

Do older adults aged 60 and older benefit from Internet training course? A pre-post
approaches to assesstechnology acceptance and impact on Taiwanese silver surfers' life
銀髮族是否能從網路學習受益？網路科技教學對於台灣銀髮族之生活影響前後測研究

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Abstract

Background: Information and communication technologies (ICTs) has received increasing attention for decreasing loneliness or avoiding social isolation in older population. However, few studies have examined in detail older adults' perceptions to and use of the Internet.

Objective: This study was to examine which aspects of Internet gathered most predilection in middle-aged and older adults in the community, and to assess different domains of psychological impacts after Internet learning.

Methods: This is a pretest-posttest design. We offered an eight-week Internet learning course to 20 middle-aged and older adults aged 50 and above who resided in community. The pre and post measures included demographic variables, revised Internet use attitudes scale, modified CESD depression scale, Chinese Happiness Inventory, and revised UCLA loneliness scale (UCLALS). Focus group interviews were conducted with a sub-sample of participants who finished the training course.

Results: Most participants in this trial have positive attitude toward Internet usage at recruitment. They also have concerns toward fatigue and blurred vision related to Internet use. After the intervention, there was a trend toward more positive attitude toward Internet usage, and decreased depressive symptoms (mean = -2.5, $p=0.004$) from baseline to the end of trial. Among the participants interviewed, two themes emerged: (1) older adults have different approach overcoming learning barrier, (2) training courses effectively improved older adults' motivation on Internet use.

Discussions: Internet use seems to contribute to middle-aged and older adults' well-being and sense of empowerment. Further research with larger sample size is needed to determine which older adults are more likely than others to benefit from this rapidly expanding information and communication technology.

中文摘要

背景：近來越來越重視透過資訊與通訊科技(ICTs)來降低老年人的孤獨感或避免社交退縮。然而，很少研究去詳細探討中老年人對於使用資訊與通訊科技的想法和實際的使用行為。

目的：本研究旨在探討社區中老年人的網路使用行為，及評估網路學習課程對其身心健康的影響。

方法：本研究採用前後測的實驗設計，提供為期八週的網路學習課程給 20 位年紀 50 歲以上住在社區裡的中老年人。問卷內容包含了基本人口學變項、電腦使用態度量表、CESD 抑鬱量表、華人幸福感量表和修訂後的 UCLA 孤獨感量表 (UCLALS)。並於課程結束後一個月，邀請參與者參加焦點團體的訪談。

結果：參與的中老年人對於使用網路有高度的興趣，不過他們仍擔心使用網路後，可能會導致他們視力衰退或會感到疲勞。在 8 週的課程介入後，結果發現長輩們對於使用網路抱持更加正向積極的態度，從前測到後測的比較中可以發現，長輩們抑鬱的狀況有明顯的下降（平均值 = -2.5， $p = 0.004$ ）。另外，從焦點團體的訪談中可以發現到有兩個明顯的結果：(1) 中老人在面對使用上的問題時，會有不同的方式去克服學習障礙，(2) 網路學習課程能有效提升長者使用網路的動機。

討論：網路似乎有助於提升中老年人的幸福感，並增進其自主性及對自我實現的可能性。在後續的研究上，需要更多的樣本去確認在快速擴張的資訊與通訊科技上，老年人是否能像年輕人一樣獲得幫助。

Introduction

Technology progressing, in particular computer and the Internet, offers an opportunity to strengthen the quality of life for older adults in several ways (Carpenter & Buday, 2007; Chen & Persson, 2002; White et al., 2002). Increasing quasi-experimental studies showed that older adults' psychosocial well-being may be improved through computer use (White et al., 1999) or Internet training (Shapira, Barak, & Gal, 2007). There is increasing evidence to suggest older adults potentially have a lot to gain from seeking out the Internet with its possibilities for convenient acquiring information and communication benefits (Chen & Persson, 2002).

As Internet surfing is a relatively new phenomenon, the proportion of older adults who were keen to this activity is small compared to younger generations (Shapira et al., 2007). According to the national survey in the US, this report showed that 59% of people aged 65 and over used the Internet, which is still far below the whole population go online, as 86% of all U.S. adults (Pew Research Center, 2014). Likewise, digital divide exists that approximately 29% of middle-aged and older adults compared to 79% of younger adults had surfed the Internet in the past 12 months in Taiwan (Chiu, Hu, & Yu, 2014). The majority of the studies discussed the reason of the lag in technology adoption by older adults. Most of them pointed out that perceived usefulness, ease of use and complexity of navigation (McCloskey, 2006; Mitzner et al., 2010; Pan & Jordan-Marsh, 2010), as well as normative age-related changes (ex., arthritis or other impairments) in ability to operate the equipment (Charness & Boot, 2009; Riviere & Thakor, 1996) were the key influencing factors in adoption of the Internet.

