



Effect of An Information and Communication Technology Utilization Program for Leisure Activities on the Anxiety of Device use and Health-Related Quality of Life

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Abstract

Purpose: With the aging of the population and the development of information and communication technology (ICT) infrastructure and education systems, methods to maintain social networks among the older adults are attracting attention. In this study, familiar leisure activities were introduced into the process of learning how to use devices, as anxiety about using devices has been considered one of the factors that hinder the spread of ICT among older adults. This study aimed to explore the effects of an ICT utilization program on device use anxiety and health-related quality of life quality and how ICT use affects social participation.

Participants and Methods: Twenty-two community-dwelling older adults participated in a social network service group exchange for 1 month, and a questionnaire survey was conducted on ICT utilization and WHO-5 before and after the program. From the survey, we examined the effects of ICT use on older adults anxiety about device use and life satisfaction.

Results: Before and after the program, a change in the WHO-5 total score and anxiety about using a device was found. In addition, not only positive opinions were heard regarding the impressions of the program, but many wished to continue the program in the future.

Conclusion: In this study, we confirmed that a style in which participants naturally learn how to use a device while interacting with each other based on themes that include elements of enjoyment leads to a reduction in anxiety about device use and increase the degree of satisfaction.

Key words: Information and Communication Technology, Older Adults, Quality of Life, Social Participation

Introduction

In Japan, the population is expected to halve in 60% of the current residential areas by 2050 because of the rapid declining birthrate and aging population. Moreover, there is a need to develop an information and communication technology (ICT) infrastructure and education

system that can provide necessary services and monitoring even in remote areas. To build a society in which older adults can continue to play an active role with peace of mind, it is important to support decision-making about their health management and life purpose. The development of this ICT infrastructure and education system is consistent with the policy of the Health Care 2035 Proposal [1], which seeks to advance technologies (e.g., the evolution of personalized medicine such as disease management, health management based on health data and support device for medical care, nursing, and nursing care, and generalization of telemedicine and automatic diagnosis through robot development) that can be used in healthcare. In addition, it is directly linked to the richness of life for older adults living in local cities who use cars as the main means of transportation in their lives.

In recent years, each local government has been actively developing preventive care projects, and in the joint research of the applicant, video materials of preventive exercises for frailty have been posted on the websites of local governments. However, viewers are limited to older adults who are familiar with ICT use, and we have been frustrated because the information we want to deliver does not reach older adults who really need preventive care.

On the contrary, in Japan, the number of older adults who actively use the Internet is increasing annually. ICT use is expected to improve the motivation of older adults such as increased communication and activities, provision of enjoyment, joy, stimulation, sense of security, improvement of health, and formation of place and role [2].

Advanced ICT initiatives include online lectures on leisure activities for older adults (UK) and the emergence of older adults posting on video distribution services such as YouTube in Japan. It is an example of practice by some older adults, and many of the viewers are young adults.

Therefore, by utilizing social network service (SNS), which is used as a means of communication by many older adults, it is possible not only to widely share information on preventive care but also to

facilitate remote social interaction through two-way information exchange. Thus, we consider that it will have a positive effect on motivation and satisfaction with life. Even in a society at the risk of spreading infectious diseases such as COVID-19, ICT its utilization has great potential for older adults.

According to a survey by the Ministry of Internal Affairs and Communications (Communication Usage Trend Survey in 2021) [3], 60% (71.7% of people in their 60s) of people aged ≥ 60 years have a smartphone and 50% (79.3% of those in their 60s) of people use social networking services for social interaction. On the contrary, many people cannot benefit from the convenience of online ICT use, such as using smartphone only for making calls. Specifically, further dissemination of ICT utilization is required based on data that 36.1% of people in their 70s and 80s have a smartphone and 54.0% use SNS. The lack of knowledge about the Internet is often cited as a reason for non-use of ICT [4], but the target of the long-term care prevention project are applicants who complained of reluctance to use the device, such as those that are difficult to use. In this study, we thought that introducing familiar leisure activities into the process of learning how to use a device would reduce older adults' anxiety on device use. Leisure activities can be said to be the time for the main activity [5], which accounts for about half of the time spent awake and active. The sense of fulfillment and satisfaction of leisure activities are reflected in the satisfaction of older adults in their lives and are directly linked to their sense of purpose in life. As a reason for the unsatisfaction with leisure activities, men reported "I do not have friends," but it can be solved using SNS that is usually used in forming groups based on interests in this research.

