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Empirical insights on technology use for navigating human services

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ABSTRACT

A considerable portion of the US population still lacks access to technology, which causes challenges for marginalized communities to access information and services. Research on the digital divide exists in various contexts, but few have examined it in the context of human services. This study examines the impact of socioeconomic status on the methods of communication used when searching for service-related information. We analyzed both quantitative and qualitative data collected from 63 low-income and/or current human service users in Albany, New York. Education showed positive associations with smartphone ownership and personal computer use. Income was found only significant for tablet use. Non-whites were more likely to use mobile apps to web browsers compared to whites. Qualitative analysis revealed three key themes (i.e., availability, ease of use, and usefulness) as influencers of individual preference of methods. Our findings suggest that the digital divide is not merely about the income level but also educational background and culture. Human service professionals need to consider multiple channels to reach targeted populations for service delivery. Particularly, the collaboration between service providers and public libraries is worth examining to ensure the physical access and skills training for those who experience the digital divide at multiple levels.

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Digital divide; information and communication technology; information navigation; human services; technology acceptance model (TAM)

Introduction

With the continuing evolution of information and communication technology (ICT), individuals have benefited socially and economically from devices such as computers, tablets, or smartphones, as well as internet and improved information access (Pew Research Center, 2015, 2019a; Van Deursen & Helsper, 2015). ICT has enhanced connection among people, boosted educational opportunities, transformed job searching process, improved health care, and support for mental health and other related services (Adams et al., 2019; Anglada-Martinez et al., 2015; Dettling, Goodman,

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& Smith, 2018; Kuhn & Mansour, 2014). Yet, in contrast to the enrichment the ICT revolution has brought, a growing disparity was born between the have and have nots, so-called the "digital divide" (Attewell, 2001, p. 252). Accordingly, research has identified that individuals with low socioeconomic status disproportionately experience a lack of access to ICT and its benefits (Chakraborty & Bosman, 2005; Pew Research Center, 2019b; Van Dijk, 2019).

However, to date, there have been limited studies that have focused on ICT use when searching and trying to access information on human services. Therefore, this study aims to draw attention to the unique challenges that individuals face when seeking human services. In particular, this study examined the relationship between socioeconomic factors and technology access, with a focus on how individuals, especially those with lower socioeconomic status, attempt to use technological devices to search for information on human services.

Benefits of ICT for human service clients

The advancements of ICT have manifested into the human service field in the past few decades. Previous literature discusses the benefits of technology in service delivery and coordination from the perspective of service providers (e.g., Mishna, Bogo, Root, Sawyer, & Khoury-Kassabri, 2012; Ventola, 2014) . In this article, we focus on the benefits from the perspective of service users. We particularly conceptualize the benefits in two dimensions: *physical* and *informational*. First, in the physical dimension, technology helps clients to overcome barriers to services when they are isolated, lack of transportation, or located in rural areas. A study by Brownlee and colleagues (2010) examined the use of ICT in a range of social work programs such as child welfare, mental health, behavioral treatment, addiction, and in other hospitals and health settings, and they found that technology has enhanced the overall access for the clients. More specifically, technologies such as "telehealth" and "mhealth" enable practitioners to communicate and provide therapy sessions online with clients who may face obstacles of transportation or isolation (Brownlee, Graham, Doucette, Hotson, & Halverson, 2010; McCurdie et al., 2012; Muessig, Nekkanti, Bauermeister, Bull, & Hightow-Weidman, 2015).

Second, technology has expanded people's informational access due to the increased availability and use of smartphones and internet access. The internet has become the go-to platform for employment searching and a popular option for education. For example, online job seekers who were previously unemployed reported a reemployment rate that was 25% faster compared to their counterpart seeker who was offline (Kuhn & Mansour,

2014). ICT has also contributed to expanding the service appeal for younger generations and for those others who would otherwise not seek help because of stigma or not knowing what to do in times of crisis (Adams et al., 2019; Mishna et al., 2012). In this regard, ICT supports the responsibilities of a provider to meet service needs on client's terms, which in turn enhances the fulfillment of the ethics of the social work profession.

