Article

Social Support and "Playing Around": An Examination of How Older Adults Acquire Digital Literacy With Tablet Computers

Hsin-yi Sandy Tsai[1], Ruth Shillair[2], and Shelia R. Cotten[2]

Abstract

This study examines how older adults learn to use tablet computers. Learning to use new technologies can help older adults to be included in today's digital society. However, learning to use new technologies is not always easy, especially for older adults. This study focuses on how older adults learn to use a specific technology, tablet computers, and the role that social support plays in this process. Data for this project are from 21 in-depth interviews with individuals who own tablet computers. We examine how older adults engage with tablet devices and increase their digital literacy. The findings suggest that, for older adults to start to use tablets, social support plays an important role. In addition, a key way that many participants report gaining expertise with the technology is through "playing around" with the tablets. Suggestions for how to help older adults learn to use new technologies are detailed.

[1]National Chiao Tung University, Hsinchu City, Taiwan
[2]Michigan State University, East Lansing, USA

Corresponding Author:
Hsin-yi Sandy Tsai, Department of Communication and Technology, National Chiao Tung University, No.1, Sec. 1, Liujia 5th Rd., Zhubei City, Hsinchu County 302, Taiwan.
Email: circles0309@gmail.com

Background: The Digital Divide and Older Adults

Older adults (aged 65 years and above) are the fastest growing population group according to the latest census report for the United States (Werner, 2011). Even though there have been some recent gains in technology use, older adults are still the group the least likely to have crossed the digital divide. They have the lowest adoption rates for using new technologies, such as the Internet (Cotten, 2011; File, 2013; National Telecommunications and Information Administration, 2013). For example, in 2014, the overall Internet adoption rate in the United States was 87%, while the adoption rate for people over 65 years old was only 57% (Pew Research Center, 2014). Early discussions on the digital divide focused on whether individuals had access to computers and the Internet. Overcoming this barrier, sometimes known as the first-level digital divide, that of having technology available to all sectors of society, has been a long-standing concern (Chinn & Fairlie, 2006; Hsieh, Rai, & Keil, 2008; Van Dijk & Hacker, 2003). Both community wide issues, such as providing infrastructure to have broadband access, and individual issues, such as limited financial ability to pay for access, have proven a challenge to overcome (Gordon, Moore, & Gordon, 2003; Hohlfeld, Ritzhaupt, & Barron, 2010). Even with these obstacles, major inroads have been made in helping more of the population to have the opportunity to access the Internet (E. Wong, 2011).

However, in addition to the first-level digital divide, that of access, there also exists a "second-level digital divide" which deals with issues of Internet skill and efficacy. This skill and efficacy with technology affects how much people can benefit from using the Internet (Yagil, Cohen, & Beer, 2013), for example, accessing health-related portals and websites (Taha, Sharit, & Czaja, 2014; Wong, Yeung, Ho, Tse, & Lam, 2012). Acquiring Internet skills, as basic elements of digital literacies, has been included in many policy initiatives in the United States (e.g., The National Telecommunications and Information Administration's Broadband Technology Opportunities Program [BTOP]). However, with an increasing number of people using mobile devices to access the Internet, the scope of digital literacy should extend to mobile devices (e.g., mobile phones and tablet computers). Nonetheless, little research has examined how to extend and help people, in particular older adults, to learn the digital literacy skills needed for using mobile devices.

Digital literacy has been widely studied and defined in various ways (e.g., Bawden, 2008; Gilster, 1997). According to Gilster (1997), digital literacy is

the ability to use and understand information from various digital devices. Thus, digital literacy for mobile devices can be operationalized as the ability to use and understand information from mobile devices. Older adults are frequently marginalized when it comes to digital inclusion as digital literacy has been negatively related to age. (Winstead et al., 2012; Yagil et al., 2013). This age group often faces numerous challenges in learning new technologies, especially when dealing with issues that arise because of changing physical or cognitive functions (Czaja & Sharit, 2012; Winstead et al., 2012). This sector of the population also has the highest rate of disabilities, making finding ways to increase digital literacy for this population even more of an issue for policy makers (Werner, 2011).

Technology interventions targeted to older adults who may need assistance using traditional computers face multiple challenges in helping older adults to achieve digital literacy. These problems include finding space to host the computers and training, while making sure that participants have room to move freely in these spaces with any assistive devices they may need to use. Furthermore, many older adults struggle with learning complex interface actions while they are learning new technological concepts (Jahn & Krems, 2013). Other issues include the need for training older adults who are not familiar with using computers and ongoing support for technological assistance, such as maintaining virus protection. All of these issues make overcoming the second-level digital divide using traditional computers seem an almost insurmountable task.

Are Tablet Computers the Answer?

With the advent of tablet computing devices, there is the potential to bridge the digital inclusion gap for older adults. Many types of tablet devices are relatively simple to use, with a growing variety of apps and websites that enable users to gain more affordances from their devices (Nielsen, 2011). Tablets do not require extensive space to set up and use; they are portable and can be utilized where the older adult feels most comfortable. As this technology is fairly new, little research addresses the actual process that older adults go through when they try to learn to use these devices (e.g., for an exception, see Tsai, Shillair, Cotten, Winstead, & Yost, 2015; Delello & McWhorter, 2015). By understanding how they learn, and the support systems needed to enhance this process, policy makers can develop programs or policies to help increase digital literacy and reduce the digital divide for older adults. The purpose of this study is to examine how older adults learn to use tablet computers. We use semi-structured interviews to provide a contextually grounded framework that allows the voices of the older adult tablet users to provide

illumination into their learning processes. Through this research, we hope to develop a better understanding of how to close the digital divide through improving digital literacy for older adults.

