Empowering Older Adults: Improving Senior Digital Literacy

Hyeon Jean Yoo
Auburn University

Abstract: As the world's population is more interconnected by the Internet and mobile devices, older adults are expected to use Internet-based services, such as education, health, finance, and even communication. Despite the recent research that an increasing number of older adults are embracing digital lives, they face unique challenges due to age-related changes. These unique barriers make it difficult for them to keep up with rapid technological advances. This study aims to explain the 7-weeks of an introductory course that was designed for older adults to enhance senior digital literacy. This study highlights the importance of creating a quality learning environment for older adults in leading more productive and enjoyable lives with mobile devices.

Keywords: older adults, mobile devices, digital literacy, technology course

Mobile device usage is one of the fastest-growing technological fields ever. In the United States, about 81% of people own a smartphone now, and about one-in-five people access the Internet solely via their smartphones instead of having traditional home broadband service (Pew Research Center, 2019). Digital technology has become a key component to fully participate in society, and it can also be a powerful empowering tool for older adults, such as helping them to maintain their independence, access information easily, and stay connected with their family and friends (Hardill & Olphert, 2012). The connection and communication using mobile devices can be especially significant for older adults living alone or who have limited mobility. Knowing how to use mobile devices got even more prominent for older adults to connect with society during the social isolation period.

This paper focuses on explaining important factors that need to be considered when developing a course for older adults in helping them improve digital literacy and increase confidence in using touch-screen mobile devices. Detailing a 7-week course that was designed for older adults to enhance digital literacy, this paper aims to propose a teaching format that would guide instructors who would be interested in creating a technology course for older adults. In this paper, we discussed the structure of the course and instructional materials provided for the participants, with suggestions and future implications of the digital literacy course.

Literature Review

Mobile devices can be an effective means to enhance the quality of older adults' lives (Tsai et al., 2017). Pimentel et al. (2016) found using mobile devices has a positive effect on older adults supporting their independence, entertainment, leisure, learning new repertoire, and cognitive activity improvement. Mobile devices were also reported to assist older adults in connecting with their family members and friends (Chan & Chan, 2014), supporting health and well-being (Blake, 2008), managing declining mental capacity (Klimova & Valis, 2018), and accessing health and social service information (Tsai et al., 2017). Mobile devices can help older adults

remember important schedules or health-related information as well as entertain themselves with fun and stimulating games (Leung et al., 2010).

Despite the considerable potential of mobile devices in improving the quality of life among older adults, they often face difficulties in learning new technologies and may need more training (Mitzner et al., 2008). These difficulties include a range of physical, cognitive, perceptual, and psychological issues, which are often associated with aging (Fletcher & Jensen, 2015). For example, older adults spend more time on tasks accompanied by errors and detours when learning a new technology due to a decline in motor skills (Ziefle & Bay, 2005). In addition to physical and cognitive changes, they often have low self-efficacy and confidence in learning a new technology (Czaja et al., 2006). These negative emotions may be the result of less experience in using mobile technology (Leung et al., 2012). Associated with less experience, older adults are more negatively affected by errors, which often occurs when learning a new technology (Leung et al., 2012). In sum, due to age-related characteristics, older adults may require special support when learning how to use mobile devices (Chen & Chan, 2014).

Research suggests that older adults can benefit from receiving some type of training in learning new technologies (Chao et al., 2020; Mitzner, 2008; Pimentel, 2016). In their eight-week classes with 40 participants, Chao et al. (2020) summarized suggestions for developing mobile and tablet courses for older adults, including the following:

- Design of curriculum linked to real-life situations
- Gathering participants' information, such as experiences and IT literacy prior to the instruction
- Group participants to have a mix of student abilities
- Having teaching assistance
- Adopting relevant learning aids to teach older adults
- Repeated reminders and reviews help improve older adults' learning
- A slower teaching pace
- Using handouts can help ease older adults' fear of learning
- Cut teaching objectives into smaller tasks to provide participants with a sense of accomplishment in learning

To enhance digital literacy among older adults, we need to understand the challenges in learning mobile devices and their learning processes to provide an environment that supports learning. This research highlights the importance of creating a positive learning environment and supportive materials for older adults in improving digital literacy, especially focusing on learning how to use smart mobile devices, such as smartphones or tablets.