Furthermore, ICT contributes to supporting autonomy and self-management. The development of many self-help mobile applications attests to the need and desire of people to self-identify and self-manage their emotional states and behavioral patterns (Proudfoot et al., 2010). For example, the Comprehensive Health Assessment for Teens or *CHAT* is a self-paced computer program developed for adolescent users to explore and answer assessment questions around alcohol, drug, and tobacco use, psychological health, and family and peer relationships (Lord et al., 2011). In terms of a tool for adults, *mDad* is a mobile application that provides parenting support specifically for fathers. Fathers who participated in the preliminary studies for designing *mDad* found the application interesting and engaging because of its contemporary delivery of the intervention, ease of use, and instant access to information when they needed it (Lee & Walsh, 2015).

In addition to the individual-level management, ICT also contributes to enhancing social connections at the group and community levels. For example, ICT facilitates community building among newly arrived refugee populations. Andrade and Doolin (2016) found that refugees used internet-based programs to learn local languages, conduct job searches, and stay up-to-date on local news and events. The refugees also connect with others in similar situations within their community while staying in touch with extended family and news from their previous countries.

Remaining questions with digital divide and access to technology

Given the aforementioned benefits of ICT, it is noteworthy that a disparity still exists in accessing technology. According to the Pew Research Center's (2019a) report, while internet access and use increased over the past two decades, 10% of the US populations still does not utilize the internet. Likewise, while general ownership of smartphones has increased, problems such as dropped signals, data limits, and service plan costs widen the access divide. Disparities exist among the marginalized population, including older individuals, those with lower income, less educated, and residents in remote areas (Pew Research Center, 2015, 2019a).

Based on the demographic patterns, the digital divide first represents the gap between those who have access to technology and those who do not—simply put, whether someone has technological tools such as the internet

or a smartphone at hand or not. Socioeconomic disparities (e.g., age, racial background, income, education levels) exist in ownership of technological devices such as personal computers and smartphones (Chakraborty & Bosman, 2005; Pew Research Center, 2019b). For example, 57% of Hispanics and 58% of blacks reported owning a desktop or laptop computer compared to 82% of whites. Likewise, only 56% of individuals with earnings of $30,000 or less have access to broadband at home, while 92% of those whose income is $70,000 report having the service (Pew Research Center, 2019b).

However, our understanding of the digital divide, while initially identified as the "have and have nots" by Attewell (2001), expands beyond material access. According to Hargittai (2002), the second-level digital divide has focused attention on one's use and skill while on the internet. Even when people have access to devices and the internet, it does not necessarily translate to their familiarity with web-based interfaces (Keusch, Leonard, Sajons, & Steiner, 2019; Trejo & Schoua-Glusberg, 2017). For example, Van Deursen and van Dijk (2014) found individuals with lower educational attainment use the internet less for information and personal development, and more for gaming and social interaction compared to individuals with more education. With the increasing availability of information and services online, it is critical to understand how people spend their time online and how those behaviors could potentially relate to further outcomes.

The third-level of the digital divide aims to explain such a relationship between online and offline outcomes. In other words, having access and skill to utilize ICT online would lead to positive outcomes offline. Van Deursen and Helsper's study in the Netherlands (2015) demonstrated that those who knew how to use the internet for particular advantages achieved tangible outcomes (e.g., discovery of government benefits, cheaper products, medical information, or better job opportunities). Given that the online platform provides ample opportunities for education, networking, or resource sharing, Van Deursen, Helsper, Eynon, and van Dijk (2017) described the internet as a "magnifier" for inequalities (p. 407). As a result, individuals at a disadvantage within the first- and second-level digital divide are more likely to miss out on the beneficial outcomes resulting offline that grow their social, cultural, and economic capital.

The aforementioned digital divide and its implications for human service practice motivated our study to examine the technology use behaviors among potential service users. We mainly focus on the first and second levels of the digital divide theory (i.e., ownership and usage) with a focus on how people search for human service information when they need to find resources. Our research also has a theoretical orientation in the Technology

Acceptance Model (TAM). We summarize the model and its connection to our study in the next section.