Digital Literacy and Older Adults

Benefits of Increasing Digital Literacy for Older Adults

Being able to use new technologies could help older adults to improve their quality of life (QoL) through improved access to information, such as health care materials and communication to maintain and enhance social ties. For example, the development of e-health systems, which reduce costs to both patients and the medical system, also makes health maintenance more efficient (Bauer, Thielke, Katon, Unützer, & Areán, 2014; Haederle, 2011). Besides, a major concern for older adults is a decline in the amount of interaction with other people (Chaffin & Harlow, 2005). When individuals retire, they lose the community of co-workers that they had previously interacted with on a daily basis. In addition, those experiencing declining mobility may have difficulty in getting out to visit with family and friends. Using information and communication technologies (ICTs) such as tablet computers or smart phones can allow users to make phone calls, texts, emails, Facetime, or Skype to maintain interactions with family. Close communication can help reduce loneliness, increase a sense of mattering, and encourage older adults to stay mentally and emotionally active, thereby improving QoL (Amichai-Hamburger & Schneider, 2014; Jongenelis et al., 2004). Past studies have found that using the Internet was linked with decreases in depression (Cotten, Ford, Ford, & Hale, 2012, 2014), loneliness (Karavidas, Lim, & Katsikas, 2005), and decreased health expenses as individuals are better able to actively participate in their care (Lansley, 2001; Mann, Ottenbacher, Fraas, Tomita, & Granger, 1999; Pavel, Jimison, Hayes, & Kaye, 2009). Therefore, encouraging the utilization of ICT devices to stay connected with others is important for this population to help maintain QoL.

Using the Internet could also slow down cognitive decline (Xavier et al., 2014). Using technology is a natural way to provide opportunities for cognitive stimulation (Czaja, Guerrier, Nair, & Landauer, 1993; Xavier et al., 2014). This includes games that can be played either individually or socially (Ijsselsteijn, Nap, de Kort, & Poels, 2007). Also, through the Internet there is a wide range of news, information, and even free college classes, such as massive open online college classes (Sanchez-Gordon & Luján-Mora, 2013; White, 2013). These opportunities for cognitive engagement also provide an increased "world size" and a perspective on one's own problems (Selwyn, 2004).

Challenges to Digital Literacy and Learning

There are many challenges to increasing digital literacy among older adults that go beyond the systematic issues just discussed. Older adults tend to have lower memory and self-efficacy, as well as needing more time to learn new materials (Czaja & Sharit, 2012; Haederle, 2011; World Health Organization [WHO], 2002). During aging, the speed of learning and memory frequently decreases (WHO, 2002). When learning to use technologies, such as computers, there are often multiple new skills being learned at one time; therefore, the learning process is very challenging (Merriam, Caffarella, & Baumgartner, 2007). However, these challenges do not preclude the desire to learn. Previous research found that the relationship between computer experiences and the attitudes toward using computers are similar for younger and older adults (Broady, Chan, & Caputi, 2010). Given enough time to learn to use a technology, older adults can still acquire the abilities and self-efficacy to use computers and other new technologies (Broady et al., 2010). For older learners to be motivated to learn, they need more reassurance and a clear link to practical daily applications (Chaffin & Harlow, 2005; Merriam et al., 2012). Also, educational levels and socio-economic status (SES) are major predictors of becoming digitally literate (Hsieh et al., 2008).

To see the potential benefits of technology adoption by increasing digital literacy among older adults, many obstacles need to be overcome. To better support digital inclusion, policy makers should understand the theoretical processes of technology adoption that are unique to this age group. To truly achieve digital literacy among this population, we need to understand the learning process and what can be done to provide an environment that supports exploration and discovery. Facilitating these conditions can help build bridges to increase digital literacy among older adults. This research is unique in that it looks at older adults and their experiences in expanding their digital literacy through adopting a new technology, the tablet computer.

Learning to Use New Technologies and Older Adults

This study uses the principles of grounded theory in using an inductive and iterative process to collect, analyze, and develop understanding through the perspectives and experiences of the subjects. One of the goals of this study was to understand the process and conditions that facilitate older adults learning to use new technologies. We believe it is important to understand the theoretical processes that appear to be at work in the process of older adults learning to use tablet devices. Therefore, we briefly review two theories/models that are frequently used in understanding this process, the senior technology acceptance and adoption model (STAM) and social cognitive theory (SCT).

The STAM (Renaud & Van Biljon, 2008) has been used to examine older adults' technology acceptance. By incorporating several technology adoption theories (technology acceptance model [TAM], the unified theory of acceptance and use of technology [UTAUT], and the mobile phone technology acceptance model [MOPTAM]), STAM uses three stages to explain older adults' technology acceptance: objectification, incorporation, and conversion/non-conversion. For older adults who have intention to use a technology to actually use it, having time for experimentation and feeling confident in exploration are important steps. During this process, "learning" or the incorporation step is a critical process. The ease of learning will determine their actual use (Barnard, Bradley, Hodgson, & Lloyd, 2013; Weilenmann, 2010). Having some conditions that can facilitate their learning and use, such as having enough social support, will help them accept a technology (Barnard et al., 2013). In addition to social support, having technology that is adaptable for the individual's special needs (e.g., the ability to zoom in for those with visual limitations or lightweight for those who quickly grow tired) can facilitate their learning process as well (Van Biljon & Renaud, 2008).