Course Description

This section discusses an overview of the digital literacy course developed for older adults, including the settings and environment of the classroom, a conceptual framework and course structure, and topics discussed in each session.

Course Overview & Setting

This course was developed to help older adults learn about their mobile devices and become more confident in navigating mobile devices. The main goal of this course was to help older adults 1) increase senior digital literacy, 2) learn how to use their mobile devices and apps, 3) stay connected with family members, friends, and communities, 4) become a savvy information consumer. Participants were asked to bring their own devices for the course so that they can learn how to use their mobile devices in their daily lives and practice outside the classroom. We provided a seven-week course with 85 minutes per week. The participants were those who attend a local community center in a medium-sized city located in a southeastern state, which offers member-centered programs for adults 50 years and older. Twenty people, aged between 64 and 86, enrolled in this class.

The class took place in a small room that included wireless Internet access, a wide-screen monitor, a whiteboard, an Apple TV, a connector, desks, and chairs that can accommodate approximately 20 people. Inside the building, there were a restroom and a kitchen close to the classroom with refreshments. The participants had 5 minutes of break time during class hours.

Conceptual Framework and Course Structure

The conceptual framework that guided the course was a senior technology acceptance model (STAM; Chen & Chan, 2014). A STAM is an adapted model of a technology acceptance model (TAM; Davis, 1989; Bagozzi, Davis, & Warshaw, 1992), which is an information system theory that aims to predict technology acceptance and usage behavior. According to the TAM, how users come to accept and use technology are influenced by perceived usefulness (PU) and perceived ease of use (PEOU). PU is described as the extent to which a person perceives the particular technology would be useful for what they want to do. PEOU is related to the extent to which a person believes that using a particular system would be free from effort (Davis, 1989).

The STAM takes into account the age-related health and ability factors, considering that the older adults experience multiple changes related to aging, including physiological and psychological abilities. It suggests that older adults are more prone to learn and use new technology when they consider such technology to be useful and relatively easy to use (Chen & Chan, 2014). Moreover, higher levels of self-efficacy and confidence are significant factors that lead to usage behavior, suggesting that older adults learn better when instructors provide a relaxed and comfortable environment to learn new technology while lowering anxiety levels.

Considering that psychological factors play an important role in learning a new device, we aimed to create a friendly learning environment and divided the learning tasks into small units so that participants can easily digest. We also asked the participants to share their motivation and experiences of using their mobile devices on the first day of the class to develop specific course goals and detailed content that participants would benefit from using in their daily lives.

Age-related characteristics were also taken into consideration when structuring the course. Due to the decline in touch sensitivity and psychomotor performance (Fletcher & Jensen, 2015), older adults may have difficulty in performing accurate and discrete movements, such as tapping

buttons or small icons, which are crucial in using touch-screen mobile devices. They may make many mistakes and errors while navigating their mobile devices, which may increase their anxiety levels as a result. Therefore, our course materials focused on guiding learners to perform the tasks successfully, assisting in a positive and encouraging manner.

In addition, older adults may need more time and require patience in processing information due to a decline in cognitive abilities (Tenneti et al., 2012). They are likely to experience more difficulty in understanding new technology and are slower in acquiring new skills than younger adults (Chen & Chan, 2014). Therefore, we gave sufficient time for the participants to learn a new function and provided a detailed process to complete the task. Previous research suggested that older adults learn better when they are provided with printed materials (Chao, 2020; Leung et al., 2012), so we prepared written materials for the participants. Those handouts included the general topic for the week, specific tasks, and step-by-step procedures to complete the particular task. The handouts were also shared through emails and a virtual group webpage so that anyone who missed the class can review and practice at home. Moreover, as social interaction was a crucial part of our goal, we created the learning tasks so that participants can interact with others and learn from peers (Chen & Chan, 2014).