Technology acceptance model (TAM)

TAM, and its modified versions, TAM2 (Venkatesh & Davis, 2000) and TAM3 (Venkatesh & Bala, 2008), have become dominant theories for explaining technology access, acceptance, and use in various fields such as healthcare, education, business, and mobile markets among others (e.g., Abbas, Carroll, & Richardson, 2018; Okazaki & Barwise, 2011; Roy, 2017; Salloum, Alhamad, Al-Emran, Monem, & Shaalan, 2019). These multiple versions of TAM share a central assumption that individual acceptance and utilization of a technological device depends on the person's perceptions of the device (Davis, 1989; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000). More specifically, TAM explicitly suggests that an individual's perceived ease of use and perceived usefulness about a technological device influence that individual to adopt and use the device (Davis, Bagozzi, & Warshaw, 1989). Ease of use refers to effortless use of the device, and usefulness relates to effectiveness or enhancement of performance of the user (Davis, 1989; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000). TAM2 explains factors beyond perceived ease and usefulness and suggests that the context of use, such as the work environment, influences a user's decision on devices (Venkatesh & Davis, 2000). TAM3, also known as the unified theory of acceptance and use of technology (UTAUT), extended the theory to include other determining factors, such as social influence, socioeconomic characteristics of individuals (e.g., age, gender, and experience) for individuals' decision on adopting and using a technological device (Venkatesh & Bala, 2008).

Using TAM as a basis for technology acceptance and usage measures, previous research has shown the impact of factors such as income, education, and age on perceived usefulness, ease of use, access barriers, and actual use of technology (Porter & Donthu, 2006; Sipior, Ward, & Connolly, 2011; Zhang, 2013). Higher levels of income, education, and employment relates to greater access and use while increases in age relate to lower levels of access, and use of technology(Porter & Donthu, 2006; Sipior et al., 2011; Zhang, 2013). Computer anxiety appears as a factor that can negatively affect comfort in the use of technology among older populations. Tsai et al. (2020) explained that older persons with health conditions find it difficult to adopt technological devices used in monitoring their health conditions due to anxiety. Considering a specific technology like mobile devices, TAM has been used to show that perceived ease of use, usefulness, and social networks of users primarily influence the adoption of

mobile devices (Lu, Yao, & Yu, 2005; Roy, 2017). In addition, specific socioeconomic characteristics such as income were found to be an essential factor that influences internet usage due to affordability issues along with perceived usefulness and ease of use (Zhang, 2013).

Despite the various applications of TAM, there is no research conducted in the context of human services using TAM as a framework. Our study, therefore, combines the theory of digital divide and TAM to examine the relationship between socioeconomic factors and technology use behaviors when people search for information on human services. We hypothesized that socioeconomic characteristics would influence people's use of technology. Based on the digital divide theory and literature, we hypothesized that younger age, higher income, and higher education level would be associated with higher adoption of online information search behaviors (e.g., using mobile applications or web-surfing on personal computers) instead of choosing non-technological options (e.g., calling someone on the phone or seeking printed information guide). We also expected that TAM-based themes such as perceived ease of use, and usefulness, and social influences would emerge to explain the motivations behind why people choose to use certain technological devices for searching. Given that people seek human services to address their socioeconomic needs, questions such as whether the clients have sufficient access to smart devices, how they utilize online resources, and how their access to online resources affects their offline outcomes, remain critical in assessing the effectiveness of service delivery and change in clients' wellbeing.

Method

We employed the convergent mixed method design that incorporated both quantitative and qualitative responses through in-person surveys. In the survey, we inquired about people's technology use and preferences when searching for information about services available in the local region, including both the information on generic services such as grocery stores and information on human services such as availability of free food. The survey comprised two sections: demographics and technology. The demographic section asked about age, sex, race/ethnic background, educational background, income level, and benefits received. The technology section asked about people's technology access, use, and preferences, such as access to smartphones and the internet, methods used to look up information about services in the past 30 days (i.e., check all that apply among options such as smartphone, personal computer, public computer, word of mouth, printed materials, etc.), top three preferred methods, and a preference between web browsers and mobile apps. Open-ended questions sought to understand why participants would prefer one method to others for information search. The

questionnaire and research procedure were approved by the authors' Institutional Review Board before the implementation of the study.