SCT (Bandura, 1977, 1994) emphasizes the interaction among personal factors, environmental factors, and behavior (see Wagner, Hassanein, & Head, 2010, for a review). Key to the learning process is support from environmental factors, which can include the support of family, friends, or those that are important to the individual's life. Personal factors include the individual's self-efficacy, desire to learn, adventurousness, or desire to explore. The behavior in this case would be the actual use of the new technology and becoming digitally literate (Bandura, 1977, 1978).

SCT also emphasizes the aspect of learning that occurs from observing others (Bandura, 1994, 2001). In addition, having positive expected outcomes is critical for a behavior to occur. For older adults to start the process of acquiring digital literacy, they need to see the personal benefits outweigh the relative effort and struggle to learn this new skill (Cody, Dunn, Hoppin, & Wendt, 1999). Past studies found that lacking "relevance" and "relative advantages" influence whether older adults use computers (Mitzner et al., 2010; Selwyn, Gorard, Furlong, & Madden, 2003). The fear of computers or other new technologies can stop them from using new technologies (Berkowsky, Cotten, Yost, & Winstead, 2013; Haederle, 2011). However, studies also showed that older adults would learn to use technology if they are given at least some opportunity (Cody et al., 1999; Winstead et al., 2012). SCT is widely used in understanding the learning process (Bandura, 1994, 2001; Compeau, Higgins, & Huff, 1999; Schunk, 1989). STAM is a relatively new model that normally looks at technology adoption for older adults (Renaud & Van Biljon, 2008). These theories are only used to help us explain

our findings and to frame the analyses. The main purpose of this study is not to test these theories. Instead, this exploratory study seeks to examine how older adult tablet users learned to use their tablets and key factors that affected their learning and use. Understanding this process should help professionals that work with older adults, as well as all those who want to help older adults, to facilitate this process. Based on this purpose, in-depth interviews were conducted. Details are provided in the next section.

Method

Method and Sample

During the progression of a large randomized controlled trial focused on determining whether training older adults in assisted and independent living communities ($N = 19$ communities; $N = 309$ participants) to use computers could improve their QoL, we noticed that several of the participants were acquiring tablet computers. We decided to examine tablet computer acquisition and use as a follow-up to the larger study, as this technology adoption was occurring during the course of the original study.

Invitations to participate in this research were extended to residents of several of the living communities in the aforementioned larger study. The requirement was that they had tablet computers. Activities directors also helped identify residents who had tablet computers. All of the participants were residents of independent living communities in a medium sized city in the Deep South region of the United States. A sample size was needed that would allow a variety of experiences and theoretical understanding, yet small enough to thoroughly examine and do a detailed analysis of the interviews. Given the relative homogeneity of the population (e.g., age contingent and living conditions) and the narrow focus of the interviews (e.g., experiences with technology and the process of acquiring as well as using tablets), a minimum sample of 20 was determined acceptable (Sandelowski, 1995). The resulting sample was a convenience sample gathered from the larger, longitudinal study on the impacts of technology on older adults.

As the process by which older adults use to gain digital literacy through tablet devices is relatively unknown, a qualitative method was chosen to better understand this process. Semi-structured interviews were used to allow participants the opportunity to fully express their experience and give researchers the best opportunity to gain insight into understanding how older adults learn to use tablets and the resources needed for this to occur. Twenty-one in-depth interviews were conducted with individuals aged 65 and older who reported owning tablet computers. Most of the interviews were done individually, even if a spouse was

interviewed. A few of the interviews were of the couple together, but these were coded as individuals and noted in Table 1. Subjects were paid US$20 for their time and most of the interviews lasted approximately half an hour.

A range of questions were asked during the interviews. Participants were encouraged to freely share their experiences to allow them to express their motivations in adapting tablets.

However, for the purpose of this research, we focus on comments that specifically dealt with (a) How these older adults learned to use their tablet computers, and (b) What support systems did the older adults have as they were learning how to use their tablet computers. For example, participants were asked about any computer experience they had prior to owning and using tablet. They were also asked to tell us about how they learned to use their tablet computer(s). Questions we asked also included "Did someone teach you or did you learn on your own?" "Did you use any online/video tutorials?" and "Has it been easy or difficult to learn to use the tablet computer?" These questions, although not specifically designed to test SCT or STAM, deal with issues that are core to these concepts. Experiential and observational learning, as well as environmental support are foundational to SCT. In STAM, the usability or "ease of use" and the ability to explore the technology are key to adoption and active use, in this case, acquiring digital literacy.

Data Analysis

Interviews were examined for themes that showed their acquisition of the devices, resources, and support in learning, as well as personal strategies for learning to use the devices. A codebook was developed based on these themes. For example, for device acquisition, two categories were included: (a) got it from others, and (b) bought it. For resources and support, four categories were included: (a) has support from family, (b) from professionals, (c) from peers, and (d) has no support. For personal strategies, four categories were included: (a) use online tutorials, (b) self-learning, (c) used books, and (d) went to class or Apple Genius. Two individuals coded a sample of the transcripts independently. Inter-coder agreement on coding samples was .84 (84%) and the Cohen's Kappa was .68 before proceeding to code all of the interviews. Pseudonyms are used to protect the privacy of the individuals interviewed.