A previous study pointed out that older adults learn better when individual learning is supported (Leung et al., 2012). Therefore, our course was designed as a two-part session: classroom-based learning and individual support. After each classroom-based learning, the instructors stayed in the classroom for 10-20 minutes to answer individual participant's questions and guide them in operating the devices and the applications. During this time set, participants were allowed to ask any questions that pertain to using their mobile devices and applications, including issues that were not discussed during the classroom-based learning. Examples of individual assistance included organizing screen, deleting the apps, closing unwanted windows, and filtering advertisements on social media.

Course Content

The course content was developed based on a needs assessment conducted on the first day of the class. Participants were asked to share the motivation, challenges, and topics they would like to learn in this class. Information gathered was used to develop course topics and detailed learning content to enhance digital literacy. The final themes for this course were as follows:

- Mobile phone essentials, such as apps and settings
- Focus group discussions
- Voice control of mobile devices
- Using map apps
- Connecting with mobile social media apps
- Streaming media apps
- Photo and video apps

Each session included multiple small tasks that required participants to interact with other members in the classroom. These learning activities motivated older adults to stay mentally active and support others' learning as well, facilitating a positive attitude toward mobile technology.

Conclusions and Suggestions

Studies show that older adults may benefit from using mobile devices, but they also meet multiple challenges in learning new technology. Due to challenges that associate with aging, they may need assistance in learning how to navigate such devices. When developing a technology course for older adults, instructors need to consider the unique characteristics of older adults to provide a supportive learning environment. Conducting a needs analysis at the beginning of the course can be an important first step to understand the characteristics of participants in the class. Even though older adults often have limited experiences in mobile technology (Leung et al., 2012), individual experiences with mobile devices and their expectations for the class may be different. Understanding participants' preferences in learning will assist in developing desirable programs as learners would be more likely to actively engage in learning when it meets their preferences.

Moreover, previous studies indicated that older adults learn better in a positive learning environment (Chen & Chan, 2014). Due to many age-related challenges, creating a learning environment that can boost their confidence is crucial. Dissecting learning tasks into smaller tasks and having participants interact with similarly aged peers are good ways to lower technology anxiety (Chao et al., 2020). Older adults are particularly sensitive to making errors and often get overwhelmed in navigating small icons. Hence, instructors need to be patient and provide individual assistance to help them perform a task successfully. Using handouts with a detailed procedure to learn a new function can help reduce fears in learning (Chao et al., 2020). Moreover, hands-on activities during the classroom and individual assistance after the class can boost confidence and reinforce learning.

Course content should be related to improving the activities of daily living. Previous studies on senior technology suggest that older adults are more prone to use new technology when they know the potential benefits of learning new functions (Chen & Chan, 2014). Before going into details on how to perform a particular task, explaining how they might benefit from using it will increase motivation in learning. For instance, when delivering a class on voice-control functions in mobile devices, we explained that the participants could benefit from learning this function when they cannot touch the screen, such as driving or cooking. We also explained that they could avoid having errors in typing or navigating small icons as these are common causes of increased anxiety when using mobile devices. In addition to explaining the potential benefits, we provided ample examples of how to use this function in various situations.

Handouts can be especially helpful for older adults in assisting their declined working memory and memory span. Even though PowerPoint slides were the primary material in guiding the task during the class, print-out materials were provided every week so that participants can review and practice outside the classroom. As older adults have less experience in using mobile devices, a step-by-step process with pictures were included. To avoid confusion, any technical words were explained with definitions and examples.

Physical changes that come with aging need to be considered when designing a course for the aging population. Instructors need to understand the changes in vision and hearing abilities, adapting font sizes, colors, typeface, and line lengths on PowerPoint slides as well as controlling

the volume of voice and audio. A decline in motor skills and cognitive abilities will require instructors not to move too quickly in delivering the content. Having a pause between each step and wait for the participants to perform a task is suggested.

Limitation and Implication

The purpose of this study was to develop a suitable course on how to enhance digital literacy among older adults in the US. All the participants in this course had their own mobile devices and were members of a senior community center located in a southeastern state of the United States. Despite the use of a theoretical model in developing the course structure, quantitative data is not included as it is not our purpose to test the model but to suggest a teaching course for older adults. The results of this study highlight the importance of creating a quality learning environment for older adults in leading more productive and enjoyable lives with mobile devices.

