเพื่อการดูแลสุขภาพผู้สูงอายุในพื้นที่จังหวัดสุพรรณบุรี เป็น - .298, .219, .174 และ .501 ตามลำดับ

คำสำคัญ : การดูแลสุขภาพผู้สูงอายุ เทคโนโลยี การใช้เทคโนโลยี

Introduction

The world is transitioning into an aging society (United Nations, 2015). Thus, on the issue of increasing numbers of older people and their needs to use technology for geriatric care. Rogers, E. M., (2003) proposed a concept for developing the use of technology to promote maximum benefit in accessing older people in communities in terms of healthcare news and information. Under the 2nd National Plan on the Elderly (2002 – 2021), Revised Edition, B.E. 2552 (2009), which is aimed at promoting the use of information technology among older people to help older people receive appropriate media and technology. The above findings concur with the findings of Saman Loifa (2011) who stated that information technology is necessary for older people. Furthermore, Ryu et al. (2009) who studied specific factors of older people in using Internet video services by developing from the Technology Acceptance Model (TAM) found benefits, ease and entertainment in using technology to be indicated as major factors causing older people to use new technologies in self-care and daily life. Pan and Jordan-Marsh (2010) studied Internet use by applying the TAM, which explained the factors linked with Internet use and found attitude about technology, ease of use and convenience to be the factors triggering interest in the use of technology among older people. Attitudes concerning benefits, ease of use and social factors also influence the use of technology. Furthermore, perceived benefits influence adults' interest in technology and use of technology.

According to the literature review, the situation was found to be consistent with problems in geriatric care in Suphanburi. Suphanburi is likely to have population growth among older people (Suphanburi Provincial Public Health Office, 2014). Therefore, public health personnel need to understand technology as well as the readiness and needs of older people in the areas of perception, methods, intention to use and suitable devices and channels for older people for the setting of each area. Hence, due to the significance of the aforementioned problem, the researcher conducted the present study on the factors influencing the use of technology in geriatric care in Suphanburi Province by using TAM (Davis, 1989) as a guideline for



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conducting this study. The researcher expects to be able to use the findings to discover proper care and healthcare service provision channels to meet older peoples' care needs in line with the context of today's world of modern technology while seeking guidelines for providing geriatric care services by using suitable technology for the settings and needs of the elderly.

Objectives

To study the correlations and predictive power on the use of technology in geriatric care in Suphanburi Province, Thailand.

Scope of the Study

This study was conducted to study the correlations and predictive power of using technology for geriatric care among 139,868 older people in Suphanburi. The researcher collected data in May – June 2015.

Methodology

This survey research was aimed at studying the factors influencing the use of technology in geriatric care in Suphanburi.

Population and the Sample

The sample size was determined by opening a power analysis table and setting P-value = 0.5 and power of test. This study obtained 400 subjects from ten districts in Suphanburi. Lots were drawn to obtain one sub-district from each district and the subjects were randomly sampled from the population of ten districts. The subjects were selected by purposive sampling and considered based on the researcher's decision. Subject characteristics were consistent with the research objectives.

Data Collection

In this study, the researcher collected data as follows: 1. The researcher prepared letters to request permission for data collection in the area; 2. The researcher worked with coordinators to collect research data in ten districts of Suphanburi by sending a draft of the research project and data collection instruments; 3. The researcher met with the volunteers participating in the study to explain information and; 4. The researcher collected data on the volunteers by distributing a mean of 42 sets of questionnaires to each district for a total of 420 questionnaires.



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The researcher received 400 completed questionnaires. Afterward, the researcher analyzed the completed questionnaires for statistical data.

Data Analysis

The researcher analyzed the data by using the Statistical Program for Social Sciences. The following statistics were used in the data analysis: 1. Frequency distribution, percentage, mean and standard deviation; 2. Description of benefits of using technology, perceived ease of using technology, attitude toward using technology, intention to use technology and communication among older people and use of technology in geriatric care in the form of mean, standard deviation and interpretations of perception levels from specified values and; 3. Determination of correlations and predictive power of perceived benefits of using technology, perceived ease of using technology, attitude toward use, intention to use technology and communication among older people and use of technology in geriatric care by using regression analysis statistics (Julalak Bamee, 2008).

Research Findings

Part 1 – Demographic Data: Most of the subjects (400 subjects) were females (52.50%) (*S.D.* = 0.63) with a mean (*M*) age of 69.73 years, a minimum (*Min*) age of 60 years and a maximum (*Max*) age of 88 years (*S.D.* = 7.32 years).

Part 2 – Perceived benefits of using technology, perceived ease of using technology, attitude about using technology, intention toward use of technology and use of technology in geriatric care. This study found the following: The subjects had low overall perceived ease of using technology ($M = 2.23$, $S.D. = 0.99$). When considered individually, the subjects were found to understand the methods for using technologies such as mobile phones or the Internet or applications such as Twitter and Facebook the most with a mean score of 2.40, followed by considering technology as easy to use with a mean score of 2.33.

