Problematizing the Digital Literacy Paradox in the Context of Older Adults' ICT Use: Aging, Media Discourse, and Self-Determination

Kathleen Schreurs & Anabel Quan-Haase
University of Western Ontario
Kim Martin
University of Guelph

ABSTRACT *Despite evidence of an upward trend in the adoption of information and communication technologies (ICTs), current media discourse suggests that older adults (those 60-plus) lag behind in terms of engagement with digital technology. Through a survey and interviews with older adults, we investigate how this population views its own digital skills, barriers to digital literacy, and the social and institutional support system it draws on for help with technology. A lack of skills and limited social and institutional systems make it difficult for older adults to gain experience and comfort with technology. However, support systems, such as family and peers, can help mediate older adults' reluctance with technology. We propose a model with the aim of understanding the needs of older adults in gaining greater digital literacy.*

KEYWORDS *Seniors; Older adults; Digital literacy; Information and communication technology (ICT)*

RÉSUMÉ *De toute évidence, l'adoption des technologies de l'information et de la communication est en train de croître. Il n'empêche que le discours médiatique actuel suggère que les aînés (ceux et celles de 60 ans et plus) ont du retard par rapport au numérique. Au moyen d'un sondage et d'entretiens avec des aînés, nous examinons comment cette population perçoit ses aptitudes pour le numérique, les obstacles à sa maîtrise du numérique, et les appuis sociaux et institutionnels auxquels elle peut recourir pour mieux comprendre le numérique. Dans plusieurs cas, un manque d'habiletés et un appui social et institutionnel limité empêchent les aînés d'augmenter leur expérience et leur confort face aux technologies. Cependant, des réseaux de soutien par la famille ou les pairs peuvent aider les aînés à combler leurs lacunes. En guise de conclusion, nous proposons un modèle pour mieux comprendre quels sont les besoins des aînés par rapport à leur habileté numérique.*

MOTS CLÉS *Aînés; Adultes plus âgés; Habileté numérique; Technologies de l'information et de la communication*

Kathleen Schreurs is a PhD Candidate in Library and Information Studies in the Faculty of Information and Media Studies at the University of Western Ontario. Email: kschreur@uwo.ca . **Anabel Quan-Haase** is Professor in the Faculty of Information and Media Studies and the Department of Sociology at the University of Western Ontario. Email: aquan@uwo.ca . **Kim Martin** is a Postdoctoral Fellow in the College of Arts at the University of Guelph. Email: kimberleymartin@gmail.com .

Canadian Journal of Communication Vol 42 (2017) 359–377 ©2017 Canadian Journal of Communication Corporation http://doi.org/10.22230/cjc.2017v42n2a3130

Introduction

Twenty-something Scott comes out of a house holding his Samsung Galaxy 4S smartphone. He and his new baccalaureate friends are having a graduation pool party. The scene is poolside and sunny with black caps and gowns mingling with bikinis and sun hats. Parents are there too, wearing cardigans, golf shirts, and loafers. Scott approaches his parents who are standing by a BBQ with grey smoke curling around their heads. Scott holds up his phone. "What are ya doing?" asks his dad. "Ah, I'm takin' a picture of these ribs with m' new GS4," answers Scott. "Have a smell," he says pointing to his phone. His father, who looks about 60 years of age, leans in to pretend he sniffs the phone, "I smelt the ribs," he says to his wife as Scott walks away. Later, Scott answers his phone with a wave of his hand and again his father reacts with incredulity, "You gotta be kiddin me. *That's* how you answer it." Other young party guests are also showing off their GS4s, answering texts with hovering fingers, and snapping pictures and sharing them by tapping their phones. "Oh wow," says one mother, "I wanna share, can I share too?" and she produces her iPhone. "No," says a young woman, "Yours doesn't do that." One father stares in confusion at his supposedly out-dated iPhone and begs, "So some smartphones are smarter than other smartphones?" The youths nod, "Exactly" (72andSunny, 2013).

Media discourse often suggests that digital technology is an integral part of younger adults' lifestyles, or at least, that younger adults understand digital technology better than previous generations. These media depictions suggest older adults are late adopters, despite statistics showing that they are readily adapting to and using digital technology. Data collected in this decade shows an increase in the adoption of technology by older adults. In 2010, 29 percent of people age 75 and over and 60 percent of those 65 to 74 had used the internet in the previous month (Allen, 2013). In April 2012 the Pew Research Center found for the first time that 53 percent of older adults (ages 65 or older) in the United States were internet users (Zickuhr & Madden, 2012). In only a year that number increased by six percent to 59 percent of older adults reporting they go online (Smith, 2014). Jenna Jacobson, Chang Lin, and Rhonda McEwen (2017) find that while the social rhetoric of older adults as adopters, or "silver surfers," is premature, there is evidence of older adults "leapfrogging older mobile devices" (p. 352) and acquiring new technology such as smartphones. In the past the prominent use of digital technology by youth was reflected in such terms as "cyberkids" (Holloway & Valentine, 2003), the "net generation" (Tapscott, 1999), and "digital natives" (Barlow, 1995; Gasser & Palfrey, 2008; Prensky, 2001). These terms still saturate scholarly literature and popular culture. What makes these young people different from previous generations is that they are considered apt at tackling any new device and problem solving potential technological glitches. The advertisement for the GS4 presents young people as having all the answers, and even when older generations use technology such as smartphones, their children do it better. The youths' phones are smarter than smart and by extension so are they.

These media depictions of older adults are ubiquitous and tell a specific story about how different generations engage with digital technology. A recent ad by Ally Bank first aired on August 22, 2016, and shows grandparents welcoming their grand-

children for a visit with warm smiles, "so great to see you," and arms full of tech, indicating that "none of this works." The ad is part of the "facts of life" series and highlights generational differences as the tween grandchildren stand holding the offloaded tech and the tagline "Grandkids = Tech support" flashes onto the screen (Ally, 2016). There are also viral videos of grandparents clumsily learning to use webcams (puremaplesyrup22, 2011), learning the language of computers where "Gmail" stands for "grandma mail" (Delightfullydumb, 2016), and comedic portrayals of older adults taping printed pictures to the "walls" of their living rooms in an attempt at social networking (Happy Street Films, 2014), or using iPads as cutting boards for veggies and then cleaning them in the dishwasher (Mayzie, 2013). Satirical as these depictions may be, they maintain the discourse that older adults are technology inept and digitally illiterate. There are also personal anecdotes published by news outlets such as the *Huffington Post* (Isaacs, 2015; Sues, 2015), and *USA Today* (Beckerman, 2016) that tell stories of persistence and the rewards of technology, but also some frustration with the learning curve involved in adopting technology. These narratives show that while older adults do persevere and can use technology well, they may feel beholden to younger generations to show them how.