Acknowledgment

I would like to extend my sincere thanks to Mike Akins, a co-instructor of a Basic Digital Literacy course, for all the support.

References

Bagozzi, R. P., Davis, F. D., & Warshaw, P. R. (1992). Development and test of a theory of technological learning and usage. *Human Relations, 45*(7), 660-686.

Blake, H. (2008). Innovation in practice: Mobile phone technology in patient care. *British Journal of Community Nursing, 13(*4),160-165.

Chao, J-Y., Kao, H-C., & Yeh, Y-H. (2020). Learning outcomes of mobile and tablet application courses for Taiwanese older adults. Recent *Development on Information and Communication Technology (ICT) Engineering*. https://doi.org/10.35745/icice2018v2.040

Chen, K., & Chan, A. H. S. (2014). Gerontechnology acceptance by Hong Kong Chinese: A senior technology acceptance model (STAM). *Ergonomics, 57*(5), 635-652.

Czaja, S. J., Charness, N., Fisk, A. D., Hertzog, C., Nair, S. N., Rogers, W. A., & Sharit, J. (2006). Factors predicting the use of technology: Findings from the Center for Research and Education on Aging and Technology Enhancement (CREATE). *Psychol Aging, 21*(2), 333-352.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340.

Fletcher, J., & Jensen, R. (2015). Mobile health: Barriers to mobile phone use in the aging population. *On-Line Journal of Nursing Informatics, 19*(3). https://www.himss.org/

Hardill, I., & Olphert, C. W. (2012). Staying connected: Exploring mobile phone use amongst older adults in the UK. *Geoforum, 43*(6), 1306–1312.

Klimova, B., & Valis, M. (2018). Smartphone applications can serve as effective cognitive training tools in healthy aging. *Frontiers in Aging Neuroscience, 9*(436), PMID 29379432. https://www.frontiersin.org/articles/10.3389/fnagi.2017.00436/full

Tenneti, R., D. Johnson, L. Goldenberg, R. A. Parker., & F. A. Huppert. (2012). Towards a capabilities database to inform inclusive design: Experimental investigation of effective

survey-based predictors of human-product interaction. *Applied Ergonomics, 43*(4), 713-726. https://doi.org/10.1016/j.apergo.2011.11.005.

Leung, R., Tang, C., Haddad, H., Mcgrenere, J., Graf, P., & Ingriany, V. (2012). How older adults learn to use mobile devices: Survey and field investigations. *ACM Transaction on Accessible Computing, 4*(3), 1-33.

Mitzner, T. L., Fausset, C. B., Boron, J. B., Adams, A. E., Dijkstra, K., Lee, C. C., Rogers, W., & Fisk, A. D. (2008, October 10). Older adults' training preferences for learning to use technology. [Paper presentation]. *Human Factors and Ergonomics Society 52th Annual Meeting, 52*(26), 2407–2051.

Pew Research Center. (2019). Mobile fact sheet: Mobile phone ownership over time. https://www.pewresearch.org/internet/fact-sheet/mobile/#smartphone-dependency-over-time

Pimental, M. G., da Cunha, B. C. R., Antonelli, H. L., Rodrigues, S. S., Machado Neto, O. J., Rocha, A., Merlo, E., Costa, A. R., Uscamayta, O. M., Rodrigues, K. R. H., & Zaine, I. (2016, December 1-3*). Enhancing older adults connectivity by introducing mobile devices communication tools* [Paper presentation]. 7th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-Exclusion, Vila, Real, Portugal. https://dl.acm.org/doi/10.1145/3019943.3019994

Tsai, H. S., Shillair, R., & Cotton, S. R. (2017). Social support and "playing around": An examination of how older adults acquire digital literacy with tablet computers. *Journal of Applied Gerontology, 36*(1), 29-55.

Ziefle, M., & Bay, S. (2005). How older adults meet complexity: Aging effects on the usability of different mobile devices. *Behaviour & Information Technology, 24*(5), 375-389. https://doi.org/10.1080/0144929042000320009