Results

Sample Characteristics

Twenty-one older adults aged 69 to 91 years old participated in this study. Nine of them were male and 12 were female. Most of the participants used

Table 1. Participants.

Name (Pseudonym)	Gender	Age (when known)	Marital status (when known)	Previous occupation (when known)	Type of device	Method of acquisition
Anna	F				iPad	Bought
Bernie	M				iPad	Bought
Bill	M	90		Submarine commander	iPad	Gift
Carol	F	70s	Married		iPad (and a Kindle for reading)	Bought
Connie	F	77			Kindle Fire	Bought
Dan	M	81		Computer programmer/ engineer	iPad	Gift
Elsa	F				iPad	Bought
Emma	F	75			iPad	Gift
Esther	F	82		Head of a senior center	iPad	Gift
Fred	M	84	Married to Irene		Mini iPad (had a Kindle before)	Bought
George	M				iPad	Bought
Grace	F			Retired legal secretary	iPad	Gift
Harold	M		Married		iPad (had a Kindle before)	Bought
Henry	M	95	Married		iPad (and a Kindle for reading)	Gift

Table 1. (continued)

Name (Pseudonym)	Gender	Age (when known)	Marital status (when known)	Previous occupation (when known)	Type of device	Method of acquisition
Irene	F	86	Married to Fred		Mini iPad	Gift
Laura	F	72	Widowed		Kindle Fire	Bought (bought additional ones as gifts for others)
Martha	F		Married	Nursing instructor	iPad	Gift
Mary	F	89			iPad	Bought
Sam	M	90	Widowed	Pilot	iPad	Bought (bought additional ones as gifts for others)
Sarah	F	69	Married	Finance	iPad	Bought (bought additional ones as gifts for others)
Walt	M				Kindle Fire	Bought

iPads (81%): 15 used full sized iPads and 2 used iPad minis. Four of them (19%) used Kindle Fire. The facilities where the residents lived required an income of at least middle class or upper-middle-class backgrounds. Questions about income were not specifically asked. Many of them discussed their age or professional background, and these results are in Table 1.

The Learning Process and Predisposition

Three areas of personal factors were readily apparent in the learning process; these areas included the participant's attitudes toward novelty, their previous experiences with computers, and their physical limitations. The willingness to try new things seemed to heavily influence the acquisition of the tablet devices, which is the first step of the learning process. Sixty-two percent (*n* = 13) purchased the tablets for themselves (see Figure 1). The stated reasons for their purchase varied widely. Some of them saw the tablets as good for entertaining themselves. Fred[1] (84 years old) said that he got his iPad mini because, "I buy all the new toys." He was very comfortable with his technology: "I have a desktop, a laptop, an iPod Touch, phones and this I knew would be far superior in terms of ease of using it." He was a good example of the participants who were quite knowledgeable and loved trying new things. Others purchased the tablet not just for entertainment, but because they like to stay current with others. Sam, a former pilot, who is 90 years old, said,

> I just wanted to spend money and entertain myself . . . I have been on airplanes as a passenger sitting near [those] that have them and they just seem to be having a ball, and I'm sitting there dumb and wanted to do it so that's really why I bought it.

Some of the participants (38%, *n* = 8) received the tablets as gifts (see Figure 1). Most of the devices were greatly appreciated from the start, but others were received with initial hesitance. The cognitive cost of having to learn a new technology was one factor. Bill, a former submarine commander and now 90 years old, said, "I have enough trouble with my computer without worrying about an iPad." Others were hesitant to get the devices because they were worried about the financial cost. Grace, a retired legal secretary, said, "I had seen hers [a daughter's], but I felt it was too expensive. I didn't need it, but they gave it to me anyway." However, despite these initial hesitations, both of them came to appreciate their devices. Grace said, "I've gotten hooked on Facebook, I play games on it, and I look up things, and I read my emails on it, it'll just do everything." Bill said,

> You know my granddaughter . . . put something on it, Facebook. I can check in about 30 seconds, you know. Whereas if I got to get on the computer, I've got to warm it up, get it up, it takes 10 minutes before you can see anything.
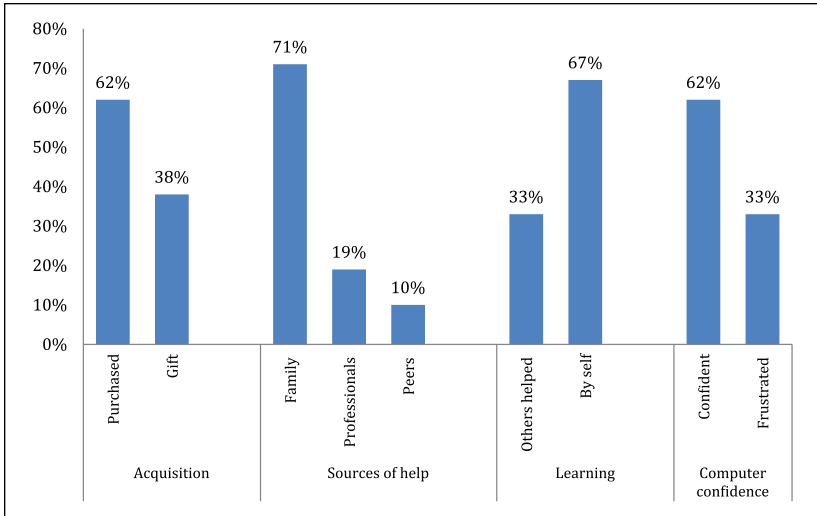
Figure 1. Descriptive results.

