Evidence-based Digital Literacy Class for Low-income African-American Older Adults

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Abstract

Based on our community engagement project involving 47 low-income African-American older adults from a senior community center, this study analyzes how an underserved population acquires knowledge and skills related to digital technologies. We discuss the conceptualization, implementation and evaluation of a weekly, four-month long computer class for members of the senior community center. Our mixed-method research shows the importance of taking into account both the multidimensional nature of adult learning and the social and cultural contexts in which learning occurs when working with underserved adult populations. Findings from our formative and evaluative research offer insight into changes in the computer class participants' attitudes toward and perspectives on key digital literacy issues including security and privacy online and online information verification. Scholarly and policy implications are discussed in the context of digital competency and adult learning for marginalized populations.

Keywords: community engagement; underserved population; digital literacy; African-American older adults

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Introduction

Increased concern regarding misinformation and disinformation online highlights the importance of digital and information literacy among citizens (Anderson & Rainie, 2017; Connaway, Julien, Seadle, & Kasprak, 2017; Foley, 2017; Tharoor, 2018). Secondary and higher education institutions have strengthened information literacy offerings in their curricula in response to these concerns (Foley, 2017), and academic and industry workshops have discussed challenges and opportunities in this area (Connaway et al., 2017).

Despite this increased interest, insufficient scholarly attention has been paid to how marginalized groups are affected by this phenomenon (Polizzi, 2017). Previous research suggests underserved populations tend to be left behind, whether due to inadequate access to digital devices or lack of relevant skills (Perrin, 2015; Smith, 2014). In particular, more digital literacy programs informed by empirical research are needed for low-income African-American older adults, as they tend to have lower levels of technology access and use compared to similar age cohorts of other racial and income groups (Jaeger, Bertot, Thompson, Katz, & DeCoster, 2012; Perrin, 2015; Seo, Erba, Geana, & Lumpkins, 2017; Smith, 2014). In addition, older adults are a prime target for online scams (Epperson & Dickler, 2017; Whitty, Doodson, Creese, & Hodges, 2015). As more and more activities take place online, it is important that these older adults be equipped with relevant technology tools and skills.

Our research examines how a digital literacy class for low-income African-American older adults has influenced their uses of digital technologies, verification of online information, as well as their perceptions of privacy and security online. Based on formative research, the research team designed and implemented a 90-minute weekly class for four months at a senior

community center, which is located in one of the poorest neighborhoods in a major city in the

Midwest and serves low-income African-American older adults in the area. While the senior

community center is open to anyone older than 55 years old, most active members are older than

65. We conducted a program evaluation relying on seven focus groups with members of the

community center before and after the digital education program, participant observations during

the program, interviews with the class instructor and director of the center, and analysis of class

documents and assignments.

This research has scholarly and practical implications regarding digital literacy for low-

income African-American older adults and other marginalized groups. Findings from the current

study enhance our understandings of adult learning in the area of digital literacy among this

population. It also provides a framework for developing and evaluating community engagement

projects in the context of digital literacy. Our curriculum and insights from the class will help

inform other similar courses aimed at supporting underserved populations.

Literature Review

Digital Literacy

While scholars have proposed slightly different definitions of digital literacy, there is a

general consensus that it refers to the ability to find, evaluate, create, and use content and

information using digital technologies (Cordell, 2013; Cornell University, 2018; Walton, 2016).

It is important to note that digital literacy covers not only technical skills utilizing digital

technologies but also cognitive aspects of evaluating online information. For example, the

American Library Association Office for Information Technology Policy's Digital Literacy Task

Force stated that people who are digitally literate "possess the variety of skills—cognitive and

technical—required to find, understand, evaluate, create, and communicate digital information"

and are able to "interpret search results and judge the quality of the information retrieved" (Cordell, 2013, p. 179). In this sense, digital literacy is closely intertwined with information literacy, the ability to critically assess information (Jacobson & Mackey, 2013; Spitzer, Eisenberg, & Lowe, 1998). Paul Zurkowski, former president of the Information Industry Association who introduced the concept of information literacy, defined it as "techniques and skills for utilizing the wide range of information tools as well as primary sources in molding information-solutions to their problems" (Spitzer et al., 1998, p. 22).

While credibility assessment of online information sources has been an important research topic for some time (e.g., Metzger, Flanagin, & Medders, 2010; Sundar & Nass, 2001), there has been renewed attention to digital literacy and information literacy amid concerns regarding misinformation and disinformation (Foley, 2017; Tharoor, 2018). Being able to critically evaluate information online and to properly manage privacy and security settings online has become more important. Low-income and older adults are facing bigger challenges in this area due to general lack of access to digital technologies and relevant skills to use them (Hargittai & Dobransky, 2017). As surveys of U.S. adults have shown, older adults display lower rates of Internet adoption and social media use as compared with younger generations (Anderson & Perrin, 2016; Perrin, 2015; Pew Research Center, 2018). In early 2018, 66% of adults aged 65 or older reported using the Internet as compared with 98% of 18-29 year-olds, 97% of 30-49 year-olds, and 87% of 50-64 year-olds (Pew Research Center, 2018). Among older adults, those with higher income display higher levels of digital literacy than older adults with lower income and are also more likely to go online for diverse activities such as getting news and consulting government services (Hargittai & Dobransky, 2017).

In a series of focus groups with a racially diverse group of participants (about one-third African American, one-third White American and one-third Hispanic American) between 65 and 85 years old,[1] Mitzner et al. (2010) found that older adults perceive digital technologies favorably and that some of the main challenges they face pertain to security and reliability concerns. While older adults recognize the benefits of digital technologies for daily activities, maintaining social relationships and even overcoming some age-related barriers (e.g., physical mobility), they also fear that not being digitally competent can leave them further behind (Hill, Betts, & Gardner, 2015). Overall, studies focusing on older adults reveal that they are open to digital technologies but many of them, especially those belonging to marginalized groups, feel unsure how to use these technologies.

Despite relatively rapid progress in access to digital technologies, the level of Internet adoption among older African-American adults (55 or older) is particularly low. In addition, low-income African-American families are less likely to be digitally competent, as we describe in the next section (Smith, 2014). To reverse these trends, it is important to develop evidence-based digital and information literacy programs for low-income African-American older adults.

Demographic Characteristics of African Americans' Use of Digital Technologies

Various reports on the technology uses of African Americans paint a complex picture of their digital competency levels and the relationship they have developed with digital technologies, as one could expect from such a large and heterogeneous group. For instance, while African Americans are less likely than White Americans to own a traditional computer or have high-speed Internet at home (Perrin, 2017; Seo et al., 2017), African-American women have adopted social media platforms at higher rates than other demographic groups (Grace,

[1] Researchers did not report participants' income but noted that 46% of them had less than a college degree, while 56% had a college degree or more.

McCaskill, & Roussell, 2017). More specifically, African-American women are more likely to use social media for activism (Wood, Hughs, & Ainpour, 2018). In addition, older African-American women (50+ years old) are more likely to spend time on social media and use social media to develop a professional network and meet people with similar interests than older White-American women (Grace et al., 2017). Similarly, young African-Americans are more likely than youth from other racial/ethnic groups to use Twitter, although usage differences disappear when Twitter users' interests in various topics are taken into account (Hargittai & Litt, 2011).