Data

Data was collected in Albany, NY, the capital city of New York State for six months, between July-December 2018. While we were open to recruiting the general public, we aimed to reach out to low-income and/or current human service users. Therefore, we made targeted outreach efforts to the public libraries located in low- to mid-income neighborhoods and the community centers that provide social services, such as childcare, education, and health classes. As a result, two branches of public libraries and one local community center allowed the research team to host a table and conducted surveys at the site. The surveys took approximately 1 hour on average. Every survey participant received a $15 gift card as an incentive and an expression of appreciation. In total, 63 people participated in the study. Most demographic variables have complete observations except for age, gender, and income: one person rejected to answer both age and gender, while two people rejected to answer gender and income respectively. Some people also did not fully answer the question about their preferred method of searching for service information. Below we describe how each question was used as a variable for analysis.

Demographic variables

Age was used as a numeric variable. Sex was used as a binary variable (1 = Male, 2 = Female). Race/ethnic background was coded as five groups, including non-Hispanic white, non-Hispanic black, Hispanic, Asians, and others. Educational background was coded as "1 = less than high school, 2 = high school completion, 3 = some college/associates degree, 4 = bachelor's degree, 5 = master's degree, and 6 = professional degree." Income level was coded between 1 and 12 (1= less than $10,000, 2=$10,000-19,999, 3=$20,000-29,999, and up to 10= $90,000-99,999 with an equal interval of $10,000, 11=$100,000-149,999, and 12=$150,000 and more). Benefits were asked as an open-ended question. When participants mentioned various benefits (e.g., Supplemental Security Income (SSI), Medicaid, Supplemental Nutrition Assistance Program (SNAP), housing vouchers), we created a variable that calculated the total number of benefits that participants receive.

Technology variables

The access to a smartphone was a binary variable (1 = Yes, 0 = No) to the statement, "I have a smartphone." Access to the internet was measured as a 3-point scale (3 = Agree, 2 = Neutral, 1 = Disagree) to a statement, "I have reliable access to the Internet on a daily basis.") For statistical analysis, the

preferred methods of looking up information were considered as a binary variable (1 = methods that require the internet, 0 = methods that do not require the internet). For example, if participants had ranked "smartphone," "computer," or "tablet" as the most preferred method used, those entries were coded as "1" while the other "offline" entries such as "phone calls" or "printed materials" were coded as 0. The same re-coding procedure was repeated for each rank. The preference between web browsers and mobile apps was coded in four categories (0= neither, 1= web browser, 2 = app, 3 = both).

Data analysis

Statistical analysis

We first conducted a descriptive analysis to examine the overall distribution and patterns of the demographic and technological variables. We then ran t-tests, Analysis of Variance (ANOVA), and correlation analysis to examine the relationship between socioeconomic characteristics and technology use behaviors. All tests were conducted using StataIC16.

Qualitative analysis

The open-ended responses for why participants prefer a particular method and why they prefer a web browser or a mobile app for information search generated short descriptive narratives. In the first phase, the first author coded each response and identified several themes based on repeated content (Kushwaha et al., 2017). Then, in the next phase, the third author reviewed the themes in relation to the raw narratives and discussed categories that can represent each theme with the first author. During this process, certain themes were combined into a single category while some unique narratives were revisited for their reliability. This analysis method was guided by the principles of content analysis, particularly following the logic of inductive category development (Mayring, 2004). More specifically, our analysis was guided by observations first, and the theoretical framework helped defining the categories in the second stage. Lastly, we identified the quotes that could be most informative for reporting our findings.

Findings

Participant characteristics

Descriptive statistics in Table 1 show that 63 participants took part in the study and completed most sections of the questionnaire. Participants' ages ranged between 21 and 85, averaged in 48.34 years. Participants included 58.06% of females and 41.94% males. The white population constituted the majority of participants (n = 30, 47.00%), followed by blacks or African

Table 1. Descriptive statistics.