Scholarly research suggests that older adults lag behind in terms of their digital engagement (Hale, Cotten, Drentea, & Goldner, 2010; Hargittai & Hinnant, 2008; Madden, 2006), and a key obstacle to older adults utilizing the internet has been identified as their lack of digital literacy (Broady, Chan, & Caputi, 2010). While the number of older adults adopting technology is growing there is still a "grey divide," or generational gap (Friemel, 2016). The media depictions of older adults and technology reaffirm the concept of the "second digital divide," which identifies social groups that experience challenges with the use of digital technologies beyond access alone (Howard, Busch, & Sheets, 2010; Ono & Zavodny, 2007). That is, some social groups lag behind in technology adoption and use, not because they cannot afford a computer, internet connection, or smartphone (Chen & Wellman, 2005), but because they do not have the necessary skills to use digital devices and perform a wide range of online tasks such as searching for information, banking, and uploading pictures to the web (Hargittai, 2002). One such group is older adults, some of whom have the means to purchase a computer and pay the monthly fee for an internet subscription, but make the choice to remain unconnected because they do not know how to use the technology. For older adults the acquisition of digital literacy skills is essential, as their adoption may have real benefits to their lives.

An expanding body of literature discusses the benefits of older adults' use of ICTs and how using these technologies can fulfill their needs. This literature shows that digital technology helps older adults communicate with their family and friends (Adler, 2002; Campbell, 2008; Quan-Haase, Mo, & Wellman, 2017; Sum, Mathews, Hughes, & Campbell, 2008), expand their opportunities for lifelong learning (Chen & Persson, 2002), access health-related information (Bradley & Poppen, 2003; Chaffin & Maddux, 2007), and explore additional resources for personal interests and entertainment (Gatto & Tak, 2008; Xie, 2008). In short, digital technology can improve older adults' quality of life (Bond, Burr, Wolf, & Feldt, 2010; Shapira, Barak, & Gal, 2007; Slegers,

van Boxtel, & Jolles, 2008) and help support many of their daily activities (Quan-Haase, Martin, & Schreurs, 2016). Also, perceptions about the ease of use of computers are shown to be a barrier to older adults adopting technology (Mitzner, Rogers, Fisk, Boot, Charness, Czaja, & Sharit, 2016). As digital technologies are driving profound changes in the lives of older adults, the media rhetoric surrounding older adults and technology affects how older adults perceive their own digital literacy and may itself be a barrier to digital technology use by lowering their confidence and depleting their willingness to further develop their digital skills.

Digital literacy is defined as a "range of complex and densely interwoven communicative forms that are digitally mediated, as well as the mechanical and navigational competence that is a prerequisite to working on a screen" (Merchant, 2007, p. 119). The concept of digital literacy, however, eludes a universally accepted definition, with some scholars restricting it to the technical aspects of operating computers, the internet, and digital technologies, and others applying it to cognitive and socio-emotional aspects of work (Eshet-Alkalai, 2004; Haight, Quan-Haase, & Corbett, 2014). Paul Gilster (1997) defines digital literacy as "the ability to understand and use information in multiple formats from a wide variety of sources when it is presented via computers" (p. 6) and, particularly, through the medium of the internet. For those born before the proliferation of digital media this means adapting their skills to an evocative new medium (Gilster, 1997, p. 6). An important research question concerns what older adults' understanding of and comfort with technology is and how their experiences with and perceptions of technology will help them or hinder them in developing digital literacy.

Any understanding of the digital literacy of older adults is complex. Generally, digital literacy is gained through experience that goes beyond basic exposure to technology (Murray & Pérez, 2014), and older adults often lack the experience because they are hesitant to try new technologies (Quan-Haase, Martin, & Schreurs, 2014). Jacobson, Lin, and McEwen (2017), also identify important distinctions in the communication practices and technology preferences of older adults, which suggest a high degree of variability of experiences within this generational group. We propose to develop a digital literacy model that situates the digital divide between older adults and younger generations within the social context of media discourse and highlights the importance of experience and support. Through the lens of the digital literacy paradox it becomes evident that supporting older adults in their digital literacy is a complicated endeavour that requires not only a focus on skills, but also on the cognitive and socio-emotional aspects of digital engagement (Eshet-Alkalai, 2004; Haight et al., 2014). Representations of older adults and technology in media discourse and society impact these aspects by creating an atmosphere of doubt (and self-doubt) around the capacities of older adults. However, by helping older adults gain competency and feel empowered, ICTs can be used to their full advantage. The concept of the digital literacy paradox highlights how learning is a social process and thus digital literacy is best acquired in social settings where family, peers, mentors, and gatekeepers come together to provide an environment for exploration. The paradox emerges when older adults need to gain experience with ICTs to develop their skills, but they are apprehensive about using ICTs because they do not have the needed skills. The proposed model stresses social learning as a key element. Critical

questions arise such as: How do older adults identify their own digital skills in relation to their age? What barriers exist to older adults acquiring digital literacy and ICT experience? And what support systems do older adults rely on to gain digital literacy?

Methodology

We interviewed 21 older adults face-to-face and created a survey with which we gathered responses from 23 older adults. The interviews were conducted between January 2012 and December 2013. All participants were recruited from southwestern Ontario and represent a population that had a good familiarity with digital technology. Recruitment for the interviews took place in person at community events that catered to the senior population, and through posters advertising the study on community boards at local libraries and shopping malls. We also relied on snowball sampling to gain participants after the first few interviews. Five trained members of the research team conducted the interviews: the second and third authors of this piece, and three research assistants that were hired to work on the project.

Throughout the 21 interviews we investigated how older adults see themselves in terms of their digital skills and what they identified as barriers to gaining digital literacy. The age range for participants was 61 to 84 ($Md = 68$). The majority of participants were female (81%) and nine participants were married, five widowed, four divorced, and two single (one response to the question is missing). Participants' past professions were varied and included a former teacher, zoologist, and social worker. All participants were retired.