Based on the above, to obtain basic data for the dissemination and enlightenment of ICT among community-dwelling older adults this study aimed to investigate the effects of SNS exchanges based on leisure activities on their reluctance to use a device and life satisfaction among community-dwelling older adults.

Methods

In this study, the study population included community-dwelling

older adults aged ≥ 65 who use SNS (LINE®, etc.) for daily communication in Gunma Prefecture. Information on leisure activities was exchanged for a certain period within the SNS group created based on the interests of the participants. This study examined the effects of older adults' motivation and life satisfaction.

Study Design and Participants

In this study, a survey was conducted before and after the implementation of the program, and the effect of the program was examined. The participants were community-dwelling older adults aged ≥ 65 years who attended a welfare center for older adults in Gunma and used SNS (LINE®, etc.) for daily communication. Twenty-two people (aged 76.2 ± 5.6 years) who expressed their willingness to participate in the study were recruited for 1 month through publicity at the facility and briefing sessions by researchers. Elderly welfare centers are defined based on the Elderly Welfare Law and are operated by municipalities or is a public social welfare facility that is comprehensively providing facilities for promoting health, improving education, and recreation. In addition, permission has been obtained from LINE Corporation for the use their company's name in this study.

ICT Utilization Programs

1) Implementation period and frequency

In principle, the program was held on weekdays from 8:00 am to 6:00 pm. It was conducted for 1 month, from October 2021 to December 2021 in each group.

2) Program overview (Table 1)

Researchers created groups on SNS (LINE®) based on the interests and concerns provided at the time of registration. In the video about participating in the study, we included an explanation about using SNS and all participants take the course on their smartphones. Participants who agreed to the contents of this study and SNS use created an account. The program was conducted face-to-face at the facility where participants were recruited, and the researchers and volunteer staff accompanied the researchers to support the operation.

| Term | Groups | Group composition (number people) | | Basic Program | | | | Information exchange menu |
|------|-------------------|-----------------------------------|--------|---|---|---|--|--|
| | | participants | Staffe | 1st week | 2nd week | 3rd week | 4th week | |
| 1st | 1 Gardening Caf? | 6 | 5 | S e l f - introduction | Introduction of activities at the elderly W e l f a r e centers | Experience of video call Introduction of Gunma prefecture HP | Introduction of Gunma Occupational Therapist Association | Cooking recipe Crops |
| | 2 Art | 5 | 3 | | | | | Art exhibition Landscape painting Art work |
| | 3 Entertainment | 3 | 5 | Introduction of habbies | Introduction to home to post photos | Introduction of university classes | photo of travel destination Climbing information | |
| | 4 Exercise | 4 | 5 | Frailty prevention Exercise crass | | | | |
| | 5 Handicraft | 3 | 3 | handicraft work | | | | |
| 2nd | 6 Gardening Caf? | 3 | 5 | Experince photo posting (w o r k , location, etc.) | Instructions on how to post video | Introduction of the Gunma regional rehabilitation support center HP | O n e - p o i n t a d v i c e for health promotion | Cooking recipe Crops |
| | 7 Reading History | 3 | 3 | | | | | Temple tour |
| | 8 Dance Music | 3 | 6 | | | | | Frailty prevention Nursing care recreation |

Table 1. Group composition and program overview

Gunma Occupational Therapist Association: A nonprofit organization operated by prefectural occupational therapists as members. They also disseminate information useful for health to the general public.

Gunma Regional Rehabilitation Support Center: A nonprofit organization consisting of rehabilitation professionals. It functions as a point of contact for the introduction of specialists to municipalities.

After the recruitment period, based on the responses of the participants on the questionnaires, we formed SNS groups so that participants with similar interests could exchange information. The researchers invited the participants to an organized SNS group. Participants joined organized groups and introduced themselves to the group members. Thereafter, the participants exchanged information on daily activity records and leisure activities for 1 month. As a means of information exchange, “send texts,” “post photos,” and “information on sources of information (URLs, etc.)” were performed.

All these tasks were performed remotely, and researchers and volunteer staff acted as moderators of the SNS group.