Yet, older adults are able to learn to surf the Internet effectively with appropriate training (Dauz, Moore, Smith, Puno, & Schaag, 2004); Previous research also indicated that tailored educational class which is small to allow for self-pacing and the availability of assistance when problems are encountered (Zandri & Charness, 1989), and taught them adequate operation and Internet usage skills could improve their actual use (Shapira et al.,

2007). In addition, the development of touch screen technology, such as smartphone or Pad, might eliminate the problems of operation, and thus prompt their motivation to use the Internet. Moreover, the significantly expanded mobility environments (Bertolini & Dijst, 2003), consisted of the Internet and mobile devices might be as an important tool for the rapidly increasing older population to lead independent lives through various applications, or “apps” for short. Apps are like programs on a desktop computer, and contain breadth of information and resources (Cumiskey, 2011), which can be used on demand on different domains.

Despite the potential psychological positive impact these apps may offer for middle-aged and older adults, to date, attention has not explicitly focused on demonstrating its effectiveness in a real community. In order to move the field forward, it becomes crucial to study the psychological impact of apps technology to see if modern technology really brings middle-aged and older adults to a more convenient life.

In this study, we took advantage of embedded mixed method approach amalgamating quantitative analysis and focus group interview, which provides solid data base within quasi-experimental design and deeper discussion of related issues after intervention to prompt greater depth in understanding. Our aims are to evaluate the immediate impact of 8-week Pad training courses on middle aged and older adults’ attitudes toward Internet usage and well-being.

Method

Design Overview

We conducted an 8-week Pad training courses for middle-aged and older adults in a community. A mixed-method approach was used to explore whether Internet training courses could foster the attitude change towards this innovative area (i.e., Internet and application on Pad) and further benefit elders' wellbeing. The research protocol was approved by the National Cheng Kung Hospital Institutional Review Board prior to the initiation of the study.

Setting and Participants

A community near campus was invited to participate. Community was required to assist recruitment and to provide an adequate area where could accommodate about 40 elders and 15 trainers. Enrollment began in January 2014 and data collection including questionnaire and focus group interview was completed in July 2014.

There were 39 community elders (25 women, 14 men) aged over 50 was recruited and provided informed consent. After an information session introducing the study, participants signed the informed consent were requested to participate following 7 weeks training course and to complete the baseline interview. Four participants refused to engage in and two participants were excluded due to non-literacy. One participant died before the study ended and two participants participated in training less than 5 times. Ten additional participants dropped out of the last course and didn't complete the final survey. Therefore, a total of 20 participation (51% of the initial 39) completed training and pre- and post-questionnaire were used in the statistical analysis.

In addition, participants were invited to join focus group interview which could share their attitude change towards technology or their experience in Internet usage. A total of fourteen participants agreed to interview and six focus groups were conducted.

Training course

After the baseline interview, subjects were requested to participate in the apps-based training course within following 7 weeks. Briefly, participants received two hours of group training each week, which covered basic Pad operation, an introduction of applications in the android cellphone, and use of four different topics' applications, such as entertainment (YouTube, games camera and photo editor,) transportation (train schedule and maps,) health (Internet Pre-registration System for clinic visit, medication reminder, exercise short film, and food security and nutrition information) and social media (skype). Training manuals covering these topic were developed specifically for this study and distributed to each participant.

There were 12 trainers who were college and graduated students, well versed in the use of the Pad, and had received 12 hours education about adult learning theories and educational gerontology before training course. The trainers helped participants operate pad and application, answer participants' questions, deal with their technical problems, offer suggestions of what to do when participants encountered problem, and provide praise and encouragement.

Quantitative Questionnaire

Quantitative data was collected at pre- and post- interview (the first week and the eighth week, respectively.) The background questionnaire assessed participants' gender, age, race and health condition. Additionally, participants also needed to complete a questionnaire including attitude towards Internet usage, Internet usage, e-health literacy and psychological wellbeing.