The survey was distributed in person at an alumni event after the interviews were conducted and was available either online or as a paper-and-pencil version in order to maximize participation. Most participants chose to answer a paper copy of the survey, which we then entered into the survey form on Google Docs. The survey included questions about computer and internet use and specifically examines older adults' level of digital literacy based on a framework previously developed by Eszter Hargittai and Yuli Patrick Hsieh (2012). The ages of survey participants ranged from 60 to 84: five were 60–64, seven were 65–69, seven were 70–74, and four were 80–84. The participants of the survey all identified as having access to the internet, with at least one laptop or desktop computer in their home. Their computer usage included searching government websites, medical information, travel, banking, shopping, and using Skype. The most prominent use of the computer among these participants was email communication.

We base our findings on these two data sources and use quotes from the interviews to illustrate our points. The survey data specifically helps to better understand older adults' familiarity with various internet-related terms, which we employ as a proxy for digital literacy (Hargittai & Hsieh, 2012).

Age, ICTs, and self-determination

An examination of these two data sources reveals that while many of the participants were adopters of technology, they sometimes lacked confidence in using technology even after they acquired it. For example, Participant S7 used email for communication and stated that it is "wonderful," yet she was not comfortable with many advances in technology:

> Well, I have a laptop 'cause my son made me get it and I do use email a lot. That's a wonderful communication tool. I don't look up a lot on the Internet. I'm not all that comfortable with it. I am not interested in ebooks at the moment anyway, just because I am not comfortable with that kind. I mean, I long for the days that the television had an on and off button. You know, I have three controllers here and I hate it. I am just not into this thing.

All participants had access to the internet at home and most used it on a weekly or daily basis, in addition to email correspondence, a common use of the internet was information seeking. For example, participants regularly used Google and researched recipes, real estate, genealogy, and books. In these interviews, age was a key factor influencing engagement with ICTs. Participants not only highlighted differences in the use of technology between themselves and younger generations, they also considered their age when deciding to adopt a specific technology. In this way age affected their self-determination of technology use.

The perceptions of older adults toward ICTs were varied and were often determined by a cost-benefit analysis of a particular technology and its effects on their everyday lives. While older adults in our study recognized the benefits of ICTs, they also identified difficulties in acclimatizing to their usage. For some of our participants even the benefits of staying in touch with their family were not enough to draw them to ICT use. Although Participant S8 recognized that Facebook might be useful for her to keep in touch with her grandchildren, it was not something she was interested in. For her, the cost of learning outweighed the connection to her family:

> And I know I'm not in—I miss being connected to the grandchildren and stuff like this, but I just thought—and I don't know how they end up with 300 friends, quite frankly; they don't know 300 people, but that's their parents' problem as far as I'm concerned.

Similarly, Participant S15 said:

> No, I don't do Facebook and I have absolutely—I'm very opposed to doing it. For me.
>
> Interviewer: Mhmm.
>
> S15: But I mean, I've—I have family here: a daughter and two grandchildren who are both university age now. And they're—I mean, they nag me, but I don't think I'm going to give in on this one. I see the downsides to it and I'm not attracted to it at all.

There is little doubt that there are differences in how different generations are willing to adopt and use technology (Norton & Bass, 1987; Oblinger, 2003). The terms "digital natives" (those who used technology throughout their lives) and "digital immigrants" (those who had to adapt to technology later in life) were popularized by Mark Prensky in 2001 to highlight fundamental discrepancies in a person's technology outlook. These terms have been much debated, with many scholars demonstrating that although differences will inevitably exist between generations, digital literacy is not necessarily determined by age or is at least not solely determined by age (Guo, Dobson, & Petrina,

2008; Ransdell, Kent, Gaillard-Kenney, & Long, 2011). What is interesting is the way older adults perceive the differences between ICT use by younger generations and themselves. The older adults we interviewed were certainly aware that differences exist in use, as Participant S4 remarked:

> I wonder about age. Is it older people like me who are resistant to electronic media?

S15 also spoke about resistance to technology as a result of age:

> Or it's down for a number of hours and it's panic. So I think … I just wonder about it. You know, that's part of my age. I'm 82.
>
> Interviewer: Well …
>
> S15: So I think that's part of it, you know, there's a built-in resistance to, in a sense, think, "Do I have time to do this?" Is this how—what I want to do in how I spend my time?

Older adults were aware that they have less experience with technology than younger generations. However, this did not appear to worry them, rather they marvelled at the skills that youth exhibit, and often commented on the positive changes brought about by ICT use. Participant S12 observed the changes in young people's reading habits due to the implementation of technology into their lifestyles:

> Um, in my day, you didn't read unless you picked up a book or picked up a newspaper, which you didn't do on a constant basis. Kids on computers are reading constantly. Um, and I think in a way that's a good thing.

Many older adults, such as S7A acknowledged not only changes between generations but also a progression in their own habits as a result of ICTs:

> But I'm learning and I am not against it, I'm just, I just have to learn how to do it. And I have to think about doing. I would think of looking something up [in print] before going on the internet. So, it's slowly changing.

One area that many of the participants reflected on was the use of search engines to help support their memories. Participant S18 commented on a dependence on Google:

> Gosh, I Google a lot. I Google A LOT. And I find it's just a blessing for people my age who like my memory it's … there's no doubt it's going. Not at a fast pace, I hope, but um, there are things that I just can't remember, but if I need information about it I'll just Google it.

The examples above are all evidence of the complex relationship older adults have with technology. For those older adults that are aware of ICTs, there is often a large learning curve associated with use, which they have to weigh against the benefits that will come from knowing how to operate the technology. It is by weighing these issues that older adults self-determine their engagement with ICTs. For example, social media such as Facebook and Twitter were largely unpopular with the older adults we interviewed, except when these technologies allowed older adults to increase their communication with family members that lived at a distance. For the majority of participants exposed to ICTs by family members, the costs (the effort associated with learning to use the technology) were outweighed by the benefits (staying close with family members).

Digital skills of older adults

Early discussions of the digital divide tend to focus on access to the internet as a critical barrier that separated the "haves" from the "have-nots" (Dickinson & Sciadas, 1996). Paul DiMaggio and Eszter Hargittai (2001) were among the first to criticize this approach for being simplistic, arguing that access was often closely interlinked with other barriers to using the internet. The authors stress that a lack of digital skills could be seen as a central barrier, as a person who does not know how to make good use of a computer may also not be motivated to obtain internet access. The terms "digital skills divide" or "second digital divide" describe the challenges faced by those who have little knowledge about the internet and do not know how to use various applications and platforms (Hargittai, 2002). A U.K. based study focusing on the "grey" digital divide and disenfranchised older citizens finds that barriers to e-literacy include a lack of interest, feeling too old, and the fear of new technology, as well as a lack of access to technologies and low digital skills, limited experience with ICTs, concerns about security and cost, and problems related to disability (Morris, 2007).

