



## Full length article

# The attitudes, impact, and learning needs of older adults using apps on touchscreen mobile devices: Results from a pilot study



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## ARTICLE INFO

## Article history:

Received 10 June 2015

Received in revised form

11 April 2016

Accepted 8 May 2016

## Keywords:

Touchscreen mobile device

Mobile applications (apps)

Older adults

Technology acceptance model

Diffusion of innovation theory

Mixed-method approach

## ABSTRACT

Despite the proliferation in understanding older adults' acceptance and limitations of Internet technology, the learning needs of older adults living in low Internet usage areas and their acceptance of touchscreen-based apps have lagged behind. This study describes an embedded mixed-method research evaluation of an eight-week touchscreen mobile device training for thirty-nine older adults who were recruited from a community center in a low Internet usage area in southern Taiwan. Among the participants, 20 completed both the pre-test and the post-test and 16 attended the focus group interviews. The design of the training course was based on constructs informed by the diffusion of innovation theory and the technology acceptance model, and it incorporated both a classroom-based and small group tutoring approach. After the training session, the participants reported significantly lower depressive symptom scores compared to baseline. Qualitative interviews reveal the participants' learning needs related to extended practice, usefulness, and compatibility in adopting touch-screen apps. Findings from this study shed light on the possibility of touchscreen-based apps, including health-, entertainment-, transportation-, and social media-related apps, for improving psychological well-being in older adults with limited Internet experience living in the community. Discussion on their learning needs was also provided.

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## 1. Introduction

The progression of technology, in particular mobile technology, offers an opportunity to strengthen the quality of life of older adults in several ways (Carpenter & Buday, 2007; Chen & Persson, 2002; White et al. 2002). An increasing number of quasi-experimental studies have shown that computer use and Internet training may improve older adults' psychosocial well-being (Cotten, Ford, Ford, & Hale, 2012, 2014; Shapira, Barak, & Gal, 2007; White et al. 1999).

Despite the potential positive psychological impact the Internet may have on older adults, a lag in technology adoption by older adults has remained. Compared with 60.2% of older adults who use the Internet in the United States (Le, Chaudhuri, White, Thompson,

& Demiris, 2014), only 32% of older adults use the Internet in Taiwan (Chiu, Hu, & Yu, 2014). With the development of touchscreen technology such as smartphones and tablets, which might eliminate problems with operating computer devices, various useful and handy applications (apps) are now running on smartphones with touchscreens. Because older adults may want to, for example, enhance their bond with their children via social network apps, since the younger generation is keen on using them (Zhou, Rau, & Salvendy, 2014), it is imperative to address the attitudes, impacts, and learning needs of older adults who have only limited Internet experiences.

Previous findings have implied that healthcare smartphone apps may improve patients' health management among older adults (Boulos, Wheeler, Tavares, & Jones, 2011; Grindrod et al. 2014). However, to the best of our knowledge, there has been less research focused on the influence of other types of apps (such as entertainment and communication apps) on older adults' physical/psychological well-being. The majority of existing outcome studies

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on older adults learning about touchscreen technology have been conducted in pure research settings, in the context of testing a highly scripted model targeted at a homogeneous group of older adults (Zhou et al. 2014). Intervention research is needed that focuses on older adults who are learning how to use touchscreen technology in the real world and that describes their learning needs when they have difficulty. The study of an apps-based touchscreen device training course can serve as an important source of information regarding how best to design and disseminate it within the gerontechnology ecosystem.

In this study, we introduced an eight-week training course to middle-aged and older adults in a low Internet usage area, where lower Internet use experiences comparing to the other areas in Taiwan was reported (Chiu et al. 2014). The training course was designed based on two theories—the diffusion of innovation (DOI) theory and the technology acceptance model (TAM). The DOI theory (Rogers, 2010) highlights the importance of individuals' beliefs about technology and the perception of need in determining the adoption of new technologies (Atkin, Jeffres, & Neuendorf, 1998; McCloskey, 2006; Mitzner et al. 2010). The perception of need can be seen as the idea that individuals think that technology can be a part of their lives, which also echoes the concept of usefulness in the TAM. Thus, we selected apps that would be useful to older adults in their daily lives for the training course. To mitigate the barriers to and complexity of adopting touchscreen devices and apps, we provided tablets with pre-installed apps and designed the course to be as simple as possible (Pan & Jordan-Marsh, 2010). Using an embedded mixed-method research approach, including one group pre-test/post-test and six focus group interviews, the current study examined the learning needs and changes in attitude and psychological well-being following the training course in a sample of older adults with or without previous Internet experience and with a heterogeneous sociodemographic background.