All of these participants had used computers before. Thirteen (62%) mentioned they were confident or comfortable with using a computer, while 7 (33%) people mentioned they either did not have confidence, or were frustrated when using a computer. Martha, a retired nursing instructor, mentioned that her initial experience was one of frustration,

> It's not difficult [now] . . . I was for a long time intimidated by the computer and my husband just kept encouraging me. I enjoy it. I used to get very frustrated in the beginning. I would really get upset and stopped.

Some of the participants had grown used to computers but still had mixed feelings toward them. Elsa mentioned, "Well if you know, when we first had to learn to use the desktop, of course that was more difficult, but [compared to] our level of usage now it was not that difficult." Esther, an 82-year-old woman who was formerly the head of a senior center, when talking about her desktop computer, said,

> I was comfortable with the few things I knew how to do, but I was afraid to . . . I was afraid to play with it. Afraid I'd [break it] because every time I did anything, I'd screw up and so . . . it was just really frustrating.

This previous frustration level with traditional computers seemed to make several of them somewhat hesitant to try the new devices. Surprisingly, many

of the participants who said they were confident in using computers, only used theirs for minimal functions, such as reading email. They mentioned the long wait to load up the computer and need to sit at a desk as being a barrier to use. They frequently discussed the comfort of using a tablet device, being able to sit in a comfortable chair rather than a desk. This comfort allowed them to explore new uses for technology and truly use the devices for many purposes.

Almost all of these older adults (90%, *n* = 19) found it easy to learn to use tablets. Despite whatever their attitude toward computers, they discussed how they felt comfortable with the tablets and were able to use them for more true functionality than they had with computers. This degree of comfort allowed them to actively perform more functions and increase the ways in which they used technology.

For those who had certain physical limitations, the tablets were readily adopted. These devices were seen as a way to comfortably continue participating in beloved activities, such as reading books. The tablets were also preferred to using laptop or desktop computers. Sarah, who is 69 years old and formerly worked in finance, said,

> Because I have trouble with my arthritis in my hands so I can't hold a big book, so my books are on my iPad . . . even your laptop has to be plugged in and it is big and bulky to take into the living room and sit, that is why I like it better.

Several other participants also mentioned that they preferred using the tablets because they were able to sit somewhere comfortable and the tablets were lightweight and easy to hold. These affordances not only helped those with arthritis or mobility issues, it helped those with weakening muscle tone. The tablets were also seen as helpful for those with visual limitations. Walt, who owned a Kindle Fire, said,

> I have macular degeneration and if I try to read regular print my eyes get very tired. With the Kindle I can enlarge the print . . . [it] is small enough I can carry it around easily, you know, to doctor's appointments.

The ability to scale the font for easy reading was frequently mentioned as a feature that the participants enjoyed. This scalability was helpful for those with even relatively minor vision issues such as presbyopia.

However, some of the participants had physical limitations that hindered the use of tablet devices. This primarily pertained to fine motor control and using the touch screens. Seven of the participants (33%) mentioned that they had trouble with the sensitivity of the touch screen.

Fred summarized many of their comments well when he said,

Sometimes, the sensitivity of the touch is a little bit much with clumsy fingers. I have little tremors . . . that's the thing I like the least about [it]. I think the hardest thing was to make sure you don't touch something you don't want.

This is an issue of concern, as one of the features that makes tablets desirable—the touch screen interface—also causes an issue that makes the devices somewhat limited in increasing digital literacy for older adults with fine motor control issues. If a subject has difficulty using the touch screen, or using a graphical interface, then the range of use will be limited to activities that the users are able to comfortably accomplish (e.g., reading an e-book or reading email).

The Learning Process and Social Support

Environmental support factors had a strong influence on the participants' initial adoption and learning process. These primarily were from three areas: family, professionals, and peers. This support appeared to be critical not just to starting to use the device, it also affected the depth and frequency of use. For example, Henry and Martha had their son help them set up their iPad. He had worked for IBM for many years and downloaded many apps for them. When asked how they learned how to use it, they noted that they "taught ourselves." They use it for browsing the web, checking the weather, paying bills, checking accounts, and answering emails. This was similar to the experience of many who mentioned how sons or daughters had helped set up their tablets to work on their Wi-Fi networks and had downloaded many apps for their use.

Fred said, "Actually our son is the boy with the answers." His wife, Irene, in a subsequent interview also affirmed this, "Our son is very computer literate. He started when he was 8 years old and he just loves it [computers] and does extremely well." They were using their tablets for many purposes. Irene said that she uses the tablet to take online courses about American history, for emails, sharing photos, listening to music, weather apps, reading, and frequently using Skype to communicate with family members.

The participants discussed their sources for help in using tablet computers, especially their initial set up and problem solving. Anna said, "My son set up all the Internet and things that took me a while." Many had multiple options. For example, several mentioned that even though family members had promised to help, they also felt comfortable in going to the store or seeking professional help. Several of the participants had family members who were very busy or lived far away, yet these family members were supportive whenever they could.