To assess participants' attitude towards Internet usage, we used existing multi-item scales, such as the Attitudes Toward Computers Questionnaire (Jay & Willis, 1992) and the Computer Anxiety Rating Scale (Heinssen Jr, Glass, & Knight, 1987), adapted to suit the

context of the study, to measure perceived ease of use, perceived usefulness and attitude toward Internet usage. To ensure that the scale had adequate validity, we invited three specialists, have many years' experience in community and education, to review and refine the final questionnaire. We further modified scale item in line with the result of exploratory factor analysis and item analysis for internal consistency, and finally, 6 items were extracted from two factors (each factor was constructed by 3 items), anxiety and confidence respectively. Each subscale has good internal consistency in this study (Cronbach's α are 0.74 and 0.67 respectively).

Moreover, participants were asked to answer eight questions about their perspective on Internet usage. These questions aimed to understand the influence of surfing the Internet on subject's social capital as well as physical health and psychological emotion, such as enlarging socio network, enriching recreation activity, improving physical health or eyesight deterioration. Participants were also requested to report their behavior of surfing the Internet operationalized as an individual's extent of Internet usage (e.g., frequency of use.) Furthermore, they were asked whether they had ever used a computer and/or the Internet before and whether they have engaged in some online behavior (e.g., shopping, searching information or socio media etc.)

E-Health literacy was measured by the eHealth literacy scale (Norman & Skinner, 2006), which has been used to measure perceived skills at and comfort with using the Internet for health information and decision making in multicultural samples (Koo, Norman, & Chang, 2012). The main scale has 8 items ranging from 1-5 points. Higher score indicates higher eHealth literacy efficacy. This scale had shown excellent internal consistency reliability (Cronbach's α was 0.93) in this study.

Psychological well-being was measured with three outcomes: depressive symptoms, loneliness and happiness. A depressive symptoms score was assessed with the 10-item Center for Epidemiologic Studies Depression Scale (CES-D 10) (Kohout, Berkman, Evans,

&Cornoni-Huntley, 1993), with each symptom ranging from 0-3 points (Cronbach's α between 0.79-0.83). Respondents are asked to indicate the frequency with which they experienced specific symptoms of depression within the preceding week. In this study, the Cronbach alpha coefficient was 0.77.

Loneliness scale with 20 item questionnaire (UCLALS) was used to measure one's subjective feelings of loneliness as well as feelings of social isolation, and had been indicated excellent internal consistency (Cronbach's α ranging from .89 to .94.) Participants responded on a 4-point scale to 20 statements, Total scores ranged from 0 to 60, the higher scores means that subject frequently experience feeling of loneliness. (Russell, Peplau, & Ferguson, 1978). Cronbach alpha coefficient found in the present study was 0.88.

The Chinese Happiness Inventory (Lu & Lin, 1998) was used to measure perceived level of happiness, composed of positive affect, (lack of) negative affect, and life satisfaction. Scores ranged from 0 to 30, which higher total score indicated a higher level of overall happiness. In this study, the Cronbach alpha coefficient was 0.82.

Qualitative Interview

Six focus groups were conducted in private rooms at the community centre one month after the training course. A structured discussion guide was devised, refined to ensure that the discussion questions were clear and prompted discussion relevant to the issues of immediate interest, and then used by trained moderator and co-moderator to promote consistency across groups. Responses to open-ended questions was designed to encourage participants to discuss their attitudes about Internet usage and to discuss the benefits of Internet access about additional support for the lives of older adults. The discussion questions are like, "For those of you, did you continually use Pad or surf the Internet after training courses?" or "Which aspect of life did be benefitted after surfing the Internet?" Participants were also requested to discuss

whether the training courses improved their motivation to surf the Internet, and how does they overcome the barrier when encountered operation problems.

Two experienced interviewers (one moderator and one co-moderator) conducted these semi-structured interviews. Moderators were instructed in the use of directive probes to elicit additional information and clarify ambiguous comments; co-moderator wrote field notes to capture key points in and observations about the discussion. All interviews were digitally audio-recorded and transcribed verbatim. All names and identifiers were removed from the text to protect participant confidentiality. These clean transcripts were used in analysis.

Statistical Analysis

In this study, we applied a mixed method approach, using multiple methods (i.e., quantitative analysis and qualitative interview) to gain a better understanding of results, to discover underlying perspectives, and to gather more comprehensive and accurate results (Mitchell, 1986; Thurmond, 2001).