Variable	No.	Perc.	Obs.	Mean	Std. dev.	Min	Max
Demographics							
Age			61	48.34	16.12	21	85
Sex			62	1.58	0.49	1	2
Male	26	41.94					
Female	36	58.06					
Race/Ethnicity			63	2.06	1.37	1	5
Non-Hispanic White	30	47.00					
Non-Hispanic Black/African American	18	28.57					
Asian	3	4.76					
Multiracial	5	7.96					
Hispanic	7	11.11					
Education			63	3.33	1.29	1	6
Household size			63	1.90	1.74	1	5
Household income			62	4.19	3.53	1	12
Benefits received			63	0.89	1.18	0	4
Technology use							
Smartphone ownership			63	0.81	0.39	0	1
Reliable internet access			63	2.86	0.43	1	3
Methods of information search in the past 30 days							
Smartphone			63	0.73	0.48	0	1
Phone call			63	0.56	0.50	0	1
Personal computer or laptop			63	0.54	0.50	0	1
Public computer			63	0.56	0.50	0	1
Tablet			63	0.33	0.48	0	1
Printed material			63	0.48	0.50	0	1
Word of mouth			63	0.49	0.50	0	1
Preferred methods (1 = online, 0 = offline)							
First choice			62	0.82	0.39	0	1
Second choice			58	0.72	0.45	0	1
Third choice			57	0.44	0.50	0	1
Web vs. App Preference			63	1.24	0.56	0	3

Americans (n = 18, 28.57%), Hispanics (n = 7, 11.11%), multiracial participants (n = 5, 7.96%), and Asians (n = 3, 4.76%). More than half of the participants had either completed high school or more education (mean = 3.33, with 3 being some college). The average income range of the participants was about $40,000 (mean = 4.19, 4 being 30,000 to 39,999). The mean income is below the median household income of Albany County ($62,293) (U.S. Census Bureau, 2013–2017). The gap indicates that our sample overrepresents the low-income populations in the city, which aligns with the original aim of the study. The income limits calculated by the U.S. Department of Housing and Urban Development (2018) for the same geographical area (i.e., Albany County) also confirm that more than 60% of our sample would qualify for the Section 8 Housing program. Approximately 51% (n = 32) of the participants mentioned that they receive at least one benefit from the government.

Technology use: Descriptive statistics and relation to socioeconomic characteristics

Key findings are presented regarding the relationship between socioeconomic variables and technology use preferences based on t-test (Table 2), ANOVA (Table 3), and correlation (Table 4) results.

Table 2. T-Test results.

Measure	Results	D. f.	SE	t-value	p-value (E-size)
Gender					
Smartphone ownership		60	0.05	1.08	0.28 (0.28)
Reliable internet access		60	0.05	0.21	0.83 (0.05)
Methods of information search in the past 30 days					
Smartphone (look up)		60	0.06	0.99	0.32 (0.26)
Phone call		60	0.05	0.89	0.38 (0.23)
Personal computer/laptop		60	0.06	−0.64	0.52 (0.17)
Public computer		60	0.13	0.16	0.86 (0.04)
Tablet		60	0.06	0.64	0.52 (0.16)
Printed materials		60	0.06	0.43	0.67 (0.11)
Word of mouth		60	0.99	0.26	0.79 (0.32)
First choice rank (online/offline)		60	0.15	0.32	0.74 (0.02)
Second choice rank (online/offline)		59	0.06	0.63	0.53 (0.17)
Third choice rank (online/offline)		55	0.05	0.55	0.58 (0.25)
Web vs. App preference		60	0.07	0.32	0.75 (0.08)

*$p < 0.05$;
**$p < 0.01$

Smartphone ownership and internet

The majority (n = 51, 80.95%) of the participants owned a smartphone in our sample. Smartphone ownership showed a significant positive relationship with educational level ($r = 0.25$, $p < 0.05$), but not with other demographic variables. The majority (n = 56, 88.89%) of the participants mentioned that they have reliable internet access daily, fewer participants (n = 5, 7.94%) answered neutral, and even fewer (n = 2, 3.17%) indicated the lack of reliable access to the internet. Internet access did not have strong statistical correlation with the demographic variables. The overall access to smartphone and the internet (approximately 80% and 89% of the sample respectively) is closely aligned with the national average published by the Pew Research Center (2015, 2019a).

Methods of service information search

The results show that the participants use various methods for searching service information to varying degrees. The participants identified using smartphones (n = 46, 73.02%) the most, followed by public computers (n = 35, 55.56%) and phone calls (n = 35, 55.56%). Tablets recorded the lowest patronage (n = 21, 33.33%). Approximately half of the participants use traditional means of searching for service information, such as word of mouth (n = 31, 49.21%) and printed materials (n = 39, 47.62%).

