Calling Doctor Google? Technology Adoption and Health Information Seeking among Low-income African American Older Adults

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Abstract

We conducted focus groups with low-income African American older adults in Kansas City, MO, to examine how this underserved group adopts and uses technology and how technology adoption/use is associated with health information seeking behavior. Low-income African American older adults have been shown to lag behind in terms of their technology access and use. Our findings show that although low-income African American older adults perceive technology to be highly useful, they do not view it as easy to use, thus preventing them from further adopting or using relevant technologies. Consequently, there is skepticism with respect to using technology to search for health information. Our study advances research on underserved groups' technology use and health information seeking by looking at the intersectionality of race/ethnicity, age, and income.

Introduction

As more day-to-day transactions, such as accessing financial accounts and medical information take place online, it is crucial for older adults to not be left behind. Getting health information or connecting with medical providers online is particularly important for older adults, as they are more likely to deal with health-related issues. However, although use of the Internet and social media has increased across different demographic groups, gaps in technology adoption still persist among different generational, racial/ethnic, and income groups (Perrin, 2015).

From a generational context, Baby Boomers (born between 1946 and 1964) and the Silent Generation (born between 1928 and 1945) tend to lag behind in technology adoption compared with Generation X (born between 1965 to 1976) or the Millennial Generation (born between 1977 and 1995) (Fry, 2016). Relative to other age cohorts, those who are currently 65 and older and are part of either the Baby Boomer or Silent Generation particularly lack digital access or use. Indeed, only about 58% of U.S. adults ages 65 years or older reported using the Internet, compared to 81% of 50-64 year-olds, 93% of 30-49 year-olds, and 96% of 18-24 year-olds (Perrin, 2015).

Technology adoption among African American older adults is particularly low (Smith, 2014). This pattern is in line with the fact that racial/ethnic minorities, particularly African Americans, have lower rates of technology access and skill, even when controlling for socio-economic status (Mossberger, 2006; Smith, 2014). About 45% of African American older adults reported using the Internet in 2014 with only 30% having broadband access at home. In contrast, that same year, 63% of white older adults used the Internet and 51% had broadband access. Although various factors—including income, education level, and race—influence technology adoption (Helsper, 2016; Wilson, Wallin, & Reiser, 2003), African American older adults have consistently been shown to have lower technology access and use (Perrin, 2015; Smith, 2014).

If these gaps are not properly addressed, they likely will only grow further. To enhance digital inclusion of African American older adults, especially in the context of access and use of online health information, it is important to develop data-informed policies and interventions based on systematic research. At this point, few empirical studies are available on how and why African American older adults adopt and use digital technologies, and data is even scarcer when it comes to their use of these technologies for health information (Haughton, 2005; Jaeger, Bertot, Thompson, Katz, & DeCoster, 2012; Rhinesmith, 2015). A few studies have explored ways to decrease health disparities via digital technologies for African Americans, focusing on the role of faith-based organizations (Holt, 2017) or on the development of an online health information application (Winbush, 2014). However, these studies mainly focus on specific interventions and do not investigate in-depth the barriers to overcome in using digital technologies in general and in particular, searching for online health information.

Against this backdrop, this study examines how low-income African American older adults in Kansas City, MO, adopt and use digital technologies as well as how perceptions about these technologies influence their health information seeking. We focus on low-income African American older adults, as this group represents the intersection of income, race, and age categories shown to be associated with lower-level technology adoption. For example, Google's 2012 survey of Kansas City residents showed that 17% did not use the Internet at the time of the survey ("The state of Internet connectivity in KC," 2012). Of those not using the Internet, 44% were 65 or older, 47% were African American, and 42% reported a household income of less than $25,000 a year.

Specifically, the research objective of this study is two-fold. First, this research is aimed at understanding how this underserved group's technology adoption might be associated with

perceived usefulness, perceived ease of use, social influence, and other factors considered important in this area (Atkin, Hunt, & Lin, 2015; Davis, 1989; Venkatesh, 2000). Second, the study analyzes how perceptions of technology and level of technology adoption are reflected in the search for health and wellness information, an important online activity done by a majority of people in the United States. A technology adoption model (Atkin et al., 2015; Davis, Bagozzi, & Warshaw, 1989; Venkatesh & Davis, 2000) and theory of planned behavior (Ajzen, 1991) provide theoretical frameworks for this study. Empirical data come from focus groups of low-income African American older adults,[1] who are members of a senior community center located in an urban core of Kansas City, MO.

This study advances research on underserved groups' adoption and use of digital technologies by investigating the intersection of race, age, and income. Findings from this research can inform policy discussions, communication, and education interventions aimed at enhancing digital inclusion and online access to health information for low-income African American older adults.