The availability of mobile devices has enhanced low-income populations' access to the Internet. Sixty-three percent of low-income African Americans own a smartphone, which is similar to the rate of smartphone ownership among other racial groups in the same income category, but lower than ownership among higher-income African Americans and other racial groups (Perrin, 2017). However, African Americans are more likely to access the Internet via library computers than White Americans (Perrin, 2017). Horrigan (2017) developed categories pertaining to how U.S. adults approach facts and information online. He found that the most "confident" Internet users were "disproportionately white, quite well educated and fairly comfortable economically" (para. 5). These users were also overwhelmingly young, compared to the "wary," who were 65 years old or older (Horrigan, 2017). Similar findings had been reported about 10 years ago, thus revealing that the increase in Internet use over the past decade has not been uniform and that disparities in Internet use may be reinforcing existing social inequalities (Hargittai, 2008).

While older Americans are increasing their online presence, as suggested above, this trend has mainly been driven by affluent older adults (Anderson & Perrin, 2017; Hargittai & Dobransky, 2017; Hunsaker & Hargittai, 2018). About two-thirds of adults older than 65 use the

Internet and about two-fifths own a smartphone, whereas less than a third of low-income older

adults (annual household income below $30,000) have home broadband (Anderson & Perrin,

2017). A similar pattern emerges for social media use. While approximately one-third of older

adults use social media (Smith & Anderson, 2018), more than half of affluent older adults use

social media platforms compared to only one-fifth of low-income older adults (Anderson &

Perrin, 2017). In terms of skills, affluent older adults have higher levels of general Internet usage

skills and are more social media savvy than low-income older adults (Hargittai, Piper, Morris,

2018). Older adults' Internet use also varies among age groups, with more "young-old" adults

using the Internet than "oldest-old" adults (Hunsaker & Hargittai, 2018, p. 5).

A recent report identified the demographic profile of non-Internet users in the United

States (about 11% of the population), revealing that, in order of importance, education, age,

geography, income, and race influence Internet usage (Anderson, Perrin, & Jiang, 2018). Low-

income, older African Americans with less than a high school degree and living in a rural area

represent the group most likely to *not* use the Internet (Anderson et al., 2018). The computer

class we developed as part of our digital literacy program focuses on the intersection of three of

these identities: age, income, and race.

Adult Learning Theory

Efforts to enhance digital literacy among older adults require informed understandings of

how adults learn. Adult learning theory provides a useful framework for this (Merriam, 2008;

Tisdell, 2008). It focuses on "the individual learner, how that learner processes information, and

how learning enables the individual to become more empowered and independent" (Merriam,

2008, p. 94). At the same time, there has been increased interest in and emphasis on

understanding the *context* in which learning takes place (Fenwick, 2008; Merriam, 2008; Tisdell,

2008). Context here refers to "where the learner is situated concretely (as in the workplace) or socio-culturally (as in working-class America, Confucian society, and so on)" (Merriam, 2008, p. 95). In examining workplace learning, for example, it is important to analyze power and politics such as what knowledge counts in the workplace and who makes the decision (Fenwick, 2008). Spirituality in adult learning is another context that has garnered increasing attention (Tisdell, 2008). Our current study takes into account the digital learning context of low-income African-American older adults. Such contexts include a senior community center in one of the poorest neighborhoods in a major city in the Midwest, predominance of African Americans at the center, and the center's affiliation with Christianity. From a socio-cultural perspective, members of the center, all born before the 1964 Civil Rights Act, have witnessed both progress made in terms of race relations as well as institutional practices that have kept their community marginalized.

Another important trend in adult learning research is recognition of the multidimensional nature of learning (Freiler, 2008; Merriam, 2008; Shelton, Conan, & Fulghum-Nutters, 1992). This approach takes into account different ways that people learn best and helps provide appropriately diverse learning environments. For example, Freiler (2008) argued that "engaged, lived bodily experiences of physicality, sensing, and being in both body and world" can help enhance learning and knowledge (p. 39). Being in line with holistic and integrative learning, this embodiment approach makes the body more prominent as a source of knowledge and site for learning. In addition, social processes and sociocultural dimensions are considered for a personalized approach to learning. This multidimensional approach to learning provides guidance for developing a tailored digital literacy program for low-income African-American older adults. Consistent with a general consensus in the area of adult learning, we chose to make participation in our computer sessions optional. As a consequence, members of the senior

community center who took part in the program were motivated to learn about computer skills by internal factors rather than external ones, a key characteristic of adult learners in the context of the theory (Merriam, 2001).

In accordance with adult learning theory's focus on individual learners, we included members of the senior community center in the planning of the computer class in order to determine their overall levels of digital literacy and identify topics of particular interest. Other tenets of adult learning theory include task-oriented activities, immediate relevance of learned knowledge, self-directed instructions, out-of-classroom learning, supportive group dynamics, as well as a climate of mutual respect and collaboration with educators (Knowles, Holton, & Swanson, 2005; Merriam, 2001, 2008). Therefore, the computer class was conceptualized to include specific activities relevant to members' digital literacy needs, and weekly handouts were provided to participants as guidance during the class and practice outside of class. As members of the community center had varying levels of computer experience and digital literacy, members with more experience and higher levels of digital literacy were sometimes paired with other members to assist with specific activities. Members also provided their feedback throughout the program, allowing the instructor to know which topics to address and/or further address in subsequent class sessions.

Present Study and Research Questions

Digital access and skills are increasingly important for citizens to engage in different aspects of society. However, low-income African-American older adults tend to show lower levels of digital competency and access to digital technologies compared to similar age cohorts of other racial and income groups. If the gap is not addressed, they will be left even further behind. As part of our efforts to contribute to narrowing the digital divide and enhancing digital

competency levels among members of marginalized groups, our research team partnered with a community center that serves low-income African-American older adults. As explained below, the center is equipped with a computer lab and some members of the center had expressed interest in a new computer class after a previous one had been canceled. At the same time, members of the center, who had taken part in the previous computer class, voiced their dissatisfaction with how the previous class was structured and instructed. Therefore, our research team aimed to develop a computer class grounded in the tenets of digital competency and adult learning theory and guided by the needs and concerns expressed by members of the center.

To this end, the present study explored what low-income African-American older adults perceived as the main digital skills they wanted to acquire as well as the primary concerns they had about taking a computer class and learning relevant skills. This study also evaluated the effectiveness of the computer class by examining how the perspectives of participants in the computer class evolved and differed from non-participants in terms of privacy and security online and verifying online information. We focus on the areas of privacy and security and information verification online, as these are important, fundamental areas for those who are not currently digitally sophisticated (Cordell, 2013; Jacobson & Mackey, 2013; Walton, 2016). Older adults are a prime target for online scams, and privacy and security concerns often discourage older adults from learning and using the Internet (Epperson & Dickler, 2017; Whitty, Doodson, Creese, & Hodges, 2015). As discussed above, evaluating information online has become ever more important as misinformation can spread quickly via popular social media sites (Connaway et al., 2017; Foley, 2017; Tharoor, 2018). Finally, previous research on adult learning provides guidance to the research design and analysis (Fenwick, 2008; Freiler, 2008; Merriam, 2008; Tisdell, 2008).

RQ1a: What are the main digital skills low-income African-American older adults in a large Midwestern city perceived as important to acquire?

RQ1b: What are the primary concerns among low-income African-American older adults in a large Midwestern city regarding taking a computer class and learning digital technology skills?

RQ2: How did the perspectives of participants in the computer class evolve and differ from non-participants in terms of privacy and security online?

RQ3: How did the perspectives of participants in the computer class evolve and differ from non-participants in terms of verifying online information?