In terms of the relationships with socioeconomic characteristics, racial and ethnic background was significantly associated with the use of printed materials ($F = 6.51$, $P < 0.01$). Additional chi-square test showed that whites and Asians used printed materials more than the other groups. The scores and expected values include white (n = 22, expected = 14.3), Asians (n = 2, expected =1.4) as compared to blacks (n = 4, expected = 8.6), multiracial (n = 2, expected = 2.4) and Hispanics (n = 0, expected = 3.3).

Table 3. ANOVA result.

Measure	SS	D. f.	MS	F	*p*-value
Race/ethnicity					
Smartphone ownership	0.77	4	0.19	1.25	0.30
Reliable internet access	0.19	4	0.05	0.24	0.91
Methods of information search in the past 30 days					
Smartphone (look up)	0.17	4	0.04	0.21	0.93
Phone call	1.72	4	0.43	1.80	0.14
Personal computer/laptop	0.69	4	0.22	0.87	0.49
Public computer	1.39	4	0.35	1.43	0.24
Tablet	0.98	4	0.25	1.09	0.86
Printed materials	4.87	4	1.22	6.51	0.01**
Word of mouth	2.06	4	0.51	2.18	0.08
First choice rank (online/offline)	0.62	4	0.15	1.05	0.39
Second choice rank (online/offline)	0.49	4	0.12	0.58	0.67
Third choice rank (online/offline)	0.89	4	0.01	0.04	0.48
Web vs. App preference	4.33	4	1.09	4.19	0.01**

*$p < 0.05$;
**$p < 0.01$

Table 4. Correlation results.

	Age	Education	Household Size	Income	Total Benefits
Smartphone ownership	−0.10	0.25*	−0.01	0.13	−0.08
Reliable internet access	0.01	0.20	−0.12	0.04	−0.13
Methods of information search in the past 30 days					
Smartphone	−0.21	0.07	−0.05	0.01	−0.02
Phone call	−0.07	0.05	0.22	0.12	0.07
Personal computer/laptop	0.24	0.51**	0.01	0.21	−0.11
Public computer	0.06	−0.07	−0.02	−0.10	0.12
Tablet	0.04	0.23	0.23	0.49**	−0.26*
Printed materials	0.21	−0.24	0.02	0.12	0.06
Word of mouth	−0.06	0.12	0.12	0.16	0.07
First choice rank (online/offline)	−0.10	0.02	−0.12	−0.11	0.03
Second choice rank (online/offline)	−0.13	0.14	−0.14	0.09	−0.31*
Third choice rank (online/offline)	−0.12	0.10	−0.01	0.03	−0.26*

*$p < 0.05$;
**$p < 0.01$

Household income and education also emerged as significant factors associated with the use of some personal devices for service information searches. Increased household income strongly correlated with an increase in the use of personal computers/laptops ($r = 0.30$, $p < 0.01$) and tablets ($r = 0.49$, $p < 0.01$). Similarly, the educational level also strongly correlated with an increase in the use of personal computers/laptops ($r = 0.51$, $p < 0.01$) and tablets ($r = 0.06$, $p < 0.05$). Furthermore, the total number of benefits received by participants, which can be another indicator of income, had a statistically significant negative correlation with the use of tablets (r=-0.26, $p < 0.05$).

Preferred methods of searching for service information

After classifying the ranking of preferred methods of searching information based on the condition of being "internet-based" and "non-internet-based"

(marked as "Online/Offline" in the tables), we found that a majority of the participants chose internet-based methods as their top 2 preferences: internet-based options comprised 80.95% (n = 51) of the first choice and 72.41% (n = 42) of the second choice. On the other hand, more than half of the participants chose non-internet-based methods as their third choice of searching for service information (n = 32, 56.24%). In terms of the preference between web browsers and mobile apps, the majority (n = 49, 77.78%) reported that they prefer to use web browsers compared to mobile apps (n = 10, 15.87%). The other participants either remained neutral (n = 1, 1.59%) or mentioned that they use both options (n = 3, 4.76%).