Technology adoption among underserved populations

Despite the initial fanfare of the Internet's potentially being the most important equalizer in modern times, studies have shown that Internet access and usage have remained uneven among different socio-demographic groups (Hargittai & Hinnant, 2008; Hargittai & Hsieh, 2013; Seo, Houston, Knight, Kennedy, & Inglish, 2014; Seo & Thorson, 2016; van Deursen, Helsper, & Eynon, 2014). According to a Pew Research Center report, 13% of U.S. adults did not use the Internet at all as of 2016, though the number reflects a decline from 32% in 2005 and 24% in 2010 (Anderson & Perrin, 2016). The report shows that Internet non-adoption is associated with socio-demographic variables such as age, educational level, household income, and community type (rural vs. urban). For example, adults with an annual household income of $30,000 or less were eight times more likely to not use the Internet as compared with adults in higher income brackets. Age has been a consistently significant factor in Internet adoption with 96% of 18-24 year-olds, 93% of 30-49 year-olds, 81% of 50-64 year-olds, and 58% of people aged 65 or older using the Internet as of 2015 (Anderson & Perrin, 2016; Perrin, 2015). African American older adults show a particularly low level of Internet adoption (Smith, 2014) with about 45% of African American older adults reporting using the Internet in 2014 as compared with 63% of white older adults in the same year.

Exploring U.S. adults' "preparedness and comfort in using digital tools" (p. 2), Horrigan found that racial/ethnic minorities, older adults, and members of lower-income households were less prepared than White Americans, younger adults, and members of higher-income households (Horrigan, 2016). Horrigan categorized U.S. adults in five groups based on their levels of

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[1] 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.

preparedness and comfort, labeling the majority of older adults and low-income populations as unprepared and reluctant. African Americans were mostly classified as traditional learners, wanting to learn but displaying concerns about trust of online information. Despite these trends, older adults have recently had faster adoption rates than members of other age groups (Perrin & Duggan, 2016).

A more complete understanding of technology adoption examines the effects of these socio-demographic variables as well as other relevant social psychological variables. A variety of theories has attempted to account for how one decides to adopt and use a technology. For example, the technology acceptance model (TAM) argues that perceived usefulness and perceived ease of use influence one's technology adoption and use (Davis, 1989; Davis et al., 1989). That is, a new technology perceived as useful and easy to use is more likely to be adopted and used than one that is thought to be frivolous or difficult to employ. The TAM has been expanded to incorporate theoretical constructs involving social influence processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived usefulness) that are considered to be essential to the study of user acceptance of a technology. This unified theory of acceptance and use of technology is referred to as TAM2 (Venkatesh, 2000; Venkatesh & Davis, 2000).

The uses and gratification theory, an audience-centric approach to understanding why people seek out particular media, also has served as a framework for understanding technology adoption (Luo & Remus, 2014; Ruggiero, 2000). Studies using this theory focus on why people use social media and what gratifications they obtain as a consequence (Barker, 2012; Whiting & Williams, 2013). For example, Whiting and Williams identified 10 uses and gratifications for using social media that include social interaction, information seeking, information sharing, entertainment, and relaxation. Their research concluded that social interaction was the most important motivation for using social media. Despite its wide use in media/technology adoption research, the uses and gratification theory often has been criticized for overly broad conceptualizations and operationalizations of some key constructs such as information seeking, or not properly taking into account motives related to antecedents (Krishnan & Hunt, 2015; Sundar, Jia, Waddell, & Huang, 2015). Despite these limitations, the uses and gratifications approach has served as a useful framework for studies in technology adoption (Luo, Chea, & Chen, 2011; Quan-Haase & Young, 2010; Raacke & Bonds-Raacke, 2008).

Recently, some scholars have proposed integrating the uses and gratification theory with technology acceptance models (Atkin et al., 2015). The "Integrated Technology Adoption Model" argues that system factors and audience factors influence adoption of information on the Internet or adoption of the next-generation computer interface technology, respectively. In addition, it suggests that social factors such as opinion leadership in peer social networks will affect whether people adopt emerging technology systems. These theoretical frameworks guide this study in understanding how low-income African American older adults adopt and use the Internet and other digital technologies.

Health information seeking among underserved populations

"Information systems cannot be effective unless they are used" (Mathieson, 1991, p. 173). Although we live in a time when interaction with technology seems ubiquitous, there is still a significant technological gap between generations and between socioeconomic strata (Geana & Greiner, 2011; Mehra, Merkel, & Bishop, 2004). Efforts to reduce this gap and to increase the use of technology among underserved populations have been multiple, but not always successful. Many communication technology studies have focused on awareness or knowledge building, without a direct translation to behavioral change. It is important to investigate these pathways and how health seeking factors among these populations may lead to such behavior change.