Methods

To answer these research questions, we used a mixed-methods approach adopting several qualitative research methods. Figure 1 shows an overview of our empirical research steps for this project. Our two primary methods were focus groups and participant observations. We conducted a total of seven focus groups with African-American older adults who are members of the community center serving low-income adults aged 55 and over.[2] In addition, the research team completed participation observations of the computer class attended by African-American older adults for four months (from September to December 2017). Data from focus groups and participation observations were triangulated by interviews with the computer class instructor, the senior community center director, and community staff members, as well as by analyses of the instructor's teaching journal, class exams, and other class-related documents. Specific details of each method are described below. By using the mixed-methods approach, this research provides a more holistic understanding of low-income African-American older adults' experiences with

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[2] We conducted research with African-American adults aged 55 and over who are members of the senior community center, since the age requirement for the senior community center is 55 years or older.

digital technologies. The research protocol used in this study was approved by the Institutional Review Board of the authors' university.

Focus Group Research

Before conceptualizing and implementing the computer class, we conducted five focus groups with 33 low-income African-American older adults in February and March 2017. These focus groups were aimed at understanding the center members' experiences, familiarities, and needs in terms of digital skills and literacy. Focus groups were opened to all members of the center, regardless of experiences with computers, and the moderator guide included questions for participants who may never had used a computer or gone online. Focus group participants addressed questions such as "What comes to mind when you hear the word 'computer'?"; "What do you think people do with a computer?"; "Are there some tasks on the computer that you feel more comfortable doing than others? Which ones? Why?"; "What are the main barriers you face when you want to use a computer?"; "What would motivate you to want to use a computer or go online?"; and "What would you like to learn or learn more about in a computer class?"

Two additional focus groups with 16 participants were conducted in December 2017, four months after the start of the computer class, to evaluate how the computer class has influenced participants' experiences and comfort with technologies and to understand their perspectives on the role that technologies play in their lives. In the area of digital skills and literacy, we asked several of the same set of questions from the February/March 2017 (pre-computer class focus groups) to analyze how computer class participants' attitudes toward related topics have changed. The post computer class focus groups also included specific class-related questions, such as "What motivated you to take the computer class?"; "Which aspect of the class was most helpful? Why?"; "Which aspect of the class did you find most challenging?

Why?"; and "Has taking the class changed the way you get information online? How so?" Focus group participants who had not completed any of the computer sessions were asked their thoughts about their peers' comments, answering questions such as, "How willing would you be to attend a computer class based on your peers' experiences? Why or why not?"; "How is listening to your peers talk about their experience in the computer class change your perceptions of computer?"

All focus group were held in a conference room of the senior community center and lasted between 60 and 90 minutes. Participants were recruited through the community center, and all participants were members of the center. More than 90% of about 200 members of the center are African American, and all focus group participants identified as African Americans. Focus group flyers were placed at the check-in desk of the center and center staff announced the focus groups at several meetings held at the center.

Participant Observations

Participation observation is a widely used qualitative research method for a systematic description of behaviors or events in a social setting (Guest, Namey, & Mitchell, 2013). This method is relevant for the current study as we attempt to understand the ways low-income African-American older adults learn digital technologies. In particular, by conducting participant observations from September to December 2017, we were able to track a longer and regular insight into the participants' experiences. Observers' fieldnotes were generated by three faculty members who alternated observing the weekly, 90-minute computer sessions.

The instructor, a graduate student in mass communications with significant experiences with digital technologies and also a member of the research team, wrote a journal entry every week after each class session. Fieldnotes from participant observers and the journal entries from

the instructor during the time period resulted in a 60-page single-spaced document. These notes

and entries were composed of five sections: (i) environment notes; (ii) lesson notes; (iii)

participant notes; (iv) feedback from class observers; and (v) reflections. These categories were

determined based on best practices on writing qualitative fieldnotes (Emerson, Fretz, & Shaw,

2011).

Additional Evaluation Data Collection

Interviews with the instructor were conducted every month during the four-month period

to gauge interactions during the class. Interviews with the community center director were

conducted three times—two interviews before the computer class began and one interview after

the computer class concluded. Interviews resulted in a 10-page, single-spaced document. In

addition, we analyzed class review exams taken by the participants at the end of the four-month

period and other documents related to class activities, such as lesson plans and written activities.

Participant Characteristics

A total of 47 low-income African-American older adults participated in our research.

This number represents the unique number of participants, as some participated in data collection

sessions at multiple stages of the research (e.g., formative focus groups, computer classes and

evaluation focus groups). Table 1 summarizes key characteristics of these participants, as well as

the focus groups they participated in and the number of computer sessions they attended. The age

range of the participants was from 55 and 88 years old ($M = 71$; $SD = 7.63$). Of those who

disclosed their age ($n = 43$), 13.9% ($n = 6$) were ages between 55 and 64 years old, 51.2% ($n =$

22) between 65 and 74 years old, and 34.8% ($n = 15$) between 75 and 88 years old. The majority

of the participants (76.7%, $n = 33$) were women reflecting the gender distribution of the senior

community center. Forty-two participants answered the education (highest level of education

completed) question. Of them, 50% ($n = 21$) said high school, followed by less than high school (16.6%, $n = 7$), associate degree (11.9%, n = 5), master's degree (11.9%, n = 5), and bachelor's degree (9.52%, $n = 4$). Of those who answered the income question ($n = 23$), 26.1% ($n = 6$) chose "less than $10,000" as their annual household income, 39.1% ($n = 9$) for $10,000-$19,999, and 34.8% ($n = 8$) for $20,000-$29,999.

Findings

In this section, we identify the main themes which emerged from our focus groups, participant observations, interviews, and analysis of relevant documents. To make this section more cohesive, results are organized by research questions, combining findings from the relevant research methods for each research question. We refer to each participant using a pseudonym to protect the participant's privacy and identity.

Formative Research (RQ1a and RQ1b)

Our first research question asked what are the main digital skills low-income African-American older adults in a large Midwestern city perceived as important to acquire (RQ1a) and what are the primary concerns among the group in taking a computer class and learning digital technology skills (RQ1b). The director of the senior community center indicated that the previous computer class run by a volunteer from a technology-related nonprofit organization lacked focus and relevance. According to both the director and class participants, the previous class put too much emphasis on computer hardware aspects and not enough attention to software aspects or other topics of interest to center members. One of the major complaints that emerged from the interviews and focus groups was that previous instructors often lacked empathy and patience. Referring to an early experience trying to learn how to use a computer, Betsy stated, "she [instructor] was so bossy until I didn't come back." Joy interrupted to say, "she knew

everything," to which Betsy responded, "yeah, she knew everything and I didn't know anything." Similarly, Denise talked about family members telling her how to use a computer, saying that "they don't talk to me, they just go on and tat, tat, tat, tat, tat; they don't have the patience."

Concerns over security and privacy online. Focus groups conducted in preparation for the computer class revealed central concerns participants had vis-à-vis computers that the class should address. These mainly dealt with privacy, security, online passwords, and an overall sentiment of feeling lost around computers. Maintaining their privacy was one of the main reasons participants cited for not using the Internet. For instance, Vince, referring to the Internet, stated, "I don't like all that stuff coming out there and people having access to your stuff, I wouldn't put a credit card number into anything because you never know what happens to it, I don't trust that." Pamela said she did not use the Internet for a similar reason, saying, "I don't trust that. I don't want my information out there," while Penny stated, "nothing, nothing, nothing of a personal nature goes on the computer." Others were also concerned about their information, especially because they felt they had no control over what others could find out about them online. Joy worried about the availabilities of "addresses, where someone is living," emphasizing that the Internet can "show you the address and the house." Pat said this "can be dangerous too, people knowing where you're living." Denise echoed that sentiment, saying, "it's too much information. I didn't give it to them."

In addition to privacy concerns, participants were worried about security and discussed fear of being hacked or getting a virus on their computer. Discussing online shopping, Dominique stated, "you don't understand everything when a little, what you call that, icon comes up and you hit that button and you're making a virus in your computer." Pat expressed her

concerns when going online: "there are things that I do on the Internet and I just have to pray and ask God to keep it safe." Similarly, Zari worried about scams because "there's too much other junk that you could end up in if you're not too sure [where to] click," whereas Emma worried that "there are too many hackers."