Older adults are identified as a population who often do not have the necessary skills to conduct advanced searches for information online, perform complex transactions such as banking and ecommerce, and purchase products such as movies, music, and other goods and services (Broady et al., 2010). It is often argued that older adults did not grow up with digital technologies, as digital natives have, and therefore, have had to learn how to navigate digital technologies later in life (Prensky, 2001). Moreover, even those older adults who use computers at work and have prior experience with information technology (IT) often tend to halt their engagement once they retire (Selwyn, 2004). Thus, for some, it is a choice not to use computers and access the internet, as they do not see the relevance to their current life needs. To further explore the extent to which older adults understand technology, we integrated a survey question originally developed by Hargittai and Hsieh (2012) to capture a person's ability to use the internet as well as to employ those skills to take full advantage of all the possibilities the internet has to offer. Participants were asked: how familiar are you with the following internet-related items? Table 1 shows the results from the survey. The results show variability in older adults' understanding of the terms. A few participants were fairly technology savvy and understood many of the terms, while others were only familiar with a few. We also noticed that terms we assumed most older adults would be familiar with were often not understood fully, only somewhat. For instance, eight older adults indicated understanding "advanced search," while 15 indicated they had only had some or no understanding of this concept. Similarly, only five older adults understood what a wiki is, the majority did not. While we did not expect older adults to be familiar with all the terms, it is clear that some terms are rather obscure for this population. For example, the majority did not know the meaning of such terms as RSS, tagging, weblog, and phishing.

The findings from the survey suggest that older adults who are digital (have access and engage in some ICT use), such as our study population, have a limited understanding of internet-related terms. Older adults use technology for a specific set of activities, such as sending an email or reading the news, and thus develop skills only

Table 1: Digital skills of digital older adults

	No Understanding	Little Understanding	Some Understanding	Good Understanding	Full Understanding
Advanced Search	1	3	11	4	4
Bookmarks	2	2	5	8	6
Favourites	1	0	5	11	5
Firewall	3	1	7	6	3
JPG	6	4	2	8	3
Malware	8	2	5	4	2
PDF	3	2	7	7	4
Phishing	10	2	4	6	1
Podcasting	7	4	5	5	1
Preference Setting	8	2	5	4	2
RSS	16	3	3	1	0
Spyware	8	3	5	3	2
Tagging	13	4	2	3	1
Weblog	13	2	6	2	0
Wiki	10	5	3	4	1

around these activities and therefore are not exposed to the range of ICTs that could benefit their lives. They move in a "digital skills bubble," where some activities and skills are very familiar while others are foreign to them. We argue that this creates a paradox, as older adults could engage further with ICTs and enlarge their bubble if they could improve their skills, but this can only occur if they have more opportunities to try out and test ICTs.

The older adults we interviewed for this study sometimes still felt excluded from the progress of technology and showed embarrassment about their limited knowledge of some terms. However, regardless of their reservations, they showed a desire to become digitally literate and were often excited at the prospect of developing digital competencies. Older adults were motivated to be included in the digital world by connecting with others, primarily family, via the internet. For example, the use of Skype and photo-sharing platforms were popular reasons for obtaining internet access and developing their digital skills further.

Older adults were often curious about new devices and their affordances. S15 expressed her curiosity about learning how to use an e-reader. She was introduced to one during her summer holidays and recognized its utility for meeting her needs. S15 witnessed how others employed the technology and, as a result of this social learning, de-

cided she would also like to try it. But she thought of her own skill set as a barrier. She felt that she would need to engage in learning first to be able to make use of the device:

> Why—why would I need one? I was away with my family in a cottage last August sitting on the deck—so four people with an e-reader, and I've got a book. So they, um, I think it really it's the technological part of learning how to use it.
>
> Interviewer: Mm-hmm.
>
> S15: Because there again, you need somebody to explain it. I don't consider myself very good technologically. It's not a skill set that I have highly developed.
>
> Interviewer: Mm-hmm.
>
> S15: I'm not sure that I would ever have been. I mean, I had to use a typewriter, and even use an electric typewriter, but beyond that—I can master the microwave and these other gadgets that you have—but I mean, it took me a while to hook up and make sure I got my … radio going, because you have to follow the instructions for—which are really, um, technical kinds of instructions just in the setup. So I think it, it's—I'm intimidated by, um, by the fact that you have to learn which buttons … .

Our participants often wished they knew more about the devices and how they operate. For example, S12 expressed frustration with knowing what an ICT could do for her, but not having the skills to actually get Skype to work:

> Um, no. Um, and, my Acer—I should be able to do Skype, but I don't know how and no one has shown me or has had time to show me, so, no, I haven't yet, but it's something that I look forward to learning.

S12 saw the relevance of Skype for keeping in touch, but had little means of learning how to use Skype. She clearly was engaged with technology, was eager to explore new applications, and even looked forward to learning new skills.

This is often linked to what Everett Rogers (2003) has called the knowledge stage of technology adoption. Rogers (2003) divides the knowledge stage into three distinct types of knowledge: awareness-knowledge, how-to knowledge, and principles-knowledge. Our participants regularly demonstrated awareness-knowledge; that is, they were aware of a specific device or application and understood its purpose. But they often lacked both how-to knowledge and principles-knowledge. How-to knowledge would have allowed them to use the device appropriately and troubleshoot problems. Principles-knowledge, the understanding of how the system operates, is not necessary for older adults to integrate ICTs into their everyday lives and fulfill their needs. Even many young people have only limited principles-knowledge when it comes to ICTs, as they are avid users, but have little understanding of how the technology operates (Bennett & Maton, 2010). That is, there is a lack of how-to knowledge to utilize a specific technology and hence individuals cannot easily solve technical problems. Many participants expressed similar enthusiasm to learn new applications, but lacked the support to acquire the needed skills.

For our participants, finding help was a barrier to digital literacy. S10 explained how she has tried figuring things out on Google, without much success:

> … in fact I'd like to know how to get rid of the e-books that are on there. I haven't really figured that out yet.
>
> Interviewer: Oh really?
>
> S10: Even though I've Googled it and they've told me, I still haven't been able to get rid of them. Um, yeah, so I don't really see myself collecting books on the Nook. I'll just download them for a couple of weeks and when they go, they go.

Therefore, the support system in which older adults are embedded is central for understanding their ability to overcome barriers associated with skill level and to be able to learn how a technology both can be useful and how it can be operated, including troubleshooting problems.