For this study, we define health information seeking as all purposive systematic actions taken by a rational individual toward acquiring information related to health or wellness. This activity is often associated with either an increase in awareness about a potential risk factor or is directly related to an illness or affliction (Weaver III et al., 2010). In terms of seeking information and how it relates to one's health, this *activity* is an individual's information seeking *behavior* and may be affected by several factors. Viswanath and Ackerson (2011) argue that race/ethnicity and income affect the ways in which we access, seek, process, and use health information.

Cultural dimensions relative to race/ethnicity are important factors moderating both the attitude toward health information search as well as its use to promote behavioral change (Geana, Greiner, Cully, Talawyma, & Daley, 2012). Self-perceived literacy, low literacy, access to health information, and lack of mobility have been suggested as main factors influencing health information searching among older African Americans in urban dwellings (Gollop, 1997). Furthermore, mistrust of the medical community, religious beliefs, and limited knowledge about health information sources further moderate information seeking behaviors among African Americans (Matthews, Sellergren, Manfredi, & Williams, 2002). Today's emphasis on the adoption of patient portals raises new challenges for vulnerable populations, from access to the lack of tailored and accessible training and support (Tieu et al., 2017). Although technology adoption has been heralded as an equalizer, and we see this phenomenon expressed in multiple domains, low health literacy is a factor that pushes people away from using information technology sources for health information and reverting to more traditional media outlets (Manganello et al., 2017). Novel digital technologies should address health literacy-related disparities, either as a screening tool or to appropriately tailor the health information found online (Kim & Xie, 2017). An exploration of perceptions about adoption of information technology and the usefulness and ease to seek health information via information communication technologies may further help to demystify gaps and barriers among low-income African Americans.

Research Questions

A May 2017 report by the Pew Research Center highlights the following three barriers for technology adoption among older adults: not being confident of their ability to learn new technologies, the need to be guided as to how to use it, and physical challenges related to old age (Anderson & Perrin, 2017). Barriers to technology adoption are directly related to barriers to access to online health information. Therefore, it is crucial to investigate the intersection of digital and health information challenges among low-income African American older adults to overcome these barriers. Through this research, we examine two research questions:

RQ1: How does technology adoption occur among low-income African American older adults? Specifically, how are perceived usefulness, perceived ease of use, and social influence processes associated with this group's technology adoption and use?

RQ2: How do perceptions of technology and level of technology adoption among low-income African American older adults influence their health information seeking behavior?

Method

To answer the research questions, we conducted focus groups with low-income African American older adults who are members of a community center in Kansas City, MO. Focus group research is widely used to gather information about opinions, attitudes, and perceptions (Patton, 2002). This approach helps provide insight into "processes that otherwise remain hidden and are difficult to penetrate" (Barbour, 2008, p. 26).

We recruited participants through a community center, located in one of the poorest neighborhoods of Kansas City, MO, by distributing fliers and announcing focus group sessions at events held in the community. We conducted five focus groups with four to eight participants in each focus group, resulting in 33 total participants. We stopped recruiting participants for additional focus groups when, based on initial data analysis, participants' responses yielded no new information, thus demonstrating theoretical saturation of data, a qualitative research concept that refers to the point at which enough information has been collected to replicate the study (Fusch & Ness, 2015). While qualitative researchers recommend recruiting between 20 to 30 participants as a broad rule of thumb (Creswell, 2013), there is no formula or set number of participants to reach theoretical saturation of data, as it depends on a study's research questions. Therefore, we ended data collection once our data revealed that "depth as well as breadth of information [had been] achieved" (O'Reilly & Parker, 2013, p. 192). Focus groups lasted approximately one hour each and were held in conference rooms at the community center throughout February and March 2017.

As Table 1 shows, participants' age ranged from 55 to 88, with 18.2% ($n = 6$) between 55 and 64, 48.5% ($n = 16$) between 65 and 74, and 33.3 percent ($n = 11$) between 75 and 88. About 82% ($n = 27$) of the participants were female, and 18% ($n = 6$) were male. This gender distribution reflects the fact that more women than men use the senior community center. In terms of the highest level of education completed, about 50% ($n = 16$) of the participants said high school, followed by master's degree (15.6%, $n = 5$) and bachelor's degree (12.5%, $n = 4$). Most of those answering the question about their income ($n = 22$) indicated their annual house income level was below $30,000 (22.7% for less than $10,000; 27.3% for $10,000-$19,999; 31.8% for $20,000-$29,999; 13.6% for $30,000-39,999; 4.5% for $40,000-$49,999).