Participants also expressed their frustration with online passwords, which Jayla referred to as "the most challenging thing in my life are these darned passwords." Vince stated, "You can't remember where you wrote them at, you can't remember if you transpose the numbers, so nobody else would know your secret, and sometimes you just can't remember it." Denise said that she did not take advantage of certain online services because they required a password. She used the example of medical records to illustrate her point: "you can go on the Internet and look at your whole records. I never would do it because my password, half the time I lost it and everything, but that's another thing I really want to be able to do." Sarah said that she would like to have "something" that she could use to "put it [password] in there in a coded fashion, so that it's not all there, but it's something that burns my memory."

Other desired skills. Focus group participants listed a range of specific programs they would like to learn about including Word, PowerPoint, and Excel. In addition, they indicated desire to improve their understandings of smartphones and tablets. Lilian said, "I have a tablet and I don't understand all the features of it." Thinking about the computer class itself, several participants said that having a "manual" would help them get more familiar with computers. Sarah imagined that manual as a "booklet with pictures" and Dominique said it would need to have "large print." Gayle described it as a "step-by-step" manual with instructions on how to "turn on the computer, punch here to go here, go up here to go find what you want to do, Internet or whatever it is." Penny explained the benefits of such a manual, stating, "you could teach

yourself, you could refer back to it." Frances said that having such a manual would allow people to "keep up and go home and practice."

Our formative research highlighted the need to create an open, judgment-free environment in which participants could work at their own pace and felt comfortable asking questions. It also helped us identify class topics such as digital privacy and security as well as basic computer skills and instructional needs such as step-by-step written manuals for participants.

Program Development: Computer Class

Based on these findings, we designed and offered a computer class for low-income African-American older adults who are members of the senior community center from September 2017 to December 2017. A total of 14 computer sessions were conducted with 18 individuals attending the computer class at least once. On average, 14 people attended the weekly session. Table 2 shows weekly course topics and number of participants. Primary topics covered in the class include verifying information online, managing privacy and security online, and using social media sites such as Facebook.

It was clear from the first week of the class that there was a great variance in terms of participants' experiences and comfort with computers. Moreover, even those who reported using a computer regularly lacked knowledge and perspectives on basic issues and functions of the computer. Some participants said they frequently used computers and were familiar and comfortable with them, while a few participants said they had never used a computer before. Even some of those who reported having used a computer before did not know how to type or copy/paste a URL onto a search window. Overall, completing each task on a computer took a lot of time. The instructor wrote in her journal, "I was very surprised as to how long the activity of

searching a URL and copying and pasting it into snopes.com took even for the participants who are familiar with working with computers." Given some participants' lack of basic knowledge and skills related to a computer and the Internet, our class covered from the very basics (e.g., turning on and off a computer and basic parts of a computer such as keyboard and mouse) to make sure everyone is on the same page. This also emphasized the need for understanding the multidimensional nature of learning (Freiler, 2008; Merriam, 2008; Shelton et al., 1992).

Evaluation Research: Privacy and Security Online (RQ2)

Our second research question asked how the perspectives of participants in the computer class evolved and differed from non-participants in terms of privacy and security online. Overall lack of knowledge among several participants despite their reported years of experience using a computer and the Internet encouraged the research team to take a more individualized and tailored approach to the computer class. This was also the case for privacy and security online. Once we started the computer class, it became even evident that we needed to devote additional time to this topic.

Needs. Our participant observation research showed that these older adults did not generally have proper security settings on their mobile phones or with social networking sites. Almost none of the participants had any kind of passcode created on their mobile devices. Many of them reported that they use a simple, common password for multiple online sites they use. While several participants had accounts with Facebook, they had limited knowledge regarding to management of their privacy settings on the site. Those who use Facebook reported that their children helped them create an account on the site but they felt uncomfortable managing their presence on the site. Therefore, the topic of privacy and security was covered in multiple sessions as they related to using the Internet, social media sites, and mobile phones. This was in

line with previous research and our focus group finding that security concerns discouraged many low-income African-American seniors from learning about or using digital technologies (Epperson & Dickler, 2017; Whitty et al., 2015).

Enhanced knowledge and comfort. Through this computer class, the participants learned how their activities online are tracked and how to manage privacy and security settings such as cookie tracking with Internet searches. Several participants discussed fears they had about their identities being stolen or privacy compromised online. Exercises in this area such as identifying phishing attempts (e.g., a scam email trying to get the receiver's login information) generated active discussions among participants. At the conclusion of a group exercise on phishing attempts, for example, the participants were able to identify some of the most common types of phishing scams: a request for payment or personal information and an email that mimics a sense of urgency.

Even when the session focused on using Facebook, the participants were most interested in learning about how to manage privacy settings on Facebook. Most participants had little knowledge about privacy settings on Facebook and several participants reported not ever managing the Facebook privacy settings. Participants reported that the session was "very helpful" as most of them wanted only their Facebook friends to see their posts but were unsure how to adjust their privacy settings to this. The instructor noted that "it appeared to me that participants had the most fun with this session." Indeed, using Facebook more securely and effectively was one of the topics African-American older adults wanted the project team to cover in our computer class when we conducted our formative focus groups.

Participants who completed the computer class and took part in the evaluation focus groups reported feeling more comfortable with passwords. Chloe explained how the computer

class helped her develop more secure passwords: "the password tips that we learned in class really helped. I was doing one password for 1234 […] but I changed all that. I changed all that." Chloe added that she now goes "every day to Facebook, emails, and my finances. I check them daily." Jayla said that the computer class made her "understand it [importance of proper passwords] better" and as a result is "not using the same passwords." Only one participant from the evaluation focus groups, Aisha, said she still needed help with her different passwords, acknowledging that she "learned it" but "cannot remember it."

Class participants also felt more knowledgeable about online security in general. For instance, Teressa explained how learning more about "cyber security" made her feel more secure about using a computer: "I didn't know what it [cyber security] was, but once you get into and you see all the different things that you can do, I'm feeling a little better about it. I was afraid to go out there, click on the wrong thing." Jayla talked about how she learned how to be careful about using public Wi-Fi: "I know it is a community thing and I don't want them to hack into my accounts. So, I'll be very limited on what I do, when I go to Panera or McDonald's," while Zari explained how "you can do a hotspot from different places, like the Wi-Fi."

Most participants reported fewer concerns about privacy and security, which changed their minds and behaviors about certain online activities. Referring to online banking, Mia stated, "I've gotten more favorable to it. I do all my banking online, I pay my bills online." Similarly, Zari said, "I was leery of doing my finances, but I do all my finances now." Teressa said she "set it [online banking] on the computer and got [her] passwords, adding, "I'm getting there. I feel a little comfortable with it." Understandably, some class participants still worried about security and privacy online. Sophia said, "I hear so much about scams and security."

Participants' enhanced understanding of issues related to online security and privacy was demonstrated during an exam administered at the final session of the computer. On the test, all participants were able to correctly indicate that they knew not to use personal information in their password or the same password for every account they have, and to use a combination numbers, symbols, upper and lowercase letters. Another portion of the test asked participants to clear their browsing data and write the steps they took to complete the task. All participants who took the test were able to successfully complete the task and accurately record their steps. The test then asked participants to open a new tab in Google Chrome using incognito mode, or private browsing mode, and to again record the steps they took to do so. More than half of the participants were able to open a new tab in incognito mode. Even if they were unable to do so, all but one participant was able to correctly write an explanation for why they would use incognito mode when browsing the Internet.