As family members were quite frequently busy with jobs, dealing with their own children or sometimes grandchildren, their level of support often consisted mostly of encouragement to independently learn and explore. Henry said,

They handed it to me and said, "Get busy." Well, they would back me up, but they knew that it would be better for me to ask them questions . . . that's the method they've taken, to let me get into trouble.

Ultimately, when discussing their primary source of help, 71% ($n = 15$) talked about support from family, 19% ($n = 4$) went to professionals such as the Apple store, and 10% ($n = 2$) had support from peers (see Figure 1). As far as those who reported getting training in learning how to use the devices, 33% ($n = 7$) had someone help teach them how to use a tablet, while 67% ($n = 14$) of them learned by themselves. Often commercial instruction was reported as not ideal because of the pace of teaching or a noisy and crowded venue, where it was not easy for the older adults to hear a trainer. Mary, an 89-year-old who had formerly worked for the social security administration, got her initial training for using a tablet at the store, "He was good because he knew what he was doing . . . they were very efficient, all of that, but, I told him time and time to slow down." Later, she got help from her family member, "I told my godson that I was a lost ball in very high weeds . . . he's given me two sessions and put some apps on it for me." As a result of the help from her godson, she is able to use the device for communication (checking email and news) and keep more "current." Esther, who is 82 years old, had a similar experience,

I went to the store and there were at least 100 people in there and they were all much younger than we were . . . I'm sure you know that older people can learn but they literally physically are slower because their synapses just don't work as fast . . . that is so frustrating to me because I was so quick when I was young . . . [we were] not even sure what they were talking about so we never went back.

However, her attitude toward her iPad is still very positive, "I like the fact that is seems to be something that I could master."

Sometimes the sense of having professionals available for technical help when needed was enough to give confidence to learn how to use the devices. Sarah, who had worked in a professional firm, mentioned that when she worked at her job they had information technology (IT) specialists on call to help them with computer problems. With the iPad, she felt she could call her service provider for help. She said, "If you got somebody that knows how to tell you, it's easy." Among the participants who had initial assistance from professionals, they frequently said with only a few sessions they were able to complete basic functions such as checking emails, weather, news, or search for information.

Learning from peers or through books and instructional videos also were sources of support for adopting and discovering how to use tablets. Only a few (*n* = 4) of the older adults went to instructional sessions or bought books. A couple of them mentioned they used online tutorials to help them in learning this new technology. In line with SCT, observational learning was also prevalent (LaRose et al., 2012; LaRose, Gregg, Strover, Straubhaar, & Carpenter, 2007). About half of the participants (*n* = 10) mentioned that before getting an iPad or Kindle they had observed others using them. Through observation, they realized the potential of using the devices for many functions and could see how easy it was to use the tablets. However, by far the most common way for them was to get help from their friends, families, or other people who understood their special needs.

Often this help was very simple and consisted of setting up the device and the older adults learned the rest themselves in this supportive environment. However, to fully experience the affordances of the devices, the time to explore and get support if needed were seen as important. George said,

> I'm gonna have to play with it more or get more help to learn how to use it . . . I guess my lack of knowledge and how to take full benefit of all that it has to offer . . . There are many applications in there and I think I need more knowledge on how to make more efficient use of them.

Other participants had similar comments; they were still learning to use the devices and enjoyed discovering new applications. Because of their supportive environment, they knew they could get help if the device ever jammed or did not work properly. This gave them confidence in exploratory learning.

As mentioned in social learning theory, there is interaction between the environmental factors and behaviors. With an environment that supports and facilitates learning, the behavior of learning a new skill is much more readily embraced. This was clearly seen in our participants. Fourteen (67%) of them specifically mentioned how happy their family was that they were learning how to use tablets and increasing their digital literacy. Therefore, this research shows how important it is for older adults to have social support while learning to use new technologies.

The Learning Process: Trial and Error or Playing Around

Many of the behaviors that are essential to learning were seen in the interviews with the participants. These include the willingness to explore, repetition of newly learned skills, getting help when needed, and incorporation of

these skills into daily living. As, as previously discussed, cognitive stimulation can help reduce mental decay, ways to encourage continued learning is important to maintaining QoL issues (Czaja et al., 1993; Wenisch et al., 2007; Xavier et al., 2014).

Exploratory and self-directed learning, such as the trial and error method, was experienced by many of the participants. Elsa said, "Kind of trial and error to begin with. I went to the seminar of course, and [also] bought one of those dummies books for iPad. We use that a little bit." Sarah also mentioned that she learned how to use her iPad, "Just trial and error, playing around with it." Similarly, Anna also learned, "Trial and error, and a friend wrote how to send email." Even though the trial and error method may lead to difficulties, these did not seem insurmountable. As Martha, mentioned, "I guess I'm still learning . . . Well you know, when I would get into trouble, I really loved to get into trouble because I love to work it out."

Repetition is normally an important part of learning, but even more so, for older adults who generally require more time to learn (Chaffin & Harlow, 2005). As Esther mentioned,

> I didn't feel like it was difficult. I felt again, that it was slower because like my sons and daughter would have to go over it, whatever it was, two or three times what they were telling me because it would take me two or three times to be able to remember all the things they were saying to me and I do think that's probably pretty normal for . . . older people.