The "web vs. app" variable showed a statistically significant difference by racial/ethnic background, as shown by the ANOVA test ($F = 4.19$, $p < 0.01$). An additional chi-square test revealed further details about the difference between various racial/ethnic groups. More specifically, the proportion of whites (n = 28, expected = 23.3) and multiracial participants (n = 4, expected = 3.9) that chose web browser as their preference exceeded the expected values as opposed to the results shown for blacks or African Americans (n = 11, expected = 14.0), Asians (=1, expected = 2.3) and Hispanics participants (n = 5, expected = 5.4). On the other hand, blacks (n = 6, expected = 2.9), Hispanics (n = 2, expected = 1.1) and Asians (n = 1, expected =0.5) exceeded the expected values for their preference to apps compared to whites (n = 1, expected =4.8) and multiracial participants (n = 0, expected = 0.8).

Qualitative insights

Reasons for the participant's preferred method of searching for service information

We discuss our findings by each method of information search, sorted by its popularity. Regardless of the method, three key themes emerged regarding why people prefer one method over the others. The themes include availability, ease of use, and usefulness of the method. Availability concerns adequacy or ability to access a method without financial or physical barriers. Ease of use concerns the convenience of using certain methods due to design, portability, or familiarity. Usefulness concerns relative effectiveness in certain functions such as speed, reliability, quality of outcomes, or security.

Smartphones

Among participants who explained their reasons for using smartphones for information service search (n = 26), availability, ease of use, and usefulness

appeared as the most important factors. Concerning availability, participants explained that they could use smartphones irrespective of their locations and time. In their descriptions, participants mentioned that a smartphone is "always available," "and has "easy access." For some participants, they were only able to afford smartphones and thus did not own other devices. On ease of use, participants discussed the concept of "easiness" in two ways: one in terms of interface and the other in terms of portability. They mentioned that smartphones provide a user-friendly interface that is "easier to use for googling information" and "easier to navigate." The participants mainly mentioned the word "easy" or its comparative forms, such as "easier" and "easiest" to describe its advantage. On portability, participants commented that they prefer a smartphone because of the ease of carrying it around. They used expressions such as "handy," "mobile," and "easy pick-up." On usefulness, participants indicated that they use smartphones because of their efficacy in providing results in a more accurate and timely manner. The terms that described the usefulness of smartphones include "quick," "precise," "reliability," and "consistency." For some participants, they found smartphones most capable of providing up-to-date information specific to one's location.

Personal computer

Among the people who chose personal computers as their preferred method of information search (n = 18), usefulness emerged as one of the most prominent themes, after other themes such as availability, and ease of use. Regarding usefulness, the participants described personal computers as tools that enable quick and extensive search results and thus are suitable for research. One participant said, "Personal computers are usually quick and easy to use; they usually give good answers to questions." On availability, participants indicated they have solid access to computers at home or work. Concerning ease of use, personal computers offer user-friendly designs, specially equipped for large screen view and intuitive navigation. For instance, some participants mentioned that "Personal computers are easier to see than smartphones" and that "Personal computers are easier to use for typing or searching compared to cellphones," and they "give a wide range of information" A couple of participants mentioned personal computers are easier for their older age as they are more familiar with them compared to other devices.

Word of mouth

Those who chose word of mouth as part of the top three preferred methods (n = 12) mostly commented on its usefulness. Participants found word

of mouth particularly useful for seeking references, finding a trustworthy source of information or answers that are not available online. One unique and noteworthy comment was, "I prefer talking to people over computers," which suggests that information seeking preferences may also be associated with personal values around people-based solutions.

Phone calls

Similar to word of mouth, the theme from the participants who ranked phone calls as part of their preferred methods (n = 14) mostly fall under usefulness. The participants found phone calls effective when they needed to find specific information, follow up with someone directly, or just to speak to someone. One participant particularly mentioned phone calls a way to utilize one's social network for accurate answers: "I like phone calls, when possible as I can then ask specifics that I need to know." Similar to word of mouth, several participants mentioned that they found it "easier to speak with someone" or they "prefer to speak to someone directly."

Tablets

The responses that included tablets as one of the preferred methods (n = 9) mostly concerned ease of use. In terms of the usefulness, participants did not seem to differentiate between tablets and smartphones, but they mentioned that tablets become handy because of its screen size (i.e., easier to use than smartphone screens but more portable than laptops). Also, participants preferred tablets because they are "very intuitive," "easily accessible," and "available."