Evaluation Research: Verifying Information Online (RQ3)

Our third research question concerned how the perspectives of participants in the computer class evolved and differed from non-participants in terms of verifying online information. Given growing concerns about misinformation online, the computer class devoted one of the first sessions to how to verify information online. The participants were first presented a fake news article on genetically modified organism (GMO) and asked to tell whether the story was real or fake. The majority of the participants thought it was a real story. Rather than examining sources and facts to verify information in the article, participants largely based their judgment on their prior knowledge on the topic. The instructor then introduced fact-checking sites such as snopes.com and factcheck.org and other related methods of information verification

including Google reverse image search. The participants reported that these fact-checking sites and techniques were new to them.

After a couple of exercises on fact-checking, participants were excited about learning how to verify information. The participants especially enjoyed search engine activities including how to refine keyword search methods and exploring different content searches such as photos and videos. Many participants mentioned that they "loved" the activity and wanted to apply the refinement search techniques to other topics at home. Since fact-checking and search refinement were relatively new to every participant regardless of their level of experience with a computer, these activities generated a lot of enthusiasm.

Confidence and empowerment. No participant who completed the computer class and took part in the evaluation focus groups reported 'needing help with computers/digital technologies' or 'feeling lost around computers/left behind,' two themes that were predominant in the formative focus groups. On the contrary, the majority of participants reported feeling more comfortable with computers after the class. As Pamela explained, "until we started class, there were a lot of things I wasn't sure how to do them and actually do the procedure to get where I was trying to go." Similarly, Frances said, "I'm comfortable with just searching for things," while Sophia stated, "I feel like I know more. I can do more. I'm not afraid of it [the computer]." Ava summarized her experiences in the computer class as follow: "you feel like you are learning something; you feel like you gained." Abigail talked about the written instructions distributed at the beginning of every class, stating, "the comfort level that you acquire just through the hands on with the handouts, it made you feel like 'oh, okay.'"

Health information was one of the main interests among the participants. This is not surprising given their stage of life. Prior to taking the computer class, only a few participants

reported obtaining health information online, relying instead on the information provided by their primary care physician. However, after having completed the computer class, almost all participants said they now searched online for health information. Most of all, they reported feeling confident about verifying information. Aisha said she uses "WebMD health for women" to "put the medicine in," while Mia associated searching health information online to obtaining "a second opinion for what your doctor is telling you." Chloe, who said she "did not [verify health information until [she] took this class," explained how she searched online for additional information and then reported it to her doctor: "I'm about to get some cholesterol medication and I checked the dosage versus the number and went back and checked where my cholesterol was. And it was too much. Then I contacted her and told her about my investigation." Similarly, Sophia said she went online to learn more about her anemia: "I went to the website, pulled up 'anemic' and I looked at the cause, and how the symptoms and what to eat, and all this. And I gained a lot of information about it," while Frances explained how she sprained her ankle and sought out information online about it: "it gives you very specific things to look for to tell if it's broken or not. So, I think that I was well informed about what was going on with my ankle without consulting the doctor." Abigail simply stated that she goes "to all of them [health websites] to see what everybody has to say." Class participants felt empowered by retrieving health information online, as it gave them the opportunity to learn at their own pace. In most cases, participants used online health information to complement what their primary care physician had told them.

  Fact-checking online news. Throughout the duration of the lessons, participants began to develop a higher level of skepticism for information they found online compared to the initial week of our class. Some participants reported to the instructor they took the skills they had

learned during the lesson on information verification and used sites such as snopes.com to verify stories they came across on Facebook. Participants built upon this level of skepticism during the lesson on phishing scams but felt more confident in their ability to successfully identify a phishing scam instead of becoming a victim to one.

A portion of the test given to the participants in the final lesson dealt with identifying fake news. Participants were given a URL to search for and were asked to determine if the article was real or false with an explanation of their answer. All participants were able to correctly identify the article as false. When asked to explain their reasoning behind their decision, most participants indicated that they had used an information verification site such as snopes.com to verify the article. Several participants were able to identify additional ways a story could be verified such as checking if other new sources were reporting on the same story, checking the reliability of the news outlet publishing the story, and looking for spelling or grammatical errors.

Conclusion

Recognizing the growing significance of digital communication technologies in everyday activities, as well as a source of information and social networking, low-income African-American older adults participating in this study demonstrated a strong commitment to learning relevant knowledge and skills. Our four-month computer class was designed based on formative research and provided a valuable opportunity to gain insights into engaging this and other underserved groups in the area of digital technologies. Ultimately, this project may support low-income African-American older adults in enhancing their level of what some scholars call "technological capital," a concept based on an individual's awareness, knowledge, access, and technological capacity (Carlson & Isaacs, 2018). Lessons learned from this community

engagement project could be applied to low-income and/or older Americans of varying races and ethnicities.

Scholarly Implications

As emphasized in adult learning theory (Freiler, 2008; Merriam, 2008; Shelton et al., 1992), our findings illustrate the importance of considering the multidimensional nature of learning among adult learners. While we kept the class size fairly small to provide more tailored instruction to each individual, we still identified significant variance in participants' learning styles. Some participants were visual learners asking the instructor to draw pictures in explaining some concepts, whereas others learned most when engaging in hands-on exercises. Most participants reported that handouts for each class lesson were helpful, as they allowed them to review and practice on their own. Considering this, the instructor stayed in the community center's computer lab for some time after class to continue to interact with class participants as needed. This understanding of the multidimensional learning helped the research team convey respect and empathy to the participants.

We also needed to consider the context in which the computer class took place. Context is an important element in adult learning theory (Fenwick, 2008; Merriam, 2008; Tisdell, 2008). Located in one of the poorest neighborhoods in a metropolitan area in the Midwest, the senior community center serves low-income African-American older adults. There were some tensions in the metropolitan area in recent years with regard to city development plans where the African-American community in the area felt excluded from conversations related to city planning which could affect a nearby historically Black district. In addition, the majority of the class participants were female, reflecting the gender distribution of the center's members. Female participants tended to be most active in class discussions while male participants were quiet. Some of the

participants were more familiar with ins and outs of how the senior community center operates and who are "desirable" members of the center. These affected dynamics in class in a subtle way, and the research team paid the utmost attention to being respectful to the participants.

Our interest-driven learning design framework turned out to be effective and important in developing our curriculum. This framework develops learning activities by drawing on learners' specific interests, as interest is an effective motivator for learning (Dantas Scaico, de Queiroz, & Lima Dias, 2017; Torrey, 2011). Through our focus groups, we were able to gather data about community center members' interests in learning digital technologies as well as perspectives on related issues. These were then incorporated into the curriculum to support achieving positive learning outcomes. Our participant observations and evaluation focus groups showed that the class participants appreciated that the curriculum was geared toward their expressed interests.

Our findings also have implications for technology acceptance models concerning underserved populations (Atkin, Hunt, & Lin, 2015; Venkatesh, 2000; Venkatesh & Davis, 2000). In line with previous research on older adults (Epperson & Dickler, 2017; Whitty et al., 2015), we found that members of the center had deep concerns about security and privacy online, especially as they feel unable to properly manage relevant settings on digital platforms even as they were aware that older adults are a target for online scams. These concerns had negatively affected their adoption of digital technologies. As they became more confident through the computer class, they quickly adopted various online activities such as online banking and accessing medical sites. Participants transitioned from perceiving computers as mysteries to seeing them as machines following a comprehensible set of rules. In applying technology adoption models to an underserved population, it is important to consider specific needs and conditions facing the population.