The subjects had a moderate overall attitude about using technology ($M = 2.76$, $S.D. = 0.85$). When considered individually, the subjects were found to have the highest mean score on attitude about using technology in the area of considering the use of technology systems for modern communication in daily life as good with a mean score of 3.38, followed by considering the use of technology as modern and necessary in the present day with a mean score of 3.13. The subjects had moderate overall intention to use technology ($M = 2.54$, $S.D. = 1.17$). When considered individually, the subjects were found to have the highest intention to use



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technology and communication in the area of expectations to learn via current technology and communication systems with a mean score of 2.68, followed by intention to use modern technology and communications in the present day with a mean score of 2.60.

Concerning the use of technology in geriatric care among the subjects, older people were found to have used technology for healthcare during the past year, including using telephones to consult with health experts, and listening to health news via wireless networks such as the Internet, etc. The subjects used technology (85.00%) and did not use technology (15.00%). When the most suitable type of technology for geriatric care was considered, the radios were found to be the most frequently selected communication device (35.00%), followed by mobile phones (32.50%). Most of the subjects used technology for 1 – 3 days/month.

Part 3 – Correlations and Predictive Power among Factors on Using Technology for Geriatric Care

After analysis of the correlations between variables pursuant to preliminary analysis agreements of regression analysis statistics, regression analysis was performed by entering variables consisting of perceived benefits of using technology, perceived ease of using technology, perceived attitude about using technology and perceived intention to use technology to predict the dependent variable or use of technology in geriatric care. Analysis by entering standard regression resulted in the following analyses in Tables 1 and 2:

Table 1 – Correlation Coefficients between Predictors and Use of technology in geriatric care Shown in Correlation Matrix

Variables	2	3	4	5
1. Use of Technology	.143**	.568**	.552**	.659**
2. Perceived Benefits		.496**	.526**	.481**
3. Perceived Ease of Use			.725**	.780**
4. Attitude Toward Use				.751**
5. Intention to Use Technology				

* $p < .05$, ** $p < .01$



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Table 2 – Correlation Coefficients of Predictors in Base Scores (*B*) and Beta Scores (*Beta*) Analyzed by Multiple Standard Regression

	<i>B</i>	<i>SEB</i>	<i>Beta</i>	<i>t</i>	<i>p-value</i>
Constant	0.554	0.228	-	2.431	.015
Perceived Benefits	-0.463	0.066	-0.298	-7.053	.000
Perceived Ease of Use	0.349	0.096	0.219	3.626	.000
Attitude Toward Use	0.325	0.108	0.174	2.994	.003
Intention to Use	0.678	0.084	0.501	8.031	.000

p* < .05, *p* < .01, ****p* < .001

According to regression analysis, perceived benefits of using technology, perceived ease of using technology, attitude about using technology and intention to use technology were able to predict the dependent variable, use of technology in geriatric care, with statistical significance at .001 with a prediction coefficient of .512. The variance in the use of technology in geriatric care (model analysis predictability) was 51.20 percent. When regression coefficients were considered in beta scores (*Beta*), the predictors with the highest *beta* scores in descending order were as follows:

Intention to use technology among older people (*Beta* = .501) had statistical significance at .001, perceived ease of using technology (*Beta* = .219) had statistical significance at .001, attitude about using technology (*Beta* = .174) had statistical significance at .01 and perceived benefits of using technology (*Beta* = -.298) had statistical significance at .001.

The analysis of the predictors' regression coefficients in beta scores (*Beta*) was able to create the following equation for predicting the use of technology in geriatric care in Suphanburi:

Predicting Equation in Beta Scores

$$Z_{\text{BEH older care}} = 0.501(\text{Intend}) + 0.219(\text{Ease of use}) + 0.174(\text{Attitude}) - 0.298(\text{Benefit})$$

Results and Discussion

This study explored the predictive power of perceived benefits of using technology, perceived ease of using technology, attitude about using technology, intention to use technology and use of technology in geriatric care by using regression analysis statistics. The



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analysis found perceived benefits of using technology, perceived ease of using technology, attitude about using technology and intention to use technology to be able to predict the use of technology in geriatric care with statistical significance and the following main topics of discussion:

1. *Intention to use technology among older people was positively correlated with and capable of predicting the use of technology in geriatric care in Suphanburi with statistical significance (Beta = .501, $p < .001$).* The aforementioned findings were consistent with Davis' Technology Acceptance Model (TAM) (Davis, 1989). The TAM Model can explain the factors leading to acceptance and use of technology. Intention to use technology was a factor in the Technology Acceptance Model influencing intention to use technology and use of technology. I. Ajzen (1991) stated that the intention to perform behaviors is a factor functioning to collect data. A person willing to attempt behaviors will ultimately be able to perform actual behaviors. Bangornrat Samniangpro (2011) found expectations of efficiency to be a factor with effects on intention to perform behaviors. Furthermore, Singha Chaweesoek and Sunanta Wongchaturapattara (2012) stated that acceptance of using information technology by each person or organization was a guideline helping researchers analyze human behavior as an option for explaining human intentions and predicting human behaviors to more effectively accept the use of information technology. The factors directly correlated with intentions or behaviors in using technology are as follows: (1) expectations of efficiency; (2) expectations of effort; (3) social influence and (4) convenience of use. According to Bussara Prakobtam (2013) who studied the acceptance of online social networks, perceived ease of use, perceived benefits and social influence influenced attitude toward the use of online social networks and attitude toward the use of online social networks with further influence on intention to use online social networks with statistical significance at 0.01. Therefore, intention to use technology in this study was positively correlated with and capable of predicting the use of technology by older people. The aforementioned intention to use technology might stem from several other factors involving intention to decide to use technology for geriatric care.