Support for digital literacy

Within the larger discourse in the media and society, older adults are often targeted as needing help with technology. Research examining the effects of older adults' anxiety surrounding computer use and digital literacy on self-efficacy and life satisfaction has revealed that computer use helped to increase self-efficacy and lower computer anxiety, thereby increasing overall life satisfaction (Karavidas, Lim, & Katsikas, 2005). Recently, notice has been taken of the benefits of intergenerational mentoring. For example, the program Cyber-Seniors, and the award-winning documentary of the same name (Cyber-Seniors, 2016), began in Toronto by two high school-aged sisters who began helping residents of a local retirement community become more computer literate (Genzlinger, 2015). The documentary follows teenaged mentors who work with older adults in their community, helping them learn digital skills by creating videos with them.

Support for older adults in their technology use is critical to their gaining experience and enhancing their digital skills. As previously discussed, the older adults interviewed in this study often turned to younger family members, such as children, grandchildren, or nieces and nephews, to help them learn technology. Peers, such as spouses and friends, were also sources of support. While some participants were aware of and partook in formal support, such as classes at the local college or library, there was a greater reliance on family and friends.

Family was often cited as a source of support among our participants. Children in particular helped their parents transition to the use of ICTs. In speaking about their growing comfort with using a computer, Participant S13 remarked:

> Well, of course, I had family to help me.
>
> Interviewer: Mm-hmm.
>
> S13: And still do, so, I'm sure it was a bit—it would be slow, because it was a new technology and a completely foreign technology to me.
>
> Interviewer: Mm-hmm.
>
> S13: But, um, I felt comfortable, largely because of the support I got with it.

S13 continued to recount the importance of support to her development of computer use and highlighted how younger generations helped her with what she now feels is a technology that is a vital part of her everyday life:

> And that is very important. I have a friend whose family are out of town, and she's frus …—she's my age—and she's frustrated much of the time with devices.
>
> Interviewer: Mm-hmm.
>
> S13: So I feel—I wish she had the kind of help I did.
>
> Interviewer: Right.
>
> S13: I do. Because I really am dependent on the younger generation.
>
> Interviewer: Mm-hmm.
>
> S13: But I love it. I love having it. I couldn't live without it.

Similarly, S14 was reliant on the younger generation, her nephew, to bring her into the 21st century. She valued his support so much that she asked for a half day of his time as a Christmas present:

> No. I purchased it, but uh … I uh … told my nephew last year at Christmas, all I wanted was a half a day of his time. And I knew he was an Apple person, so I told him he was to bring me into the 21st century, so that was … that was what I got, was Apple. [Slight laugh.]

S18 recalled learning to use the computer from her children:

> Interviewer: So, how did you first start learning how to use a computer?
>
> S18: My kids taught me.
>
> Interviewer: Okay.
>
> S18: So they would have been in elementary, if I were to guess. I'm trying to remember. Say grade 5, 6, 7, that area.
>
> Interviewer: Mm-hmm.
>
> S18: And they learned. My ex-husband was very involved in technology, and actually, we had an Apple, one of the original Apples, like way back. Probably an original or very close to, even before my oldest was born. So, she's going to be 29, sorry! She is 29 … she's going to be 30. So it's been around for a long time I just never used it until they were older and they were using it and kind of embarrassed me into learning how to use it because I just kept thinking, "I don't need it, I don't want it." Anyway. So I just remember my oldest anyway, writing down the steps, step one, step two, blablabla, and that's kind of how I learned how to use the computer.

In speaking about their internet connection S2 remarked:

> It's whatever we got a few years ago when our three kids banded together and got us internet one year as a gift. We were about ready to do it, and they said "we'll do it for you," so they [did] … we're gonna upgrade it and put the phone, the cable, and the internet all together … .

These quotes from Participants S2 and S18 bring to light the fact that in some cases support systems may constitute forced adoption of technology where older adults feel pressure, sometimes the result of embarrassment, to use technology (Quan-Haase, Martin, & Schreurs, 2016). While support from younger family members was reported positively overall, S15 indicated having to ask her nephew to "slow it down" when he was showing her how to use the internet, because

> … people who are very good on it are very impatient. And they are very poor teachers.

Regardless, S15 appreciated the support and when developing language and skills about technology she found it valuable to

> [pick] it up from somebody else who is very comfortable with it.

In addition to younger family members, older adults also turned to their more tech-savvy peers, such as spouses and friends, for support. For example, S7A was supported by her husband:

> No, I had an old computer. My husband wanted to get me a computer. I wasn't all that keen on it. He was more interested in advancing technology … He was the one who wanted the microwave all those years ago. But he … we had the computer and then eventually it was finished. It's really my oldest son and he had a laptop and eventually he took me down to the Mac store and so I came home with a laptop. And he's the one that will come over and show me how to look this up or how to do this with my photographs or whatever. He sticks with me.

In speaking about her experiences with her Nook e-reader, S10 detailed how she went to a Barnes & Noble once to ask questions. She also relies on peers because it is more convenient to go to a computer-literate peer for support than to Barnes & Noble located in the United States:

> I didn't actually contact, I didn't ask the library, no I just went on—on the computer and just figured out how to download them. They were dealing more with Kindles, I think, and, um, so, no, I did once go into the Barnes & Noble. That was more I was just getting some—a cover for it actually. Now I have a few more questions for Barnes & Noble next time I get to the States, but it's in the States, so.
>
> Interviewer: Okay, so you—what kind of order would you go in for looking for help with downloading books, and—would you start at Barnes & Noble, or …?
>
> S10: If I needed help actually downloading them?
>
> Interviewer: Or just any help with your e-reader.
>
> S10: No, I would ask a friend of my husband's.
>
> Interviewer: Okay.
>
> S10: Because he knows all about downloading books.

Interviewer: Mm-hmm. Okay. So you would start with …?

S10: He was on the li—he was president of the library board of a small town near here, so he knows all about libraries and books and stuff.

Interviewer: Right.