Practical Implications

There are several important practical implications that can be helpful for those who work in the area of digital education programs for underserved populations. First of all, a partnership between an academic institution and a community organization can contribute to developing and implementing an effective program based on solid research. In our case, research activities at every stage of the program helped to improve class activities, which in turn kept participants interested and motivated. These formative, process, and outcome research procedures were possible due to years of research experiences by the academic partner. Equally important was the community organization's commitment to the project and willingness to engage in sincere and honest conversations about the organization's needs and resources. The academic-community partnership is also important in supporting nonprofit organizations that often lack resources. During the interviews as part of the formative research, the director of the senior community center made it clear that they could only provide a computer lab with 18 laptop computers and assistance in promoting the program. A graduate student, who is highly qualified and is both respected and liked by class participants, was hired by the funding the research team secured for the project. A couple of computer sessions were interrupted because of Internet disruption or building maintenance issue at the center. However, these obstacles were addressed smoothly thanks to close communication between the research team and the center leadership. Setting clear expectations and establishing effective communication channels are key to developing and sustaining a successful academic-community partnership.

Second, our research-based community engagement project shows that personal traits and teaching styles of an instructor can help overcome distinctions between in-groups and out-groups. As a young, White woman, the instructor differed from class participants in terms of

visible identity (race/ethnicity and age). Yet, the instructor established a strong rapport with participants by validating the concerns they expressed about computer and respectfully walking them through any difficulty they encountered during the class activities. Class participants shared highly positive feedback about the instructor, often describing her as "kind," "knowledgeable," and "patient." The instructor created a relaxed environment in which participants felt free to ask questions. For example, many participants approached her at the beginning and end of class with specific questions about their phone or tablet. She also took the time necessary to make sure that all participants understood a concept before moving forward with the lesson. While learning from mentors who look like them can help convey the message that they too can succeed in a certain area (Milgram, 2011), personality traits of the instructor—especially, patience and empathy—are also important in motivating low-income, underserved, minority learners. It should be also noted that the research team is composed of members representing diverse racial/ethnic groups, which probably helped communicate our commitment to diversity and inclusion.

Finally, nurturing an environment for peer support is important. As the class progressed and we had a better sense of the individual participants' skill levels, we encouraged those more experienced to help others who needed more support and class participants responded positively by demonstrating compassion and support for one another. This approach also helped them take more ownership of the class.

Limitations and Future Research

Working with a total of 47 low-income African-American older adults during the 12-month research period allowed us to gather in-depth understandings of perspectives and attitudes of the research participants. In future research, it would be helpful to involve a greater number of

participants to provide more generalizable findings. In particular, it would be useful to consider additional aspects such as social psychological characteristics and personality traits in studying how this population acquires digital skills. Conducting this type of community engagement project in multiple cities will allow researchers to gain both cross-sectional and longitudinal findings related to the topic. Digital literacy and relevant technical skills are important for marginalized populations to be more fully involved in key aspects of society including political, economic, and health areas. In this sense, a follow-up study examining if computer class participants' levels of civic engagement changed after completion of the class could provide important insights.

References

Anderson, J., & Rainie, L. (2017). *The Future of Truth and Misinformation Online*. Retrieved

      from http://www.pewinternet.org/2017/10/19/the-future-of-truth-and-misinformation-

      online/

Anderson, M., & Perrin, A. (2016). *13% of Americans don't use the internet. Who are they?* Pew

      Research Center. Retrieved from http://www.pewresearch.org/fact-

      tank/2016/09/07/some-americans-dont-use-the-internet-who-are-they/

Anderson, M., & Perrin, A. (2017). *Tech adoption climbs among older adults*. Pew Research

      Center. Retrieved from http://assets.pewresearch.org/wp-

      content/uploads/sites/14/2017/05/16170850/PI_2017.05.17_Older-Americans-

      Tech_FINAL.pdf

Anderson, M., Perrin, A., & Jiang, J. (2018). *11% of Americans don't use the internet. Who are*

      they? Pew Research Center. Retrieved from http://www.pewresearch.org/fact-

      tank/2018/03/05/some-americans-dont-use-the-internet-who-are-they/

Atkin, D. J., Hunt, D. S., & Lin, C. A. (2015). Diffusion Theory in the New Media Environment:

      Toward an Integrated Technology Adoption Model. *Mass Communication and Society*,

      18(5), 623–650.

Carlson, A., & Isaacs, A. M. (2018). Technological capital: an alternative to the digital divide.

      Journal of Applied Communication Research, *46*(2), 243–265.

Connaway, L. S., Julien, H., Seadle, M., & Kasprak, A. (2017). Digital literacy in the era of fake

      news: Key roles for information professionals. *Proceedings of the Association for*

      Information Science and Technology, *54*(1), 554–555.

Cordell, R. M. (2013). Information Literacy and Digital Literacy: Competing or

Complementary? *Communications in Information Literacy*, *7*(2), 177–183.

Cornell University. (2018). *Cornell University - Digital Literacy Resource*. Retrieved from

https://digitalliteracy.cornell.edu/

Dantas Scaico, P. D., de Queiroz, R. J., & Lima Dias, J. J., Jr. (2017). Analyzing How Interest in

Learning Programming Changes During a CS0 Course: A Qualitative Study with

Brazilian Undergraduates. In *Proceedings of the 2017 ACM Conference on Innovation

and Technology in Computer Science Education* (pp. 16–21). New York, NY, USA:

ACM.

Epperson, S. & Dickler, J. (2017, December 7). Internet safety tips for seniors. *CNBC*. Retrieved

from https://www.cnbc.com/2017/12/07/internet-safety-tips-for-seniors.html

Emerson, R. M., Fretz, R. I., & Shaw, L. L. (2011). *Writing Ethnographic Fieldnotes, Second

Edition* (2 edition). Chicago: University of Chicago Press.

Fenwick, T. (2008). Workplace learning: Emerging trends and new perspectives. *New Directions

for Adult and Continuing Education*, *2008*(119), 17–26.

Foley, R. (2017). *Spread of fake news prompts literacy efforts in schools*. Retrieved from

https://www.pbs.org/newshour/education/spread-of-fake-news-prompts-literacy-efforts-

in-schools

Freiler, T. J. (2008). Learning through the body. *New Directions for Adult and Continuing

Education*, *2008*(119), 37–47.

Grace, C., McCaskill, A., & Roussell, R. (2017). *African-American Women: Our Science, Her

Magic*. Nielsen. Retrieved from

http://www.nielsen.com/us/en/insights/reports/2017/african-american-women-our-science-her-magic

Guest, G., Namey, E. E., & Mitchell, M. L. (2013). *Collecting Qualitative Data: A Field Manual for Applied Research*. London: SAGE Publications, Ltd.

Hargittai, E. (2008). The digital reproduction of inequality. In D. Grusky (Ed.), *Social stratification* (pp. 936-944). Boulder, CO: Westview Press.

Hargittai, E., & Dobransky, K. (2017). Old dogs, new clicks: Digital inequality in skills and uses among older adults. *Canadian Journal of Communication, 42*(2), 195-212.

Hargittai, E., & Litt, E. (2011). The tweet smell of celebrity success: Explaining variation in Twitter adoption among a diverse group of young adults. *New Media & Society, 13*(5), 824-842.

Hargittai, E., Piper, A. M., & Morris, M. R. (2018). From internet access to internet skills: digital inequality among older adults. *Universal Access in the Information Society*, 1-10.

Hill, R., Betts, L. R., & Gardner, S. E. (2015). Older adults' experiences and perceptions of digital technology:(Dis) empowerment, wellbeing, and inclusion. *Computers in Human Behavior, 48*, 415-423.

Horrigan, J. B. (2017). *How People Approach Facts and Information*. Pew Research Center. Retrieved from http://www.pewinternet.org/2017/09/11/how-people-approach-facts-and-information/

Hunsaker, A., & Hargittai, E. (2018). A review of Internet use among older adults. *New Media & Society* (Online First), https://doi.org/10.1177/1461444818787348.