Survey item

1. Basic survey items

During the first period (hereafter referred to as pre), we conducted a questionnaire survey using the web method. The items collected were sex, age, and interests 5). Regarding the status of ICT utilization, we investigated the frequency of use, devices used, etc., by referring to literature (Table 2).

| | Index | Pre (n=22) | Pos(n=12) |
|--|--|------------|-----------|
| Age | mean±SD | 76.1±5.6 | 76.5±4.9 |
| Gender | Male | 11 | 7 |
| | Female | 11 | 5 |
| Devices that use the Internet (multiple answers allowed) | Smartphone | 20 | 9 |
| | Personalcomputer | 6 | 4 |
| | Tablet terminal | 0 | 0 |
| Frequency of use | At least once daily | 17 | 9 |
| | At least once a week | 4 | 3 |
| | At least once a month | 0 | 0 |
| | Less frequently (once a year) | 1 | 0 |
| Purpose of using the Internet | Communication and information exchange | 14 | 7 |
| | Access to information | 9 | 5 |
| | Transmission of information | 1 | 1 |
| | Community participation | 5 | 3 |
| | Use of government/ municipalities | 1 | 1 |
| | Purchasing goods and services | 7 | 4 |
| | Obtaining and listening to digital content | 5 | 2 |
| | Financial transactions | 4 | 4 |
| | Quiz, questionnaire answer | 2 | 1 |
| | Participating in online games | 1 | 0 |
| | Correspondence course | 0 | 0 |
| | Telework | 0 | 0 |
| | Job change | 0 | 0 |

Table 2. Basic attributes and ICT utilization status

2. Outcomes

At the time of pre- and final measurements (hereafter referred to as post), each measurement was performed, and researchers and cooperating staff assisted as necessary. Health-related QOL was measured using the WHO-5 [6]. To explore the effects of the program on behavioral change, we also investigated anxiety on device use, impressions of the program, desire to continue the program, and sense of burden of the program.

Statistical Analysis

The values of the questionnaire survey were simply tabulated, and the Wilcoxon signed-rank sum test was performed to compare the mean values. IBM SPSS for Windows, version 22, was used for data analysis.

Ethical Consideration

This study was approved by the Gunma University of Health and

Welfare Research Ethics Review Committee (approval no. 20A-15) and was conducted in accordance with the guidelines. The purpose of the study was explained to the participants in writing, and they signed the consent form.

Results (Review of literature)

1. Analysis target and participation rate

The participants were assigned to eight groups in a survey over two periods (first period: 2021.11.1–11.30; second period: 2021.11.15–12.15) (Table 1). Of all the participants, 10 were lost to follow-up and did not participate in the final evaluation. Twelve participants with no missing values were included in the final analysis, and their mean age was 76.5 ± 4.9 years (Table 1).

Regarding the method of participation and frequency of participation, some frequently post articles that match the content of the weekly program, whereas others post only their self-introductions and then read articles posted by others.

2. Examining outcomes

When the effect measurement values were compared before and after the program, a significant difference was observed in the WHO-5 total score and anxiety using a device. WHO-5 was significantly higher after the program (19.2 ± 2.5 points) than before the program (14.2 ± 2.2 points) ($p = 0.003$, $d = 2.03$) (Table 3). Anxiety about device use tended to be lower after the program (1.5 ± 0.5) than before the program (1.9 ± 0.4) ($p = 0.102$, $d = 0.666$). The burden (relative to the number of participants) felt for participating in the program was neither (50.0%), very easy (16.6%), easy (16.6%),

difficult (16.6%), or very difficult (0%). The desire to continue participating in the program (percentage of participants) was based on response ratios for hope (33.3%), strong hope (25.0%), neither (25.0%), not much hope (8.3%), and not at all (0%). Regarding impressions after the program, there were positive comments such as “I was looking forward to seeing others’ posts” and “I was able to broaden my horizons.” Negative comments include “I feel intimidated to converse with people I had never met before” and “I enjoy reading posts, but I’m not good at replying.”

| Outcome | Index | Pre | Pos | p value | d |
|---------------|-------------|----------------|----------------|---------|-------|
| W H O-5 | Feeling | 3.5 ± 0.8 | 4.1 ± 0.8 | 0.070 | 0.750 |
| | Relax | 3.9 ± 0.6 | 4.0 ± 0.3 | 0.480 | 0.192 |
| | Motivation | 3.5 ± 1.0 | 3.4 ± 1.1 | 0.666 | 0.094 |
| | Rest | 3.4 ± 1.2 | 3.8 ± 0.7 | 0.319 | 0.383 |
| | Interest | 3.4 ± 1.0 | 3.7 ± 1.1 | 0.336 | 0.284 |
| | total score | 14.2 ± 2.2 | 19.2 ± 2.5 | 0.003 | 2.114 |
| Equipment use | Anxiety | 1.9 ± 0.6 | 1.5 ± 0.6 | 0.102 | 0.666 |