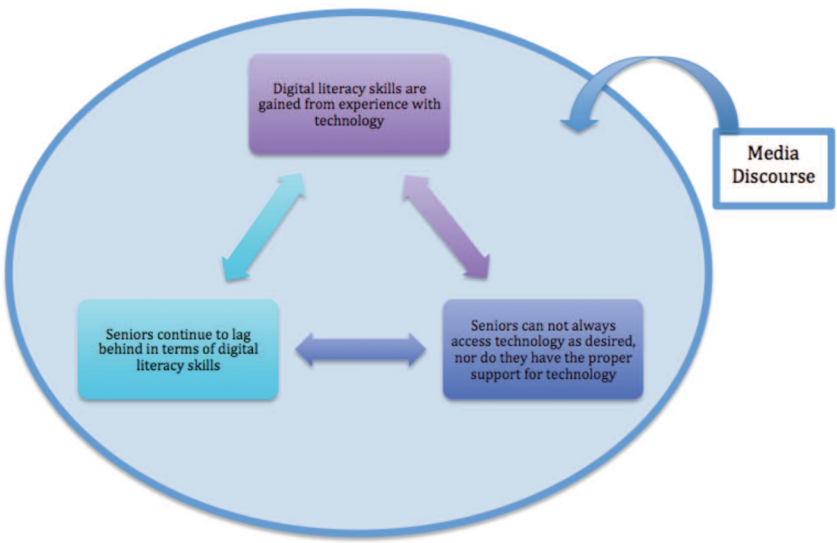
S10: And he's really computer literate, so I would ask him.

A good support system is an important aspect for overcoming barriers to digital literacy. With the help of support systems, including people older adults are comfortable with, such as family and friends, older adults can gain the experience necessary to become digitally literate. Obtaining know-how knowledge, such as troubleshooting through watching and learning, from family members and peers can help foster confidence, dispel media assumptions, and aid in overall digital literacy.

Conclusions

Based on our analysis of interview and survey data, we have begun to develop a model of digital literacy (see Figure 1). This model stresses the relationship between digital literacy and experience. It highlights the following paradox: experience is critical for older adults if they are to gain digital literacy, however, it is difficult for older adults to gain the needed skills, as they do not have the necessary support in place. In contrast to other frameworks that explore similar concepts, such as perceived usefulness, perceived ease of use, and social influence (as expressed in Fred Davis' 1993 Technology Acceptance Model), experiences (expressed in the Unified Theory of Acceptance and Use of Technology developed by Venkatesh, Morris, Davis, & Davis in 2003), our model highlights the link between support and digital literacy as an indicator of the use of ICTs by older adults. We frame this relationship between use and support in a social context where the rhetoric about older adults and technology is largely negative. In

Figure 1: Problematizing the digital literacy paradox in the context of older adults



our study, support to engage with ICTs comes primarily from peers and family members. In addition to family and peers, a stronger support system for older adults is needed to promote an awareness of ICTs and to help older adults gain valuable digital skills. Importantly, this entire paradox occurs within the larger context of a media discourse around older adults, which indicates that they are far behind younger generations in terms of ICT use. While aiming their technology at younger populations, advertisements for cell phones, computers, tablets, and digital applications all ignore older adults, who are a quickly growing segment of the population (Statistics Canada, 2011). Although this societal discourse might appeal to younger generations that feel tech-savvy and in the know, it also affects older adults, whose takeaway from this discourse is that ICTs are not senior-friendly. A clarification of this notion is required, both in the media and for older adults themselves, who have been shown to benefit from ICT use (Adler, 2002; Bradley & Poppen, 2003; Campbell, 2008; Chaffin & Maddux, 2007; Chen & Persson, 2002; Gatto & Tak, 2008; Sum, Mathews, Hughes, & Campbell, 2008; Xie, 2008). When older adults realize the utility of ICTs for their own benefit, they can move from a basic curiosity about these tools to a deeper understanding, and incorporate them further into their daily routines—thus gaining experience and digital literacy.

In developing this model, we incorporate the cognitive and socio-emotional aspects of digital engagement (Eshet-Alkalai, 2004; Haight, et al., 2014) as contributing factors to gaining experience and digital literacy. This builds on studies that found that older adults were excited about learning technology that could help them maintain their independence and quality of life, but expressed frustrations, limitations, and usability concerns (Heinz, Martin, Margrett, Yearns, Franke, Yang, Wong, & Chang, 2013). We also integrate findings suggesting that social support factors influence receptivity (Chappell & Zimmer, 1999). Through interviews and surveys, we begin to interrogate where and how experience is gained and what barriers and support are available for older adults as they adapt to digital technology. We feel that experience is critical because it helps reduce anxiety around technology use, and demonstrates the relevance of the technology, which in turn promotes self-determined use of ICTs. However, we recognize that the relationships proposed in the model are tenuous and further research is needed to test the relations. For example, the relationship between the perceptions of older adults regarding ICTs and their use, as well as the perceptions of older adults regarding the media portrayal of their generation, need to be further examined.

Age was a defining characteristic of this study both as an inclusion criterion for participants and as a developing theme. Age is not only a biological marker, but it is also a social construction. Through both the interviews and the surveys we learned that older adults often see their age as a factor in their ICT use. They recognize differences in their use and knowledge of ICTs in comparison to younger generations. Given the presence of a sometimes negative or mocking portrayal of older adults in the media, it is important for older adults to have support in obtaining digital literacy, as it would be easy to fall victim to the rhetoric that they are "inept."

Since the late 1990s there has been an upward trend in older adults adopting ICTs. In 2000, 93 percent of those aged 75-plus did not use the internet. Over the past 16

years that number has decreased to about 50 percent (Orlov, 2016). The images depicting children teaching older adults suggests that older adults are being socialized into technological spaces in supportive and encouraging ways. Scott from the 4GS ad is in fact willing to show his parents the capabilities of his phone and how they can use it: "You can control the TV with that thing?" says Scott's excited father. "Yeah, you can record shows too," adds Scott with a smile. Scott's dad takes the 4GS out of his son's hands, "Oh yeah" he says, "I'm gonna like this!"

Acknowledgements

This research was supported by a Social Sciences and Humanities Research Council of Canada (SSHRC) grant given to Anabel Quan-Haase, Insight Development Grant #R3603A17.

References

72andSunny. (2013). *Samsung Galaxy S4 commercial graduation pool party* [Television commercial]. USA: TBS. URL: https://www.youtube.com/watch?v=Dd20YYoH8lA [January 24, 2016].

Adler, Richard. (2002). *Age wave meet the technological wave: Broadband and older Americans.* URL: http://www.seniornet.org/downloads/broadband.pdf [February 2, 2016].

Allen, Mary. (2013). Consumption of culture by older Canadians on the Internet. *Insights on Canadian society*. Ottawa, ON: Statistics Canada. URL: http://www.statcan.gc.ca/pub/75-006-x/2013001/article/11768-eng.pdf [February 2, 2016].

Ally. (2016, February 1). *Facts of life: Tech support* [Video]. URL: https://www.youtube.com/watch?v=aL2wal9Wp-E [February 13, 2016].