Before the start of each focus group, participants were asked to complete a short questionnaire on their experience with a computer and the Internet. Most participants indicated that they had some level of experience with digital devices (93.9%, $n = 31$) with only two participants' reporting no prior experience with any digital device. Specifically, about 66.7% of the participants ($n = 22$) indicated that they have used a desktop computer and about 57.6% ($n = 19$) said they have used a laptop. In addition, 81.8% of the participants ($n = 27$) indicated they own at least one digital device—a laptop (54.5%, $n = 18$), tablet (51.5%, $n = 17$), cell phone (42.4%, $n = 14$), or desktop (39.4%, $n = 13$). About 30% ($n = 10$) of the participants reported that they had taken a computer class at the community center before.

The same focus group questioning route was used for all focus groups (Barbour, 2008; Krueger & Casey, 2009). To investigate RQ1, we began with questions on where they get information about events in the city. Then we asked about their computer/Internet access and use—whether they use a computer or other computing device such as tablet or cell phone, where they generally have Internet access, what are their perceptions and primary purposes of using different connected devices, and what are the biggest challenges in using them (Atkin et al., 2015; Davis et al., 1989; Venkatesh & Davis, 2000). To investigate RQ2, we asked where they get information about health and wellness, whether they use the Internet for health and wellness information, and reasons for using or not using the Internet for such purpose (Geana, Kimminau, & Greiner, 2011; Hesse et al., 2005).

Focus groups were video and audio recorded with IRB permission and signed consent from the participants. The recordings were transcribed for analysis, resulting in approximately 128 single-spaced transcript pages. Data analyses were conducted using ATLAS.ti (version 6.2), which provides tools to organize and interpret qualitative datasets. Participants' answers were analyzed inductively, using a combination of open coding, identifying relevant themes line by line, and focused coding, searching for specific themes to group them into categories (Charmaz, 2014; Emerson, Fretz, & Shaw, 1995). Findings are presented below based on the main themes that emerged for each category.

Table 1. Participant Demographics

ID	Name (Pseudonym)	Age	Gender	Highest Degree Earned	Income
1	Edgar	76	Male	High school	$30,000-$39,999
2	Pat	60	Female	Associate degree	$10,000-$19,999
3	Denise	74	Female	Less than high school	$20,000-$29,999
4	Tom	72	Male	No response	No response
5	Betsy	85	Female	High school	Less than $10,000
6	Emma	88	Female	High school	Less than $10,000
7	Ava	78	Female	High school	$40,000-$49,999
8	Shelby	69	Female	High school	No response
9	Carol	69	Female	Bachelor's degree	No response
10	Diana	70	Female	High school	No response
11	Pamela	65	Female	Master's degree	No response
12	Sara	69	Female	High school	No response
13	Teressa	70	Female	High school	$20,000-$29,999
14	Joy	84	Female	Less than high school	$20,000-$29,999
15	Joan	82	Female	High school	$10,000-$19,999
16	Barbara	71	Female	Bachelor's degree	No response
17	Ann	59	Female	Less than high school	Less than $10,000
18	Frances	61	Female	Associate's degree	No response
19	Vicky	56	Female	High school	Less than $10,000
20	Jennifer	73	Female	Bachelor's degree	$30,000-$39,999
21	Gayle	81	Female	High school	$10,000-$19,999
22	Penny	70	Female	Less than high school	$10,000-$19,999
23	Kate	65	Female	Master's degree	$20,000-$29,999
24	Michael	55	Male	Master's degree	$10,000-$19,999
25	Rob	76	Male	High school	$10,000-$19,999
26	Blake	80	Female	High school	Less than $10,000
27	Darcey	65	Female	Bachelor's degree	No response
28	Cole	74	Female	Master's degree	$20,000-$29,999
29	Gloria	70	Female	Associate degree	$20,000-$29,999
30	Dominique	70	Female	High school	$30,000-$39,999
31	Emily	61	Female	Master's degree	No response
32	Kyle	78	Male	High school	$20,000-$29,999
33	Omar	76	Male	High school	No response

Results

In this section, we report main themes that emerged from our focus group data. We discuss participants' perceptions and uses of computers and digital technologies prior to focusing on the barriers participants would have to overcome to become more digitally competent. We then report on specific online behavior pertaining to health care information and its associated concerns. We end this section with a synthesis of participants' thoughts pertaining to enhancing their digital competency skills. To protect participants' privacy and identity, we refer to them using pseudonyms.