For quantitative data analysis, demographic and main outcomes are presented as sample size and percent or mean and standard deviation. We used Wilcoxon matched-pairs signed-rank test to examine the improvement between pre-test and post-test on the main outcomes including attitudes toward Internet usage, perspective on Internet usage, Internet usage, e-health literacy and psychological well-being. All analyses were performed with SAS version 9.3 statistical software, with a significance level $\alpha=0.05$.

Qualitative data were analyzed using techniques described by Morgan (Morgan, 2013) and Krueger (Krueger, 1988). Specifically, the discussion was summarized immediately following each of the focus groups; the transcriptions of the accuracy were verified by randomly cross-checking the transcripts against the audio; codes were developed for relevant themes, using the research question as guides; the codes of new transcripts were compared with existing codes following each focus group to more fully develop the properties of the

overarching categories. The research team, consisting of a gerontologist and two graduate research assistant, reached consensus that coding additional transcripts would only repeat themes.

Results

Participants' characteristics at baseline

Table 1 presents descriptive statistics of participants' demographic information and main outcome variables at baseline. A total of twenty middle-aged and older adults (mean age was 69.5 years; age range from 53 to 77 years) participated in this study and completed the final survey. Among them, twelve participants (60%) were female, and nearly sixty percent of our participants had more than one chronic disease. Most of them completed high school or higher educational level (75%). Of twenty participants, six participants (30%) reported that they have the prior experience of surfing the Internet and fourteen elders (70%) were non-Internet users.

Attitudes towards Internet usage was very positive for our participants at baseline (13.2 points out of 15). Perspective on Internet opportunities was most positive on the items of social network enlargement, increasing useful information in life, leisure life enrichment, improvement in physical health, and increase happiness. In addition, the E-health literacy (range 8-40) was 30.9, and their depressive symptoms (range 0-30) and loneliness scores (range 0-60) were 5.6 and 15.1, respectively.

On the other hand, they still reported anxiety about engaging in this innovative technology (mean score was 9.6 out of 15). Although our participants have the confidence to learn Pad operation or to surf the Internet, yet they worried about the hindrance when they surfing the Internet. We also noticed that however, they also concerned about fatigue and blurred vision after surfing the Internet. In addition, they slightly agreed that adoption of the

Internet might worsen their ability to face to face communication (mean score was 2.3 on 4 point scale).

Quantitative evaluation of attitudes toward Internet use, perspectives on Internet, eHealth literacy, and psychological well-being after training course

Table 2 presents change from baseline on attitudes toward Internet use, perspectives on Internet, eHealth literacy, and psychological well-being. After Pad training courses, participants' anxiety about Internet usage decreased. In addition, the participants got more efficacy on using the Internet for health information and decision making after training courses (overall improved 0.8 points). Of note, there was a significant decrease in depressive symptoms (mean = - 2.5, $p=0.01$) from baseline to the end of trial. Likewise, participants felt lower loneliness after training courses, which the score decline 3.4 points. In addition, our result also revealed a positive change in participants' happiness. Furthermore, participants expressed that their concern about the negative influence of surfing the Internet (i.e., deteriorating eyesight, feeling fatigue or worsening ability to actual interaction) had slightly declined (0.1~0.2).

An unexpected observation was that compared to the baseline score, participants perceived lower confidence at the end of trail (mean scores were 13.2 at baseline and 12.7 at post-interview). In addition, there was little and negative change on the participants' perspective on Internet usage opportunity, such as information seeking or leisure life enrichment, which could due to participants scored highly in these tests at baseline, causing a "ceiling" effect.

Qualitative finding on participants' approach to overcome learning barriers

Through the discussion in the focus groups, participants were able to talk about the process of and barrier of self-learning on Internet or application use after the end of training

courses. In this study, we tried to understand how participants resolve the problems they encountered and the strategies of overcoming operation issues.

All the participants acknowledged the importance of diligent practice in learning this innovative technology, including adoption of the Internet and android application usage, because of memory degradation. Our participants also admitted if they encountered problems, they need to ask someone (i.e., their children) for helps or hints. Three participants stressed the importance of inquiring of someone by saying:

I think it will be the most convenience if I can ask you for help when having problem with the Internet. (Participant 13, had prior experience of Internet usage)

If I don't know how to use, I will ask my children. They will teach me. (Participant 2, had no prior experience of Internet usage)

When I have some problems with the Internet, I ask my son or just let it be! (Participant 8, had no prior experience of Internet usage)

Moreover, several participants want to discuss their problems during the training courses, and addressing the problems immediately. As one men shared: 'I think if everyone could have a tablet will be great. We can practice at home after class immediately, If we found problem, we can have a discuss next week' (Participant 14, had prior experience of Internet usage).