## 2. Method

### 2.1. Design overview

We conducted an eight-week apps-based training course for older adults in a community. A mixed-method approach with an embedded design was used to explore whether this training course could foster changes in attitude in this innovative area (i.e., Internet use and applications on a touchscreen device) and further benefit older adults' psychological well-being. The research protocol was approved by the Institutional Review Board (IRB) prior to the initiation of the study.

### 2.2. Setting and participants

The participants were recruited from a community via flyers. Thirty-nine older adults (25 women, 14 men), aged 50 or over, signed up for the training course. After an information session that introduced the study, the participants signed an informed consent form to participate in the following eight weeks of training and to complete a baseline interview. Four participants refused to engage in the study and two participants were excluded due to illiteracy. One participant died before the study ended and two participants took part in the training sessions less than five times. Ten additional participants dropped out before the last session and did not complete the final survey. Thus, a total of 20 participants (51% of the initial 39 participants) completed the training course and the pre- and post-questionnaire that was used for statistical analysis. In addition, 16 participants agreed to be interviewed and six focus group interviews were conducted one month after the end of the training course.

Comparisons between the participants who declined to

participate or who withdrew from the study during the training course and those who participated in the entire course revealed that the participants who completed this study were more likely to be older than those who did not participate in or complete this study (mean age: 69.5 vs. 63.6,  $p < 0.05$ ). We did not find significant differences in attitudes toward Internet use or in physical or psychological well-being between the two groups.

### 2.3. Procedure

Enrollment in the study began in January 2014 and data collection, including a questionnaire and focus group interviews, was completed in July 2014. After the baseline interviews, the participants were asked to participate in an apps-based training course for the following eight weeks, with each session lasting 90 min. In addition, one month after the end of the training course, the participants were invited to join the focus group sessions to share their attitudes toward technology or their experiences with the Internet and applications they used.

### 2.4. Training course

According to the TAM (Pan & Jordan-Marsh, 2010), ease of use and usefulness play an important role in older adults' adoption of Internet technology. These concepts also correspond to the DOI theory (Rogers, 2010), emphasizing the importance of relative advantages, compatibility, complexity, triability, and observability in determining technology acceptance. We applied both the model and the theory in designing our training course. For example, we asked the participants to share their motivation and experiences for learning through or using the Internet, designed manuals to overcome memory problems, and introduced applications that related to their daily lives from a person-centered perspective. These approach enables the participants to see the potential advantages of using apps on the touchscreen devices in terms of compatibility and complexity.

In addition, previous research has indicated that high interaction courses (such as asking questions and discussing ideas), learning from similarly aged peers, and learning in small groups are all effective ways for older adults to learn new things; moreover, older adults tend to have self-directed learning needs (Cercone, 2008; Ference & Vockell, 1994; Kima & Merriam, 2004), requiring more time and practice (Morrell, Park, Mayhorn, & Kelley, 2000) and technical assistance when learning (Mayhorn, Stronge, McLaughlin, & Rogers, 2004; Xie & Bugg, 2009). Considering these learning needs, our apps-based training course was designed as a two-part session: classroom-based lectures and small group tutoring.

The classroom-based lectures were structured so that the participants could learn and practice together in the classroom on a common topic taught by two lecturers. Topics over the eight weeks covered basic tablet operation, an introduction of the applications on the android tablet, and the use of four different applications: entertainment (YouTube, games, camera, and photo editing); transportation (train schedules and maps); health (Internet Pre-registration System for clinic visits, medication reminders, short exercise films, and food security and nutrition information), and social media (Skype). Training manuals with step-by-step illustrations covering these topics were developed specifically for this study and distributed to each participant.

After each classroom-based lecture, there was about 30 min remaining to answer individual participants' questions and guide them in operating the tablet and the applications in small groups (each group consisted of one trainer and no more than two participants). A total of 12 trainers were recruited from college and graduate school. All of them were well versed in the use of the tablet, and they received 12 h of training on adult learning theories

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