Barlow, John Perry. (1995, November 30). *It's a poor workman who blames his tools.* URL: http://archive.wired.com/wired/scenarios/workman.html [February 13, 2016].

Beckerman, Jim. (2016, August 15). Tech-savvy kids volunteer to help North Jersey older adults cope with new technology. *The Record*. URL: http://www.northjersey.com/news/tech-savvy-kids-volunteer-to-help-north-jersey-older adults-cope-with-new-technology-1.1645449?page=all [February 22, 2016].

Bennett, Sue, & Maton, Karl. (2010). Beyond the 'digital natives' debate: Towards a more nuanced understanding of students' technology experiences. *Journal of Computer Assisted Learning*, *26*(5), 321–331.

Bond, Gail E., Burr, Robert L., Wolf, Fredric M., & Feldt, Karen. (2010). The effects of a web-based intervention on psychosocial well-being among adults aged 60 and older with diabetes: A randomized trial. *The Diabetes Educator*, *36*(3), 446–456.

Bradley, Natalie, & Poppen, William. (2003). Assistive technology, computers, and Internet may decrease sense of isolation for homebound elderly and disabled persons. *Technology and Disability, 15*(1), 19–25.

Broady, Tim, Chan, Amy, & Caputi, Peter. (2010). Comparison of older and younger adults' attitudes towards and abilities with computers: Implications for training and learning. *British Journal of Educational Technology, 41*(3), 473–485.

Campbell, Robert James. (2008). Meeting older adults' information needs: Using computer technology. *Home Health Care Management & Practice, 20*(4), 328–335.

Chaffin, Amy J., & Maddux, Cleborne D. (2007). Accessibility accommodations for older adults seeking e-health information. *Journal of Gerontological Nursing, 33*(3), 6–12.

Chappell, Neena L., & Zimmer, Zachary. (1999). Receptivity to new technology among older adults. *Disability and Rehabilitation*, *21*(5–6), 222–230.

Chen, Wenhong, & Wellman, Barry. (2005). Minding the cyber-gap: The internet and social inequality. In M. Romero, & E. Margolis (Eds.), *The Blackwell companion to social inequalities* (pp. 523–545). Padstow, UK: Blackwell Publishing.

Chen, Yiwei, & Persson, Anna. (2002). Internet use among young and older adults: Relation to psychological well-being. *Educational Gerontology, 28*(9), 731–744.

Cyber-seniors. (2016). *Connecting generations: Cyber-seniors*. URL: http://cyberseniorsdocumentary.com/ [February 2, 2016].

Davis, Fred D. (1993). User acceptance of information technology: System characteristics, user perceptions and behavioural impacts. *International Journal of Man-machine Studies, 38*(3), 475–487.

Delightfullydumb. (2016, March 31). *Seniors vs technology* [Video]. URL: https://www.youtube.com/watch?v=VqiSfYvegbE [February 3, 2016].

Dickinson, Paul, & Sciadas, George. (1996). Access to the information highway. *Science and Technology Redesign Report*. Ottawa, ON: Statistics Canada. URL: http://www.statcan.gc.ca/pub/63f0002x/63f0002x1996009-eng.pdf [February 3, 2016].

DiMaggio, Paul, & Hargittai, Eszter. (2001). From the 'digital divide' to 'digital inequality': Studying Internet use as penetration increases. *Princeton: Center for Arts and Cultural Policy Studies, Woodrow Wilson School, Princeton University*, *4*(1), 4–2. URL: https://www.princeton.edu/~artspol/workpap/WP15 - DiMaggio+Hargittai.pdf [February 3, 2016].

Eshet-Alkalai, Yoram. (2004). Digital literacy: A conceptual framework for survival skills in the digital era. *Journal of Educational Multimedia and Hypermedia, 13*(1), 93–106.

Friemel, Thomas N. (2016). The digital divide has grown old: Determinants of a digital divide among seniors. *New Media & Society, 18*(2), 313–331.

Gasser, Urs, & Palfrey, John. (2008). *Born digital: Connecting with a global generation of digital natives*. New York, NY: Perseus Press.

Gatto, Susan L., & Tak, Sunghee H. (2008). Computer, Internet, and e-mail use among older adults: Benefits and barriers. *Educational Gerontology, 34*(9), 800–811.

Genzlinger, Neil. (2015, May 15). The Internet isn't just for the young: 'Cyber-seniors' focuses on a program for retirees. *New York Times*. URL: http://www.nytimes.com/2014/05/16/movies/cyber-seniors-focuses-on-a-program-for-retirees.html?_r=Ht [February 23, 2016].

Gilster, Paul. (1997). *Digital literacy*. New York, NY: Wiley Computer Publications.

Guo, Ruth X., Dobson, Teresa, & Petrina, Stephen. (2008). Digital natives, digital immigrants: An analysis of age and ICT competency in teacher education. *Journal of Educational Computing Research*, *38*(3), 235–254.

Haight, Michael, Quan-Haase, Anabel, & Corbett, Bradley A. (2014). Revisiting the digital divide in Canada: The impact of demographic factors on access to the Internet, level of online activity, and social networking site usage. *Information, Communication & Society, 17*(4), 503–519.

Hale, Timothy M., Cotten, Shelia. R., Drentea, Patricia, & Goldner, Melinda. (2010). Rural-urban differences in general and health-related Internet use. *American Behavioral Scientist, 53*(9), 1304–1325.

Happy Street Films. (2014, February 24). *Esurance "Beatrice" commercial 2014* [Video]. URL: https://www.youtube.com/watch?v=K5fn087Jk4 [January 24, 2016].

Hargittai, Eszter. (2002). Second-level digital divide: Differences in people's online skills. *First Monday*, *7*(4). URL: http://doi.org/http://dx.doi.org/10.5210%2Ffm.v7i4.942 [January 13, 2016].

Hargittai, Eszter, & Hinnant, Amanda. (2008). Digital inequality: Differences in young adults' use of the internet. *Communication Research, 35*(5), 602–621.

Hargittai, Eszter, & Hsieh, Yuli Patrick. (2012). Succinct survey measures of web-use skills. *Social Science Computer Review, 30*(1), 95–107.

Howard, Phillip N., Busch, Laura, & Sheets, Penelope. (2010). Comparing digital divides: Internet access and social inequality in Canada and the United States. *Canadian Journal of Communication, 35*(1), 109–128.

Heinz, Melinda, Martin, Peter, Margrett, Jennifer A., Yearns, Mary, Franke, Warren, Yang, Hen I., Wong, Johnny, & Chang, Carl K. (2013). Perceptions of technology among older adults. *Journal of Gerontological Nursing, 39*(1), 42–51.