Do their motivation for learning or using Pad/Internet be improved after training courses?

In this study, the major question is if 8-week Pad training course dose empower our participants, which motivates and encourages them to surf the Internet or to use these application without additional training courses. Although our quantitative finding showed that participants scored lower anxiety about Internet usage, we still noticed their confidence of using the Internet also decline slightly. During the discussion in the focus groups, participants

were further requested to discuss this issue. Noteworthy, we found a clearly positive motivation on using the Internet or android application after training courses for some participants. For example: The lesson that taught us how to use the hospital online appointments system is useful. (Participant 2). Another users added: 'I think learning how to use the hospital online appointments system is great.' (Participant 7). Two users further expressed his desire by saying:

I want to use the online communication software to contact with my children who live abroad. (Participant 3)

In order to catch up the trend, I must know how to use the Internet at least. If I can use it skillfully, I will see my children's or grandchildren's image vividly. (Participant 5).

Moreover, some of participants continuously learned and used the Internet and android application. As one shared: 'I learn how to use the Line, skype, youtube, and watching the news by myself.' (Participant 14). Another user also supported the idea by saying: 'I didn't know how to use the Line or take pictures before I engaged in this training courses. However, I can use it well now and I want to learn the new application because you taught me how to use those basic function.' (Participant 11).

Discussion

The present study explored the influence of apps-based training course on the middle aged and older adults' attitudes toward Internet usage, perspective on Internet usage, Internet usage, e-health literacy and psychological well-being.

First, examination of change before and after the training course indicated significant decrease in anxiety toward Internet use after the Pad training course. In addition, our study also demonstrated that concern about the negative impact of Internet usage, such as

deteriorating eyesight, feeling fatigue or worsening ability to face to face communicate, slightly decreased. This result is similar to other studies which indicated that although older adults perplexed how to handle the operating systems, worried about how to resolve problems they encountered, and feared that they might break a expensive devices (Carpenter & Buday, 2007; Cody, Dunn, Hoppin, & Wendt, 1999), training course provide older adults with adaptive assistance, which could help older adults reduce learning anxiety (Cody et al., 1999).

Unexpectedly, although previous studies indicated that once novice Internet users master computer basics, they become empowered, a renewed self-confidence and strong self-image for technology is expected after training (Timmermann, 1998), our study found that participants expressed lower confidence in Internet usage after participating in training course. The declination of confidence may be the result of overconfidence at recruitment, and also echoes existing literature suggest that elderly may underestimate their confidence in their relevant abilities to learning new computer technologies (Marquié, Jourdan-Boddaert, & Huet, 2002). In addition, our training courses provided participants with 1.5 hours practice and individual exploration each week for 8 weeks. This may not be enough to well utilize and practice, especially for those who didn't have their own device (Pad or smartphone).

For the perspective on Internet usage opportunity, past research pointed out that older adults engaged in the technology programs could increase ratings of perceived social support and connectivity (Cody et al., 1999). In our study, although this perspective still kept positive, it was not statistically significant. This could due to most of them scored highly in these tests at recruitment, causing a “ceiling” effect.

Our results showed that, after 8-week apps-based training course, participants felt lower depressive symptom, lower loneliness and more happiness, as well as improved their e-health literacy efficacy. Indeed, engaging in mobility environments can help them to improve

loneliness and isolation (Steinert, Haesner, Gövercin, & Steinhagen-Thiessen, 2013; Sum, Mathews, Hughes, & Campbell, 2008), and thus improved their psychological well-being (White et al., 2002). Older adults could use the social media apps (ex., Line or Facebook) to deliver message or information, which enhanced conversations with family or friends and made their relationship more close (Bell et al., 2013; Cornejo, Favela, & Tentori, 2010). In addition, mobility environments consisted of several types of application, and information provide older adults with a platform of information exchange to gather up-to-date health knowledge and to participate in the management of self-health status (Cummiskey, 2011; Taha, Sharit, & Czaja, 2009; Xie & Bugg, 2009).