Table 3. Comparison of outcomes before and after the program.
Wilcoxon signed rank sum test

Discussion

1. Status of ICT utilization by program participants

The study participants were community-dwelling older adults aged >65 years who use SNS (LINE®, etc.) for daily communication. A large-scale survey of ICT use using sociodemographic variables indicates that most ICT users use the Internet for communication [7]. In this study, many participants used smartphones to communicate. In addition, a study reported using ICT to communicate and exchange information (chat), obtain information (health information and news), and obtain digital content (video), in this order [8]. The third most common purpose was purchase/transaction of goods/services, but the most common purpose of use was the same. This program adopted a method of grouping based on hobbies; as every participant had various hobbies, matching was possible. This finding supports the results of a study literature [9] showing a strong relationship between Internet use and leisure activities among older adults. In addition, ICT use is associated with an increase in clubs, volunteers, group activities, and volunteer activities, as the participants are highly motivated to engage in social activities, such as regularly participating in group activities at welfare centers for older adults [10].

2. Effects of this program

In this study, group exchange and program evaluation of SNS were conducted to verify the use of ICT by older adults. Since no one withdrew from the 1-month program, it appears that this program served as an opportunity for continuous participation. More than half of the participants answered that they had hopes or strongly hope that the program would continue after the survey, suggesting that the participants find the program satisfactory. In this study, after the staff provided a brief explanation at the time of registration, participants were asked to independently use the device while on SNS communication remotely. We had confirmed the possibility that the anxiety level about device use decreased before and after the 1-month program. This is thought to be due to the fact that, unlike smartphone classes in which students simply learn how to use devices, they could learn independently by trying to use the device themselves in real life even if they are struggling with the process. In addition, by providing a place for mutual learning, the older adults have a sense of security and motivation, and a study [11] reported that the digital divide has been eliminated and a positive effect

was observed. Furthermore, in WHOQOL5, an index of health-related QOL, the total score significantly improved before and after the program, suggesting that frequent use of LINE (both posting and checking) by older adults is associated with an improvement in happiness [12], and Internet use was associated with QOL [7]. Furthermore, the program of remote SNS communication was conducted for 1 month, but many of the respondents said that the program was not a burden. Thus, the content of the program was considered appropriate in terms of ease of participation.

3. Issues and prospects of this program

Although there were no dropouts, the SNS groups allowed active and passive participation. One of the reasons for this is that, as mentioned in the impressions of the program, the faces of the participants cannot be seen, and they do not know each other. On the contrary, some of them did not know how to use the device, such as posting. As a solution, participants should be introduced enough during registration so that they would get to know each other, and they should practice basic SNS communication operations until they have mastered them before moving to a remote program. Furthermore, at this time, we used the SNS app LINE, which is assumed to be used as a means of daily communication by older adults living in the community, including the participants, and verified whether it served as a conversation tool for older adults. In previous research, to increase ICT use by older adults, we developed an online platform and introduced devices, focused on ease of use for participants, and developed and modified the platform to enable interactive communication [13]. Although we set the topic of interaction as leisure activities as an element of enjoyment, some participants could not be active because the content of the interaction was mainly text and photo postings. Regarding this, it may be good to consider a mechanism such as interactive communication using game elements, as in a previous study [14]. We analyzed the following factors in relation to the ICT use by older adults. In addition to basic attributes such as age and sex, social participation and leisure activities focused on this time, health literacy, digital skills, social networks, educational level, cultural engagement, memory, executive function, social engagement, marital status, sociodemographic, and socioeconomic indicators such as monthly income and home ownership are cited as factors affecting ICT use [7,8,14]. We would like to examine the relationship with other indicators in the future.

This study suggested that the frequency of device use by older adults is related to their anxiety about device use and life satisfaction. In addition, it was confirmed that QOL improved by participating in the ICT utilization program. Although older adults feel the necessity of being online daily, they would have few opportunities to learn how to use it or they do not know how to use it. The style of learning how to use a device is related to motivation for participation and satisfaction. Despite the abovementioned problems, this study is significant because there are very few similar reports.

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