High level of perceived usefulness of technologies

Overall, focus group participants clearly perceived computers and other digital technologies as providing access to wide-ranging information and thus potentially replacing other communication outlets. Recognizing the importance and usefulness of being digitally competent, all focus group participants, except one, expressed willingness to learn about computers, the Internet, and other related digital technologies.

Participants often discussed how computers have changed the ways people communicate and search for information. For instance, Diana argued that "some of the cell phones are replacing the dictionary. All you have to do is tell them, what's the definition of this word and it just answers you. So, we don't have to do all that paper research." Similarly, Therese explained how "you used to wait on a phone call from somebody. Now you can go online and find them." Kyle echoed that sentiment, using newspapers to illustrate his point:

> It's sort of a modern thing because computers have started to get rid of a lot of earlier sources for information. Notice, you don't have as many newspapers as you did. A lot of people don't even take the newspaper as much. So, it's a sort of a modern new way of information.

The majority of participants also perceived computers and other digital technologies as a "wide awakening to the world," to use Ann's words, because of the vast amount of information accessible. Participants frequently used expressions such as "lots of information" and "so much expression" when discussing their perceptions of computers. Kyle said that in his mind, a computer is:

> A machine with words you can type in for information that is pretty much worldwide. You can find out all sort of things like what's going on in different parts of the world and you can pull up information. If you want to buy something, you want to find out information.

Pamela went as far as saying that computers represent "the only way you can get information." Commenting on her use of computers to find information, Ava said, "It's good, it's great, it's faster."

Participants who own a computer reported mainly using it at home, while others said they used computers at community centers, at the library, or at their church. Participants mainly reported using computers to search for general information online, as Darcey stated, referring to her computer uses, "I mostly go on there if I'm researching something." Penny said, "If anything catches my attention that I want to read, or hear about on the news, I want to read further into it, then I'll do that [go online]." In addition to using computers to search for general information, participants also mentioned more specific uses, such as online banking and bill pay, keeping in touch with family members, accessing medical records, and playing games. Praising the benefits of online banking, Jerry stated, "Everything I need is right in front of me." Similarly, Shelby described her use of online bill pay as a way to avoid late fees: "I prefer to go to the individual website just because I'm always at the last minute. I like that. That way I don't have any extra charge." Emily's comment, "I love my online banking," is representative of how participants who use that service feel.

Participants reported using digital technologies to stay in touch with their family members. For instance, Vicky stated, "I have a little nephew. I communicate with him on the computer site. It's always thrilling," while Kate responded, "My grandkids, they do a lot of different things that they share with me." Similarly, Betsy stated, "It's really important for me because you can see the people, like I have family that lives out in California and I can see them." Some comments also revealed the difficulties of learning how to use these technologies for such purposes, as Doris explained, "My goddaughter told me about this Marco Polo site on there. I already forgot how to do it but, I did it though, got on Marco Polo and I could see her."

Referring to society's dependency on Internet access and use, Rob stated, "It's pushing you that way whether you want to or not. Making you go there, if you don't have it they're going to make you get it some kind of way." Betsy lamented "all the things you can't do unless you have a computer," while Teri stated that using computers has become "a way of life."

These comments from participants show they generally perceive digital devices and technologies to be very useful. In addition, they mentioned specific applications for digital devices—for example, paying bills, staying in touch with family members, or, as further discussed below, connecting with medical providers.

Low level of perceived ease of use

Although the majority of participants had already used a computer and been online, they often expressed feeling lost around computers and feeling left behind by digital technologies. In particular, participants frequently mentioned security concerns as one of their reasons for being less active online. Several participants had asked family members or friends to help them learn how to better use computers and navigate the Internet, with only limited success.

Respondents identified several major barriers in using digital technologies. These barriers include both access and use. Access issues have been continually addressed in Kansas City, MO, as more and more public places such as community centers and libraries offer access to desktop

computers, laptops, or tablets (Robson, 2017). Google Fiber began its high-speed Internet service in Kansas City, MO, in 2011, making it the first city in the United States with Google Fiber services. Since then, Google Fiber has worked with the U.S. Department of Housing and Urban Development and the Kansas City Housing Authority to provide Internet access to low-income residents (Canton, 2017). However, most participants indicated their fear of being more active online because they do not find the technology easy to use or they are worried about their personal security or safety online.