Jacobson, T. E., & Mackey, T. P. (2013). Proposing a Metaliteracy Model to Redefine

    Information Literacy. Retrieved from

    https://scholarsarchive.library.albany.edu/ulib_fac_scholar/39

Jaeger, P. T., Bertot, J. C., Thompson, K. M., Katz, S. M., & DeCoster, E. J. (2012). The

    Intersection of Public Policy and Public Access: Digital Divides, Digital Literacy, Digital

    Inclusion, and Public Libraries. *Public Library Quarterly*, *31*(1), 1–20.

Knowles, M. S., Holton, E. F, & Swanson, R. A. (2005). *The adult learner: The definitive classic*

    in adult education and human resource development. Boston: Elsevier.

Merriam, S. B. (2001). Andragogy and self-directed learning: Pillars of adult learning theory.

    New directions for adult and continuing education, 2001(89), 3-14.

Merriam, S. B. (2008). Adult learning theory for the twenty-first century. *New Directions for*

    Adult and Continuing Education, *2008*(119), 93–98.

Metzger, M. J., Flanagin, A. J. & Medders, R. B. (2010). Social and heuristic approaches to

    credibility evaluation online. *Journal of Communication, 60*(3), 413-439.

Milgram, D. (2011). How to Recruit Women and Girls to the Science, Technology, Engineering,

    and Math (STEM) Classroom. *Technology and Engineering Teacher*, *71*(3), 4–11.

Mitzner, T. L., Boron, J. B., Fausset, C. B., Adams, A. E., Charness, N., Czaja, S. J., & Sharit, J.

    (2010). Older adults talk technology: Technology usage and attitudes. *Computers in*

    human behavior, 26(6), 1710-1721.

Perrin, A. (2015). *Social Media Usage: 2005-2015*. Pew Research Center. Retrieved from

    http://www.pewinternet.org/2015/10/08/social-networking-usage-2005-2015/

Perrin, A. (2017). *Smartphones help blacks, Hispanics bridge some – but not all – digital gaps*

    with whites. Pew Research Center. Retrieved from http://www.pewresearch.org/fact-

tank/2017/08/31/smartphones-help-blacks-hispanics-bridge-some-but-not-all-digital-

gaps-with-whites/

Pew Research Center. (2018). *Internet/Broadband Fact Sheet*. Retrieved from

http://www.pewinternet.org/fact-sheet/internet-broadband/

Polizzi, G. (2017). *Critical digital literacy: ten key readings for our distrustful media age*.

Retrieved from http://blogs.lse.ac.uk/mediapolicyproject/2017/12/15/critical-digital-

literacy-ten-key-readings-for-our-distrustful-media-age/

Seo, H. Erba, J., Geana, M., & Lumpkins, C. (2017). Calling Doctor Google? Technology

adoption and health information seeking among low-income African-American older

adults. *Journal of Public Interest Communications, 1*(2), 153-173.

Shelton, L., Conan, J. S., & Fulghum-Nutters, H. (1992). *Honoring Diversity: A

Multidimensional Learning Model for Adults* (Pap/Cas edition). Sacramento, CA:

California State Library.

Smith, A. (2014). *African Americans and Technology Use*. Retrieved from

http://www.pewinternet.org/files/2014/01/African-Americans-and-Technology-Use.pdf

Smith, A., & Anderson, M. (2018). *Social media use in 2018*. Pew Research Center. Retrieved

from http://assets.pewresearch.org/wp-

content/uploads/sites/14/2018/03/01105133/PI_2018.03.01_Social-Media_FINAL.pdf

Spitzer, K. L., Eisenberg, M. B., & Lowe, C. A. (1998). *Information Literacy: Essential Skills

for the Information Age*. Information Resources Publications, Syracuse University.

Retrieved from https://eric.ed.gov/?id=ED427780

Sundar, S. S., & Nass, C. (2001). Conceptualizing sources in online news. *Journal of

Communication, 51*(1), 52-72.

Tharoor, I. (2018). *'Fake news' and the Trumpian threat to democracy*. The Washington Post. Retrieved from https://www.washingtonpost.com/news/worldviews/wp/2018/02/07/fake-news-and-the-trumpian-threat-to-democracy/?utm_term=.4befce04d39b

Tisdell, E. J. (2008). Spirituality and adult learning. *New Directions for Adult and Continuing Education*, *2008*(119), 27–36.

Torrey, L. (2011). Student Interest and Choice in Programming Assignments. *Journal of Computing Sciences in Colleges*, *26*(6), 110–116.

Venkatesh, V. (2000). Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model. *Information Systems Research*, *11*(4), 342–365.

Venkatesh, V., & Davis, F. D. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science*, *46*(2), 186–204.

Walton, G. (2016). "Digital Literacy" (DL): Establishing the Boundaries and Identifying the Partners. *New Review of Academic Librarianship*, *22*(1), 1–4.

Whitty, M., Doodson, J., Creese, S., & Hodges, D. (2015). Individual Differences in Cyber Security Behaviors: An Examination of Who Is Sharing Passwords. *Cyberpsychology, Behavior and Social Networking*, *18*(1), 3–7.

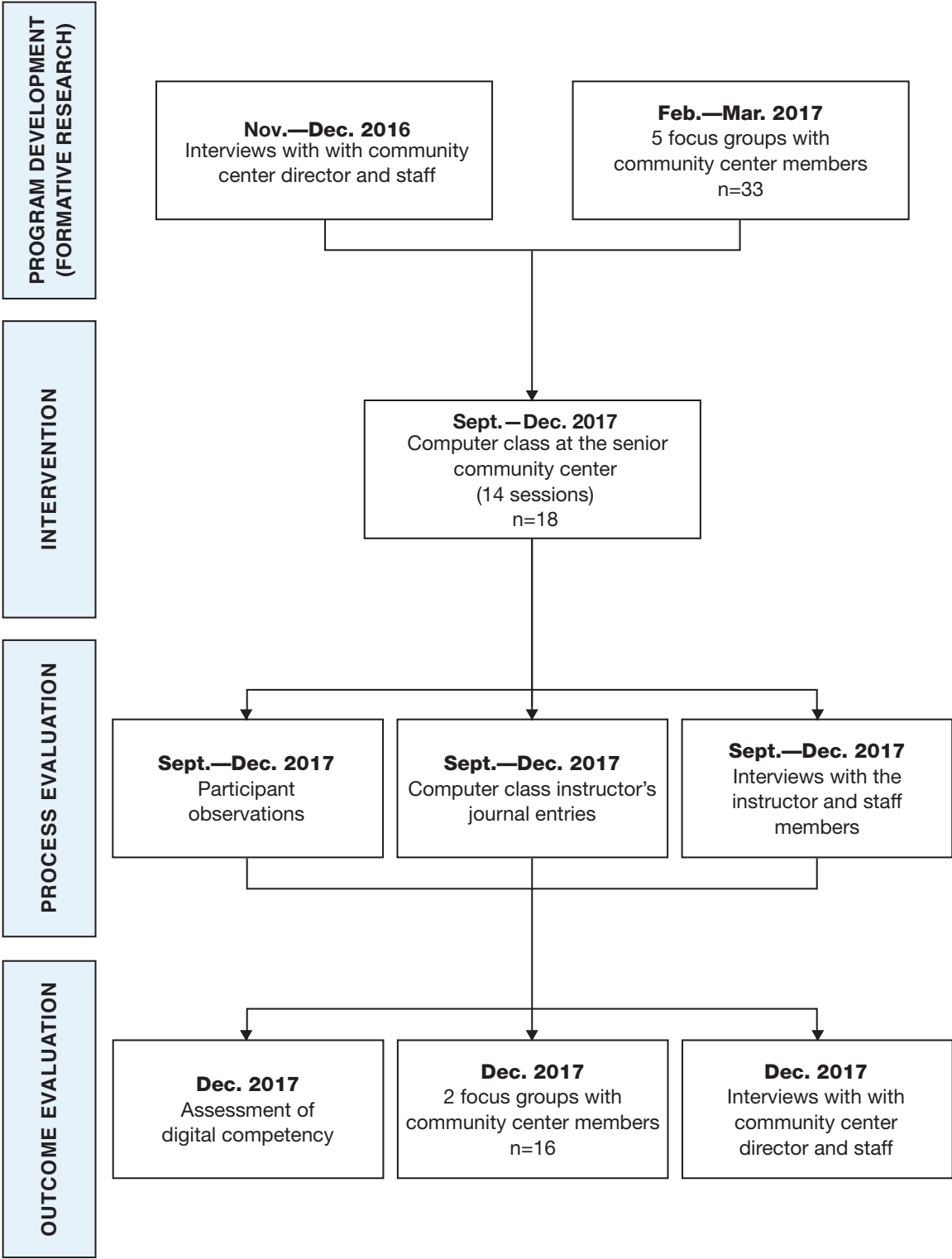Wood, M., Hughs, S., & Ainpour, S. (2018). *Black Twitter is a force for activism*. Marketplace. Retrieved from http://www.marketplace.org/2018/02/16/tech/black-twitter