The strengths of our study included conducting an 8-week apps-based training course in the real community. Community dwelling elders need a variety of assist or information, and thus choosing the real community as empirical setting allows us to test the different domain of applications matching their need, and to comprehensively understand the impact of Internet usage and applications utilization on middle-aged and older adults in their daily life.

However, there were several limitations in our study. First, the present study was an exploratory study of the nature and included a relatively small sample of participants. Although the participants had strong desire to learn new technology and voluntarily participated in this experiment, recapitulation to the population at large should be made carefully. Besides, most of participants have no Internet experience and experimental equipment (Pad) not allow users who didn't have their own device to take home to practice, which might lead the result to be underestimated on its effectiveness. Nevertheless, this study still showed the benefits of training course for middle-aged and older adults with different Internet experience and it may encourage and direct the development and design of training course focusing on the technology adoption of older adults.

In the light of these strengths and limitations, this study demonstrated that 8-week

apps-based training courses had positive impact on middle-aged and older adults' attitude toward Internet usage and well-being. The results revealed that participants' anxiety about Internet usage and depressive symptom slightly decline. This study also found that three interesting findings related to the effectiveness of the apps-based training courses. (1) Training provide middle-aged and older adults with adaptive assistance to solve problems they encounter, which could help older adults reduce anxiety on Internet usage. (2) Training content is too challenging (relative to their skills) and is unable apply to daily live will decrease participants' learning confidence in proficient at operating mobile devices. (3) Participants used the information delivered by such mobility environments to enhance conversations with new talking-points making the family relationship is more close.

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Table1. Demographics and main outcome variables at baseline

	N	%
<u>Gender</u>		
Male	8	40.0
Female	12	60.0
<u>Age^a</u>	69.5	6.9
50~65	5	25.0
Over 65	15	75.0
<u>Educational level</u>		
1-6 grade	5	25.0
7-9 grade	8	40.0
10-12 grade	7	35.0
<u>Prior experience of Internet use</u>		
Yes	6	30.0
No	14	70.0
<u>Physical condition</u>		
No	8	40.0
Only one	4	20.0
More than two	8	40.0
<u>Joined Focus Group</u>	14	70.0
<u>Attitudes toward Internet usage^a</u>		
Anxiety ^b (range: 3~15)	9.6	2.6
Confidence (range: 3~15)	13.2	1.3
<u>Perspective on Internet use opportunity and concern^a</u> (range: 1~4)		
Enlarge social network	3.1	0.4
Increase useful information	3.3	0.5
Enrich leisure life	3.3	0.5
Improve physical health	2.9	0.7
Increase happiness	3.2	0.6
Deteriorate eyesight ^b	2.8	0.6
Increase fatigue ^b	2.5	0.5
Worsen ability of face to face communicate ^b	2.3	0.5
<u>E-Health literacy^a</u> (range: 8~40)	30.9	5.1
<u>Depressive symptom^{a,b}</u> (range: 0~30)	5.6	4.5
<u>Loneliness^{a,b}</u> (range: 0~60)	15.1	10.1
<u>Happiness^a</u> (range: 0~30)	15.9	4.3

a: data presented as mean and S.D.

b: questions in reverse order, with lower score indicated more favorable outcome

Table2.Change from baseline after 8-week apps-based training course

	mean	SD	p-value
<u>Attitudes toward Internet usage</u>			
Anxiety ^a	-1.2	3.1	0.12
Confidence	-0.5	1.7	0.22
<u>Perspective on Internet opportunities and concerns</u>			
Enlarge social network	0.0	0.5	1.00
Increase useful information	-0.1	0.5	1.00
Enrich leisure life	-0.1	0.6	0.69
Improve physical health	0.1	0.8	1.00
Increase happiness	-0.1	0.7	0.75
Deteriorate eyesight ^a	-0.2	0.8	0.40
Increase fatigue ^a	-0.1	0.6	1.00
Worsen ability of face to face communicate ^a	-0.1	0.6	0.69
<u>E-health literacy</u>	0.8	5.4	0.26
<u>Depressive symptom</u> ^a	-2.5	3.7	0.01 ^{**}
<u>Loneliness</u> ^a	-3.4	7.9	0.21
<u>Happiness</u>	2.7	5.8	0.18

*: p<.05 **: p<.01 ***: p<.001

a: questions in reverse order, with negative score indicated more favorable outcome