Although participants overall expressed favorable perceptions about computers and digital technologies, some participants indicated that learning how to use them had not been easy. Several participants mentioned that they went to a computer class but never returned because the instruction was hard to follow and they felt lost. For example, Diana stated, "I went to one session and I thought it was over my head. I didn't come back." Diana said the instructor assumed that everyone had some basic understanding. She said, "I came into the class and they were far more advanced, they all knew how to turn on the computer.... I said enough of this, I am going out, back out the door." Some indicated that even having a personal friend or family member as a computer teacher did not ease their frustration. Frances said, "I had somebody who was helping me and she had my blood pressure up so high I promised myself I would never, ever, ask her." This frustration was expressed by other participants as well. Gayle said, "You get aggravated, discouraged and you just say, 'Well forget it, I'm not going to do it.'" Others felt anxious, such as Vicky, who explained her experience trying to use her computer as follows:

> When I get on it and turn it on, I'm like, "What do I do?" And I push a button and it's just like going crazy. You know, it's scary to me because I know very little about computers, and when I mess up, I'm just frazzled. I don't know what to do. I call in my daughter, "Please come and help me." So, it's scary to me.

Similarly, Joy said: "Sometimes I don't want to deal with the stress of getting on that Internet and getting on the computer…. I think what's intimidating to me is there are too many people on there for it to be that bad."

In addition to the difficulties these participants faced when learning how to use a computer, concerns over privacy also made some participants hesitant to be more active online. For example, Pat said being online can be "dangerous" because "people know where you live and call you up and you don't know what's on their mind, what they're planning on doing."

These concerns have led many participants to distrust computers and have been hindering participants' use of computers and digital technologies. Joan illustrated that sentiment when talking about her smart phone:

> I don't like smart phones, I finally got one, but I just don't use it any more than I can, prepaid and that's it. I don't like all that stuff. 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.

Those participants worried that personal information entered online could be easily accessed by others. Pat, commenting on other people's online behavior, stated, "Some people pay their bills

online through the Internet, I don't feel comfortable doing that cause it kind of opens up my information." Similarly, Penny emphasized that "nothing, nothing, nothing of a personal nature goes on the computer." She then added, "I do have a debit card but I don't do anything of a personal nature [online]. I don't even have my doctor send me test results, or anything like that. If you want me, talk to me." Pamela, stated more concisely, "I don't want my information out there."

Security concerns were also related to being nervous about viruses. For instance, Doris stated, "I hardly go online because I'm afraid of viruses. It's always something and it just kind of stresses me out. I'll cut it off for weeks at a time." Dominique explained how her computer got a virus, stating, "An icon comes up and you hit that button [and] you're making a virus in your computer." For Jere, even having an anti-virus is not enough to reassure her, as she stated, "I do have anti-virus, but it's the free one which they set up the whole stuff on there for me. He's [IT person] got free programs on there, so I'm about okay, but I still don't trust them [computers]."

Health information seeking online

Given the significance of health-related issues to older adults, we used health as a topic to better understand participants' intention and behavior in technology adoption and use. When asked about using the Internet for health information, most participants expressed skepticism that it would yield positive results for specific health-related queries, like illnesses or symptoms. For example, Darcey noted, "I just don't use the Internet for that. I don't know if it's giving me the right information or whatever." Pamela shared the sentiment: "You know what, I have heard a lot of people saying that we need to stay off the web, because that information they're given may not be as helpful as we think." Diana also expressed concern about getting wrong information about health online:

> If you run around and start looking up information online, we can come up with a wrong diagnosis. I have a situation right now, one of my family members has been diagnosed with a cancer. She is trying to find an oncologist. I tell her that you need to go to your primary doctor and get a recommendation instead of trying to find one yourself. You know just going to the Internet and look[ing] for a whole list of oncologists is not helpful.

However, about two thirds of the participants indicated that they felt comfortable using the Internet for general information related to health and wellness. Shelby said, "If they have specific problems, I would say go to the doctors. If they are looking for general information, I will probably say go to the Internet." Emily stated, "I can go online and check everything that the doctor has done." Doris highlighted the importance of having access to the Internet for medical records: "Most of the doctor's offices have now what you call a chart, and you have to have Internet that allows you to go on the Internet and look at your whole records." Participants mentioned accessing medical records and other healthcare-related information online as many times as playing games online.

Other participants also mentioned that they often use the Internet to get more information about prescription drugs. Kate was more ambivalent and mentioned that she generally gets health-related information from either the doctor or the Internet, and that she would take the information that she found online and ask the doctor about it. Kate added:

I found that WebMD is a pretty reliable source on the Internet to give a broad definition as well as some solutions or prognosis, I guess that's the right word when it comes to medical terms, for what you can do to help but they always say check with your doctor and stuff.