2. *Perceived ease of using technology was positively correlated with and capable of predicting the use of technology in geriatric care in Suphanburi with statistical significance (Beta = .219, $p < .001$).* The aforementioned findings concurred with Davis' Technology Acceptance Model (TAM) (Davis, 1989), which explained that perceived ease of using means each person's consideration, attitude and beliefs toward technology procedures in addition to the belief that the methods for using the technology are easy to understand and can be performed by the



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person following assessment. Perceived ease of using technology is dependent on influencing personal factors in each person. Karjaluoto et al. (Karjaluoto et al., 2001) studied the correlations between attitude and factors influencing the acceptance of using Internet banking and found the factors influencing use to be composed of price, speed, ease of use and one-stop services. Orathai Luanwan (2012) studied the factors influencing the acceptance of information technology and found perceived ease of using technology to have effects on overall acceptance of technology. This was in agreement with Bussara Prakobtam (2013) who studied the acceptance of online social networks and found perceived ease of using online social networks to influence intention to use online social networks with significance at 0.01 Therefore, perceived ease of using technology in this study was positively correlated with and able to predict the use of technology in geriatric care.

3. *Attitude about using technology was positively correlated with and capable of predicting the use of technology in geriatric care in Suphanburi with statistical significance (Beta =.174, $p < .01$).* The aforementioned findings concur with Davis' Technology Acceptance Model (TAM) (Davis, 1989), which explains intent/attitude toward use. TAM principles studied four main factors influencing intention to use information technology consisting of external variables, perceived usefulness (PU), perceived ease of use (PEOU) and attitude toward using (Singha Chaweessook et al, 2012). This was in agreement with a study conducted by Levitan & Visser (2008) who found attitude to have influence on receiving modern information. Therefore, attitude about using technology in this study was positively correlated and capable of predicting use of technology among older people.

4. *Perceived benefits of using technology was negatively correlated with and able to make invert predictions about using technology for geriatric care in Suphanburi with statistical significance (Beta =-.298, $p < .001$).* The aforementioned findings did not concur with Davis' Technology Acceptance Model (TAM) (Davis, 1989), which states that perceived usefulness means a person's attitude, ideas and beliefs toward the use of technology to increase the person's working capabilities. Beliefs, thoughts and perceptions are an analysis and awareness of values and importance of positive effects from using that technology. Values from the acceptance of a technology has benefits fitting the person's needs, leading to acceptance and the use of technology. The findings did not concur with those of Kiseol Yang and Laura D. Folly (2008) who studied benefits from use of online social networks. In addition, the findings from a study conducted by Lin & Lu (2011) supported the findings on perceived benefits from using technology networks regarding network service users' awareness of the benefits of using



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technology to communicate, exchange information and knowledge. According to the findings, perceived benefits of using technology had an invert correlation with the use of technology among older people. I. Ajzen (1991) explained that other factors are involved with perceived benefits. Moreover, in addition to the perception of benefits resulting in use or non-use of technology, other factors are involved in determining whether the aforementioned behaviors such as knowledge, resource readiness, technology user ability, convenience in using technology and suitability of technology for users will deviate. Although users perceived benefits, interference by the aforementioned variables will influence the use of technology.

In the present study, therefore, perceived benefits of using technology was obviously negatively correlated with and capable of making invert predictions with the use of technology in geriatric care. According to the discussion, although the older people had high overall perceived benefits of using technology, other factors were involved, which caused the older people to reduce their use of technology for self-care.

Suggestions for the future research

1. Learning exchanges should be held between older people, caregivers and officials involved in healthcare by building understanding, accepting different concepts, attitudes and views about using technology in order to create mutual understanding between both parties with the goal of using technology to provide care, thereby creating readiness to receive new information and seek guidelines for joint care of older people.

2. Organizations involved in the care of older people in the area should place importance on organizing training on technology systems and the use of devices and technologies (possessed by older people) in order to promote older peoples' capabilities to use technology with suitability for users and health services. Environments should be arranged to facilitate older people in using appropriate technologies such as promoting instruction on use of the LINE program among mobile phone users or use of communication radios for health consultations, etc., in order to create new and fast coordination and communication channels, reduce traveling expenses and ability to contact and access health services quickly and on time.



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