A couple of participants commented that even though they were exploring the devices by themselves, they realized they needed time or assistance to increase their knowledge. Connie, who is 77, mentioned, "I'm gonna have to play with it more or get more help."

When gaining literacy in the traditional sense, there is growing autonomy as well as behavioral change by utilizing the new skills in multiple areas (e.g., reading for acquiring understanding, personal benefits, as well as pleasure). In the same way, gaining digital literacy also should lead to use of technology in everyday activities. Learning to use the devices allowed participants to perform a multitude of tasks. Reading was by far the most common activity with 86% ($n = 18$) discussing how they used their devices for easily accessing their books, and online newspapers such as the *Wall Street Journal* or *New York Times*. They also discussed how they enjoyed having their tablets handy to quickly look up information (76%, $n = 16$). Most of them also mentioned they used several different apps (81%, $n = 17$). These apps included weather (43%, $n = 9$), Skype or Facetime (38%, $n = 8$), and games (29%, $n = 6$). Other uses mentioned were shopping, Facebook, online banking, checking financial accounts, watching

movies, Bible study, devotional reading, online courses, and music. A few of the participants ($n = 3$, 14%) would look up information on medically specific apps, such as WebMD and Mayo Clinic, to find out more information about their treatment options. Or, they would find out more information through a Google search. Others used their tablets to refill prescription orders and avoid having to make trips to the pharmacy.

Discussion

Older Adults' Technology Learning

The interview results showed that two kinds of social support are important in older adults' technology acquisition and learning, including the support for initial set up of devices and the support for learning to use the devices. First of all, for older adults to take the initial step in learning to use tablets, social support in the environment played an important role. Over a third of the participants received tablet computers as gifts and learned how to use them from their families. Those who learned primarily by themselves had resources (e.g., family, friends, or professionals) that they could contact to get help or support if needed. With the encouragement of family and friends (the second type of social support), participants were able to learn through exploring at their own pace. A key way that many participants reported gaining expertise with the technology is through "playing around" with the tablets. However, several participants indicated that it would be easier if they could obtain more structured help. Perceived support from family or professionals if anything went wrong was seen as crucial to give the confidence to experiment and learn new functions. This finding can be explained by the SCT theory. However, unlike the younger generations, older adults do not have many opportunities to learn from observation in the workplace or school. Nevertheless, a supportive environment is critical to the learning process. For this sample, support and observational learning often happened through interacting with family members. The older adults in this study noted the importance of these types of support, even though appreciation of support they were, overall, very independent, well educated, and self-sufficient.

One thing we noticed was that, despite the participants' diverse backgrounds, abilities, and motivations for adopting a tablet computer, after trying table computers they wanted to learn and use the devices more. The reasons for that might include the ease of use of tablets (effort expectancy; Magsamen-Conrad, Upadhyaya, Joa, & Dowd, 2015) and the perceived benefits from using tablets (Authors, 2015; Delello & McWhorter, 2015). Our participants indicated that they communicated with family members using FaceTime or Skype, checked

the weather or the latest news, reviewed their financial accounts, read about health information, monitored their activity levels, got books from the library, and even ordered food via their tablets. Our findings also are in line with Czaja and Sharit (2012) and others concerning the desire to learn and enthusiasm toward computers despite the challenges that many older adult learners face (Broady et al., 2010; Chaffin & Harlow, 2005).

Furthermore, even though personal differences, such as willingness to try new things are very important in the acquisition of digital literacy, other aspects were even more salient. According to our study, to conquer the initial difficulties or fear of using new technologies, it is crucial for older adults to have support from their families or others. The importance of this support to actual use was particularly salient. For younger generations, it might be easier for them to explore and learn new technologies by themselves or just search for information online as they were born at a time when these digital technologies were pervasive. However, for older adults, they may not be as familiar with digital technologies as the younger generations; therefore, a supportive environment will be crucial. Even though many reported that they had family to turn to whether they needed help with a problem, only those who actually had family members help set up the devices were using the devices for multiple functions. This is consistent with the findings of previous studies (Lam & Lee, 2006). Social support is important to promote successful aging (Gow, Pattie, Whiteman, Whalley, & Deary, 2007; Rowe & Kahn, 1997; Seeman, Lusignolo, Albert, & Berkman, 2001). For older adults who have family members in close proximity, this might be easier to achieve. However, for older adults who have no family support, assistance in this area can help older adults maintain independence and improve QoL.

Moving from digital access—merely being able to do basic functions on a computer—to full literacy is a complex process. This becomes even more important for older adults as critical information, such as health, social service information, and advocacy, is moved to online spaces. Also, with the growth in medical devices that interface with smart phones or tablets, increased digital literacy may enable older adults to be more proactive in their own health care. Therefore, it would be beneficial for older adult advocacy groups or the government to provide digital literacy learning support to help older adults when they have questions or problems (Berkowsky et al., 2013; Cotten, 2011).

In this research, two kinds of social support, including the social support at the initial stage and during the learning process, played important roles in older adults' technology learning. Initially, social support helped many participants to try the new technologies. In our sample, about half of the participants received their tablets from their families. For older adults whose extended

family have limited financial resources, and would be unable to help purchase an ICT device, the probability of being marginalized from digital inclusion would be higher. Having programs in place to assist those who do not have support would be key to expanding digital literacy, especially among disadvantaged populations. Second, social support during the learning process is also very important. For those who had support to help install apps or offers to help if anything went wrong, there was more exploration with the capabilities of the devices. This led to fuller adoption and increased digital literacy. However, the older adults in this sample did not frequently teach others how to use tablets. If we can encourage older adults to teach each other, then they could receive more peer-based social support, which would help increase the diffusion of digital literacy.