Penny indicated that an online search would not be her first choice but that she does go online to look up health information when some other sources such as a newspaper or medical report directs her to specific online resources. Penny said, "I don't think that highly of the computer to do it [search health-related information]. I'm not trying to be negative or anything like that, but … it's not my first call, per se."

Most participants mentioned that doctors were their primary and most trusted source of information related to health and wellness. This preference has partly to do with the fact that many of them had major illnesses. Barbara said, "Health information, all types of sources. First of all, my doctor because I have a lot of health problems, so I get a lot of information from him and from the nurses that attend to me." Diana also indicated that due to her various health issues, she makes sure to speak to her doctor on any health concern. She said, "So, my doctor, if there's anything that he wants me to have or need, he gives me the pamphlet to read about it. So, if I have high blood pressure or arthritis, I get my instructions from my doctor." Pamela, who is diabetic, said she pays heed to her doctor's recommendation on eating properly.

Participants also mentioned community centers as important sources of information related to health and wellness. They said they get their vitals checked at community centers and attend nutrition courses to learn how to eat and stay healthy. In addition, several participants discussed how they rely on their faith in dealing with health situations. For example, Pamela said that although she generally listens to what doctors say, "The ultimate thing is I pray for whatever it is. That is the bottom line. I ask the Lord if it's his will."

Most participants stated that their relative lack of knowledge of operating computers, working with websites, and performing Internet searches hindered their access to health information and search for online sources they could trust for health information. Moreover, they expressed desire for computer classes at libraries or community centers that incorporated health information aspects.

Discussion

Through focus groups with low-income African American older adults, this research examined how perceived usefulness, perceived ease of use, and other factors influence this group's technology adoption and use. We also analyzed how they use technology to search for health information, a topic of significance among this age group. The discussion in the focus groups

around these topics addressed multiple facets of how African American older adults perceive their interactions with digital technologies. Most notably, perceived ease of use and utility, which were previously identified as important factors in technology adoption, were salient in participants' discussion of why and how they adopt and use technologies and search for health information online (Atkin et al., 2015; Davis, 1989; Davis et al., 1989; Venkatesh & Davis, 2000).

Participants recognized the increasing importance of the Internet as an information source demonstrating a high level of perceived usefulness of the Internet. This perception should encourage technology adoption as well as promote its use among this underserved group (Atkin et al., 2015; Davis, 1989; Davis et al., 1989; Venkatesh & Davis, 2000). The Internet adoption rate has steadily increased among older adults in the United States—from 66% in 2005 to 81% in 2015 among 50-64 year-olds and from 28% in 2005 to 58% in 2015 among those 65 or older (Perrin, 2015). Our results show that the Internet has become an important information source for low-income African American older adults as well. Using the Internet for specific activities seems to be the strongest motivator for technology adoption. These specific uses are likely to encourage participants to continue, or start, to use digital technologies to achieve corresponding gratifications (Quan-Haase & Young, 2010; Whiting & Williams, 2013). The fact that most of the participants appreciate the relevance of digital technologies to their lives is particularly noteworthy given that the biggest reason people do not use the Internet is because they do not think it is relevant to them (Google, 2012). Google's survey of Internet non-users showed that 41% of them cited lack of personal relevance (not interested and/or seeing no need), while only 28% mentioned lack of access as their primary reason for not using the Internet. Nevertheless, access and use continue to be significant barriers, which is consistent with previous research in this area (Anderson & Perrin, 2016; Google, 2012).

Compared with the high level of perceived usefulness of the Internet and related technologies, perceived ease of use was relatively low among this group. Perceived ease of use is an important factor in one's technology adoption. When people perceive using a technology as being difficult, they are less likely to adopt it in the first place (Atkin et al., 2015; Davis, 1989; Davis et al., 1989; Venkatesh & Davis, 2000). Focus group participants expressed concerns about online security issues. Security issues are a major reason many Americans decide not to engage in economic or civic activities online (Goldberg, 2016). According to the National Telecommunications & Information Administration, U.S. adults are concerned with identity theft, credit card or banking fraud, or other related issues online (Goldberg, 2016). The same report shows that these concerns deter people from conducting financial transactions and buying goods or services online, or posting on social media sites. These are important issues that practitioners involved in digital inclusion will need to address to help this group become more fully integrated into an increasingly digital society, especially in terms of access to health information, given participants' advanced age and the digitalization of medical records.