Holloway, Sarah L., & Valentine, Gill. (2003). *Cyberkids: Children in the information age*. New York, NY: Psychology Press.

Isaacs, Ellen. (2015). Aging in a high tech world. *Huffington Post*. URL http://www.huffingtonpost.com/ellen-isaacs/aging-in-a-high-tech-world_b_6773438.html [January 24, 2016].

Jacobson, Jenna, Lin, Chang, & McEwen, Rhonda. (2017). Aging with technology: Seniors and mobile connections. *Canadian Journal of Communication, 42*(2), 331–357.

Karavidas, Maria, Lim, Nicholas K., & Katsikas, Steve L. (2005). The effects of computers on older adult users. *Computers in Human Behavior*, *21*(5), 697–711.

Madden, Mary. (2006). *Internet penetration and impact. Pew Internet and American Life Project.* Washington, DC: Pew Research Center. URL: http://www.pewInternet.org/2006/04/26/Internet-penetration-and-impact/ [January 24, 2016].

Mayzie. (2013, August 24). *German iPad cutting board* [Video]. URL: https://www.youtube.com/watch?v=p7RdfHiwA8A [January 24, 2016].

Merchant, Guy. (2007). Writing the future in the digital age. *Literacy, 41*(3), 118–128.

Mitzner, Tracy L., Rogers, Wendy A., Fisk, Arthur D., Boot, Walter R., Charness, Neil, Czaja, Sara J., & Sharit, Joseph. (2016). Predicting older adults' perceptions about a computer system designed for seniors. *Universal Access in the Information Society, 15*(2), 271–280.

Morris, Anne. (2007). E-literacy and the grey digital divide: A review with recommendations. *Journal of Information Literacy*, *1*(3), 13–28.

Murray, Meg Coffin, & Pérez, Jorge. (2014). Unraveling the digital literacy paradox: How higher education fails at the fourth literacy. *Issues in Informing Science and Information Technology, 11*(17), 85–100.

Norton, John A., & Bass, Frank M. (1987). A diffusion theory model of adoption and substitution for successive generations of high-technology products. *Management Science*, *33*(9), 1069–1086.

Oblinger, Diana. (2003). Boomers gen-xers millennials. *EDUCAUSEreview*, *500*(4), 37–47. URL: http://www.odec.umd.edu/CD/AGE/MILLEN.PDF [January 20, 2016].

Ono, Hiroshi, & Zavodny, Madeline. (2007). Digital inequality: A five country comparison using microdata. *Social Science Research, 36*(3), 1135–1155.

Orlov, Laurie M. (2016). *2016 technology survey: Older adults, age 59-85+*. Mason, OH: Aging in Place Technology Watch. URL: https://www.ageinplacetech.com/files/aip/Linkage%202016%20Technology%20April%202016.pdf [September 25, 2016].

Prensky, Mark. (2001). Digital natives, digital immigrants part 1. *On the Horizon*, *9*(5), 1–6.

puremaplesyrup22. (2011, September 15). *Grandparents act like monkeys on Webcam!* [video file]. URL: https://www.youtube.com/watch?v=kOG1BcVKZMM [January 24, 2016].

Quan-Haase, Anabel, Martin, Kim, & Schreurs, Kathleen. (2014). Not all on the same page: E-book adoption and technology exploration by seniors. *Information Research*, *19*(2). URL: http://files.eric.ed.gov/fulltext/EJ1032691.pdf [January 24, 2016].

Quan-Haase, Anabel, Martin, Kim, & Schreurs, Kathleen. (2016). Interviews with digital seniors: ICT use in the context of everyday life. *Information, Communication & Society*, *4*(5), 691–707.

Quan–Haase, Anabel, Mo, Guan Ying, & Wellman, Barry. (2017). Connected seniors: How older adults in East York exchange social support online and offline. *Information, Communication & Society, 20*(7), 967–998. http://dx.doi.org/10.1080/1369118X.2017.1305428

Ransdell, Sarah, Kent, Brianna, Gaillard-Kenney, Sandrine, & Long, John. (2011). Digital immigrants fare better than digital natives due to social reliance. *British Journal of Educational Technology*, *42*(6), 931–938.

Rogers, Everett M. (2003). *Diffusion of innovations* (5th ed.). New York, NY: Free Press.

Selwyn, Neil. (2004). The information aged: A qualitative study of older adults' use of information and communications technology. *Journal of Aging Studies*, *18*(4), 369–384.

Shapira, Naama, Barak, Azy, & Gal, Iddo. (2007). Promoting older adults' well-being through internet training and use. *Aging & Mental Health, 11*(5), 477–484.

Slegers, Karin, Van Boxtel, Martin P., & Jolles, Jelle. (2008). Effects of computer training and internet usage on the well-being and quality of life of older adults: A randomized, controlled study. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *63*(3), 176–184.

Smith, Aaron. (2014). Older adults and technology use. *Numbers, Facts, and Trends shaping the World.* Washington, DC: Pew Research Center. URL: http://www.pewInternet.org/2014/04/03/older-adults-and-technology-use/ [January 25, 2016].

Statistics Canada. (2011). *The Canadian population 2011: Age and sex.* Ottawa, ON: Statistics Canada. URL: https://www12.statcan.gc.ca/census-recensement/2011/as-sa/98-311-x/98-311-x2011001-eng.cfm [January 23, 2016].

Sues, Phyllis. (2015). Computer savvy at 91? Who me? *Huffington Post*. URL: http://www.huffingtonpost.com/phyllis-sues-/older adults-and-technology_b_6423968.html [January 24, 2016].

Sum, Shima, Mathews, R. Mark, Hughes, Ian, & Campbell, Andrew. (2008). Internet use and loneliness in older adults. *CyberPsychology & Behavior, 11*(2), 208–211.

Tapscott, Don. (1999). Educating the net generation. *Educational Leadership*, 56(5), 6–11.

Venkatesh, Viswanath, Michael G. Morris, Gordon B. Davis, and Fred D. Davis. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478.

Xie, Bo. (2008). Multimodal computer-mediated communication and social support among older Chinese internet users. *Journal of Computer-Mediated Communication, 13*(3), 728–750.

Zickuhr, Kathryn, & Madden, Mary. (2012). Older adults and internet use. *Pew Research Center's Internet & American Life Project*. Washington, DC: Pew Research Center. URL: http://www.pewinternet.org/2012/06/06/older-adults-and-internet-use/ [January 24, 2016].