Overall, even though this study focused on the acquisition of digital literacy using tablet computers among residents of independent living communities, the results could be potentially applied to future types of ICTs as well. Although tablets are easier to use for many older adults than are other types of computers, new ICT devices continue to come on the market. Developers of new technologies should continue to develop hardware that is accessible and interfaces that facilitate ease of learning and use by older adults and other populations as well. User interfaces that are easy for older adults to navigate and explore allow them to gain confidence and become adept at using the devices. In addition, to increase older adults' digital literacy, having social support, especially in the early stages, is essential.

Policy Implications

Increasing digital literacy and narrowing the digital divide has been an important policy goal in the United States and most countries in the world (Norris, 2001; Servon, 2008; Van Dijk & Hacker, 2003). To help older adults to learn the skills to use new technologies, the government or other entities that focus on senior support issues should prioritize providing opportunities for older adults to experience using new technologies. Having these devices in independent living communities, hospitals, and local community centers would allow for this type of interaction.

Just as many public schools are providing iPads and one-to-one computing programs for educational purposes, iPads/tablets for older adults could provide multiple benefits for minimal expenditure. As in educational settings where independent learning is a goal, for older adults the goal can also be learning and being well informed, especially in health care issues. Giving seniors tools to be more engaged in their health care options can not only improve QoL but can also help reduce demands on the health care systems. In addition to providing these devices, the government should provide incentives

for older adults and their families to encourage them to try to use these devices. Having some enjoyable tasks or small rewards to encourage them to look for information online might be a good way to try these devices. Encouraging participants to discover the advantages of using new technologies is also important to full digital literacy.

Finally, providing social support for these older adults is critical for their learning. Most people learn through some kind of training or instruction (Czaja & Sharit, 2012). As demonstrated through the comments of these participants, watching others and feeling confident of help, if it is needed, are essential to explorative learning. For people who do not have families around, having training programs, help-lines, or specialists who can assist them when they encounter problems is essential. Several older adults mentioned their frustrating experiences learning at stores: The instructors talked too fast and did not understand the challenges that older adults were facing when learning new technologies. Therefore, it is important to train these instructors how to teach older adults. Overall, it is not just about access. Narrowing the digital divide and increasing digital literacy will require having help available for those who need it, when they need it.

Limitations and Future Studies

Most of the participants in this study had families (children) who either gave them the tablets, provided suggestions, or showed them how to use the tablets. In addition, the communities where the subjects are living require a fairly substantial investment. Therefore, either the residents or their family would have to have middle to higher SES level to live in these communities. In addition, given we did not include the topic of work and educational histories as part of our interviews, while we would like to be able to generalize to older adults with different histories and educational levels, unfortunately it is not possible in this study. The specific social setting and SES characteristics of our participants limit the generalizability of our findings. In addition, the age variation in our sample is quite broad. There may be substantial variation within our sample of older adults due to life experiences associated with age differences. However, generalization is not our main purpose in this study. Although prior theoretical models exist with regard to technology adoption, none have been applied to tablet adoption. Although we briefly detailed two of these models in this manuscript, our goal was not to test these theoretical models, as this would have been trying to fit qualitative data into quantitatively focused models, which is problematic. We hope the findings of this study can help future researchers develop a theoretical framework or scales for future larger-scale qualitative and/or quantitative research investigations.

For older adults who do not have any family support, are socially isolated, or lack previous experience, it will be difficult for them to obtain information relevant to their needs about tablets. Aditionally, it will be almost impossible to have the chance to personally try the devices in a relaxed and non-threatening environment. How to inform these older adults who live alone, without any family members, will be a challenge. Future studies should examine how to encourage tablet use and understand perceptions about tablets among these groups. The older adult participants interviewed in this study provided us with a deep understanding of how they obtained their tablets and learned how to use them. In this study, we found that both the STAM and SCT models helped us understand older adults' technology learning process. For the SCT model, we understand that fitting qualitative data to a quantitatively focused model can be problematic. Surveys or other quantitative studies, as well as broader interventions, could further test this learning framework and generalize these conclusions to wider populations.

Authors' Note

Declaration of Conflicting Interests

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Note

1. For privacy concerns, we used pseudonyms for participants' names.

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Author Biographies

Hsin-yi Sandy Tsai, PhD, is an assistant professor in the Department of Communication and Technology at National Chiao Tung University in Taiwan. Her research interests include the policies, use, and impacts of information and communication technologies. She is especially interested in how to help people improve their quality of life and take full advantage of new technologies.

Ruth Shillair, MA, is a PhD student in media and information studies at Michigan State University. She is interested in understanding human behavior in online spaces to facilitate an environment that is safe, inclusive, and facilitates positive learning experiences for people of all ages and backgrounds. Her research includes online security, digital divide issues, and learning in online environments.

Shelia R. Cotten, PhD, is professor and associate chair for research in the Department of Media and Information at Michigan State University. Her research examines how people use technologies across the life course and the impacts of this use on their health and social life. Her work has been funded by the National Institute on Aging and the National Science Foundation.