An important approach to this is to provide more one-on-one attention in computer classes intended for older adults. Our research and experience working with older adults for digital

education suggest that when given individualized attention, they tend to feel more at ease with technology. Being patient and showing respect for older adults in computer classes are also essential. Given general lack of resources to have multiple instructors in informal computer classes, it is crucial that higher education institutions and community organizations collaborate closely in addressing this issue. Higher education institutions have knowledge and skills in developing tailored curricula for different groups whereas community organizations have access to underserved populations and experience building long-term relationships with them. Having undergraduate and graduate students in relevant fields as volunteers could further support such collaborations.

Stereotypes often drive our perceptions of underserved populations. In today's world, the Internet and other digital channels are major avenues used by health communicators targeting behavioral changes for health promotion and disease prevention. Understanding this audience's attitudes and motivators is of paramount importance to designing successful interventions. In this research, study participants' thoughts and behaviors pertaining to using technology to search for health information are somewhat paradoxical, as they expressed a desire to use the Internet for health care and information purposes, yet are skeptical as to its value. According to the theory of planned behavior (Ajzen, 1991, 2012; Godin & Kok, 1996), behavioral achievement relies on both motivation (intention) and ability (behavioral control). The theory suggests that an individual is more likely to engage in directed behavior if the individual believes that the action will result in positive outcomes. Trust in community or affinity organizations and also faith or an individual's belief in God are often reported among African American populations when illness or life-threatening situations are present in daily life (Mattis, 2002). Community-Based Organizations (CBO) and Faith-Based Organizations (FBO) in particular serve as important vehicles of health communication among African Americans (Lumpkins et al., 2017) and may be a catalyst for seeking necessary information for improving health outcomes. Perceived adoption barriers directly related to the technology (such as knowing how to use digital devices, privacy, and online security issues) seem to be the predominant influencers in how our participants search for health information online. Overall, they seem to be able to identify which online sources are reputable and trustworthy (websites such as WebMD and the Mayo Clinic were often mentioned). Reliance on word-of-mouth, family and friends, as well as doctors' recommendations as to which sites to go to when looking for health information also seem to take precedence over blind searches using Google. Even when those searches happen, our participants seem to be skeptical of new resources and would use doctors or peers to vet the source. Most of our participants felt that they would benefit from additional instruction and knowledge on how to use digital devices for health information.

Our research is not without limitations, and future research should attempt to address them. First of all, the findings are based on a group of low-income African American older adults who all live in Kansas City, MO, and attend the same senior community center. Because this study was done in only one city, it would be helpful to compare the findings from this research with those from other cities to understand how different community and/or city characteristics are

associated with this group's technology use and adoption, and online search of health information. In addition, a quantitative study of a larger and more geographically diverse group of participants with a random sampling approach would result in generalizable findings. Finally, the findings are based on what the participants told the researchers. Observational research analyzing this underserved group's actual use of technology in a computer lab, and recording participants' processes and thoughts as they search for health information would provide useful additional information.

Conclusion

According to a 2015 survey by the Pew Research Center, about 15% of U.S. citizens do not use the Internet—whether for lack of resources, skills, or perceived relevance (Anderson & Perrin, 2016). Yet, not having Internet access or relevant skills can negatively influence civic engagement as well as other significant aspects of citizens' lives such as employment and access to health information. This study examined a group that is particularly lagging behind in terms of technology adoption and by extension, access to online health information: low-income African American older adults. Any efforts to address the digital divide should start with identifying primary barriers that particular group faces. Our research contributes to enhancing our understandings of how low-income African American older adults adopt and use technology and how their technology use is associated with health information seeking. This research offers several scholarly and policy implications. Most of all, the current study advances studies of underserved groups' technology use and adoption. Although numerous studies on this topic exist, little empirical research has been conducted on this particular group (Atkin et al., 2015; Davis, 1989; Venkatesh, 2000). In particular, most studies exploring digital media access and use have focused on individual demographic characteristics of participants, analyzing data solely based on race/ethnicity, age, or income, as opposed to looking at the intersectionality of these demographics, such as low-income African American older adults. This research helps fill this gap in the literature. This research also enhances our understandings of health information seeking among this underserved group. Our findings show that peers and community organizations remain important entities for this group to get information about health and wellness, but they are increasingly using the Internet for health information searches. Better knowledge about and familiarity with digital devices, as well as an improved understanding of the risks and safeguards associated with online activities, would improve their engagement with online health information.

Policy makers and practitioners working on helping low-income African American older adults improve Internet access and skills should benefit from this study's findings. Our research suggests that although low-income African American older adults understand the importance of the Internet and see its relevance to their lives in general, they are often hesitant to adopt more technologies due to perceived difficulties of using them. Slow-paced and individualized

computer lessons may help them ease their reluctance to use new technologies. Incorporating health and wellness aspects into digital skills courses will also help motivate them to attend those courses.

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