Figure 1: *Empirical research process flowchart*

Table 1: *Characteristics of research participants*

	Pseudonym	Age	Gender	Formative FG (Yes/No)	Evaluation FG (Yes/No)	Class (Yes/No)	Class (No. of sessions)
1	Abigail	65	F	No	Yes	Yes	10
2	Aiden	N	M	No	No	Yes	5
3	Aisha	73	F	No	Yes	Yes	10
4	Ava	78	F	Yes	Yes	Yes	14
5	Chloe	77	F	No	Yes	Yes	13
6	Darius	N	M	No	No	Yes	11
7	Emily	72	F	No	Yes	Yes	1
8	Emma	88	F	Yes	Yes	Yes	11
9	Ethan	N	M	No	No	Yes	14
10	Frances	61	F	Yes	Yes	Yes	11
11	Jayla	67	F	No	Yes	Yes	12
12	Laqueta	N	F	No	No	Yes	7
13	Mia	68	F	No	Yes	Yes	11
14	Pamela	65	F	Yes	Yes	Yes	14
15	Shelby	69	F	Yes	No	Yes	11
16	Sophia	67	F	No	Yes	Yes	14
17	Teressa	70	F	Yes	Yes	Yes	14
18	Zari	65	F	Yes	Yes	Yes	14
19	Ann	59	F	Yes	No	No	0
20	Barbara	71	F	Yes	No	No	0
21	Betsy	85	F	Yes	No	No	0
22	Blake	80	F	Yes	No	No	0
23	Carol	69	F	Yes	No	No	0
24	Cole	74	F	Yes	No	No	0
25	Denise	74	F	Yes	No	No	0
26	Diana	70	F	Yes	No	No	0
27	Dominique	70	F	Yes	No	No	0
28	Edgar	76	M	Yes	No	No	0
29	Gayle	81	F	Yes	No	No	0
30	Jacob	81	M	No	Yes	No	0
31	Jennifer	73	F	Yes	No	No	0
32	Joan	82	F	Yes	No	No	0
33	Joy	84	F	Yes	No	No	0
34	Kate	65	F	Yes	No	No	0
35	Kimani	66	F	No	Yes	No	0
36	Kyle	78	M	Yes	No	No	0
37	Micaela	55	M	Yes	No	No	0
38	Olivia	65	F	No	Yes	No	0
39	Omar	76	M	Yes	No	No	0
40	Pat	60	F	Yes	No	No	0
41	Penny	70	F	Yes	No	No	0
42	Rob	76	M	Yes	No	No	0
43	Sara	69	F	Yes	No	No	0
44	Sarah	61	F	Yes	No	No	0
45	Tom	72	M	Yes	No	No	0
46	Vicky	56	F	Yes	No	No	0
47	Vince	70	F	Yes	No	No	0

Table 2: *Computer class topics and number of participants per session*

Sessions	Topics	Participant Activities
Information Verification and Searching (*n* = 10)	-Determining if an online story is real or false -Using information verification sites	-Identifying elements of a news story to determine validity -Using Snopes.com to verify an article
Computer Basics (*n* = 14)	-Parts of a computer and operating systems -File explorer -Computer settings	-Identifying parts of a laptop and desktop computer -Organizing files within file explorer -Adjusting computer settings such as brightness, desktop backgrounds, and zoom
Searching Online Part 1 (*n* = 16)	-Explanation of the Internet and its purpose -Types and uses of web browsers -Web browser navigation buttons -Search Engines	-Opening a web browser and searching for a specific URL -Using the navigation buttons back, forward and refresh -Bookmarking a website -Conducting a keyword search on a search engine
Searching Online Part 2 (*n* = 17)	-Anatomy of a webpage -Reading a webpage -Website security indicators -Privacy settings in Google Chrome	-Using the find tool bar to quickly find information on a website page -Modifying Google Chrome privacy settings -Deleting browsing history -Opening and using a browser in incognito mode
Cyber Security Part 1 (*n* = 17)	-Creating strong passwords -Understanding browser tracking -How cookies work	-Practice distinguishing between a strong and weak password -Opting out of cookie tracking in a browser
Establishing and Using a Gmail Account (*n* = 13)	-The Gmail interface -Mail settings and adding contacts -Sending an email	- Registering for a Gmail account and adding contacts -Sending an email to other class participants -Signing out safely
Gmail Part 2 and Facebook (*n* = 15)	-Inbox organization and settings -Replying to emails -Dealing with and reporting spam -The purpose of Facebook	-Replying to emails -Deleting emails -Setting up Gmail on smartphones -Creating a Facebook Account
Facebook (*n* = 15)	-Common terms used on Facebook -Tutorial of the homepage and timeline -Privacy settings	-Exploring the homepage -Exploring the timeline -Adjusting individual Facebook account privacy, timeline and tagging settings -Blocking specific Facebook users
Cyber Security Part 2 (*n* = 13)	-Using and being safe on public Internet -How to spot phishing scams -Two step account verifications	-Connecting a personal device to public Wi-Fi -Establishing two step verification on Google Accounts

		-Spotting phishing scams from email examples
Smartphone Basics (*n* = 14)	-Differences of iPhones and Androids -Operating systems and applications -Security settings and tips	-Using basic smart phone apps -Connecting a smart phone to Wi-Fi -Creating secure screen locks and passcodes
Tablet Basics (*n* = 13)	-Internet usage on a tablet -Security and privacy settings -Advertising tracking	-Third party application privacy settings (Facebook) -Adjusting location services settings on smart phones and tablet -Deleting the cache on a smart phone and tablet
Microsoft Word (*n* = 13)	-Everyday uses for Microsoft Word -Exploring the Word interface	-Creating and saving a new document with Word -Practice typing and formatting text -Using spell check and word count
Microsoft Excel (*n* = 14)	-Everyday uses for Microsoft Excel -Exploring the Excel interface -Navigating a spreadsheet and basic formulas	-Creating and saving a new workbook with Excel -Creating a monthly budget -Using basic formulas for budgets
Test and Review of Lessons (*n* = 10)	-Computer basics -Searching online and information verification -Cyber security and passwords	-Written review test covering a broad overview of each lesson. Test contained: fill in the blank, short answer and true or false questions