Public computers

Seven participants mentioned public computers as part of their preferred methods, although only a few chose it as their top choice. Among those who mentioned specific reasons for choosing public computers, availability was a prominent theme. Participants get access through universities or libraries because they are free. Many participants who chose public computers did not own personal computers. Among the available options, they preferred public computers because of its large screen and its printability.

Reasons for choosing web browsers vs. mobile apps

The themes that emerged from the "web vs. app" question resemble the ones from the discussion on "personal computers vs. smartphones" to some degree, given that those platforms are where each software is mainly operating. Although nearly 90% of the participants preferred web browsers

over apps, some of the reasons why some prefer web browsers overlapped with the reasons why some prefer apps. For example, both groups mentioned ease of use as the common rationale for choosing the web over an app, and vice versa, which suggests that ease of use is, in fact, a perceived concept and would differ by individuals.

One major difference was that participants discussed ease of use for web browsers in terms of familiarly, whereas the others discussed ease of use for apps in terms of availability and functions. For example, some participants indicated their lack of knowledge or confidence in using apps by mentioning that they "know very little about apps" or "haven't really used apps." One person specifically commented that web browsers are easier because it gives a clear sense of "opening and closing" as opposed to apps. On the other hand, some participants discussed that apps were easier because they are available all the time and because they have unique functions such as push notifications and shortcuts.

Other than those key differences, the most distinct theme for preferring web browsers was related to its capacity in achieving outcomes. Participants explained that they could search for more specific terms and obtain more comprehensive, accurate, more up-to-date information faster when searching on a web browser. Other unique strengths of web browsers included that they provide more privacy and save memory space on the phones. A couple of participants said they prefer web browsers simply because they do not have smartphones. They considered that "The web is always free, and there are almost unlimited resources online for information."

Discussion

In this study, we examined the relationship between socioeconomic characteristics of individuals and the use of technology for service information search among a predominantly low socioeconomic population. As predicted in our hypotheses, we found some significant differences and potential determinants of technology use based on socioeconomic characteristics. Perhaps most noteworthy is the existing gap in accessing technology among people of different racial/ethnic backgrounds, those with lower education, and lower incomes. Consistent with existing literature on the digital divide theory and TAM, the household income can determine an individual's ability to own or use certain devices such as personal computers or tablets for service information search (Pew Research Center, 2015, 2019a; Van Dijk, 2019; Zhang, 2013). As a relevant measure of income, our study also adds the number of benefits received by a household as a new variable to the digital divide literature. Our findings showed that an increased number of benefits received by a household might negatively affect their use of

personal computers, which then implies their limited use of computers and opportunities for information search. These findings overall provide evidence that socioeconomically marginalized persons have limited access to technological tools when searching for service-related information, as seen in other contexts (Chakraborty & Bosman, 2005; Pew Research Center, 2015, 2019a; Zhang, 2013).

At the same time, this study showed the relative importance of public computers for serving marginalized populations. Many people in our sample mentioned that they use a public computer in place of smartphones or personal computers in seeking information on services. Given that increasingly more services and procedures (e.g., application, assessment, consent forms) are offered on the online platform, human service professionals need to ensure that those interfaces are easily accessible on public computers to reach clients broadly. Indeed, recent studies have indicated that public libraries act as community centers, and could be more integrated into human service because of its possibility to provide protective space for the marginalized in the society (Freeman, & Blomley, 2019; Lloyd, 2020). For instance, Lloyd (2020) indicated that public libraries provide water, safety, shelter, socialization, and books. Hence, increasing access in such spaces could boost the potential for human service professionals to contribute not only to bridging the digital divide but also to increasing access to services.

In line with TAM's assumptions that people may use a technological device due to their social environment (Venkatesh & Bala, 2008), our study also suggests that there may be cultural differences associated with technology use. Our findings show that some racial/ethnic groups prefer one method of communication than others. Specifically, the difference showed in the use of mobile applications in seeking information. Compared to other racial/ethnic groups, whites and Asians use printed materials more. In terms of app use, blacks, Hispanics, and Asians particularly preferred apps than web-based tools compared to whites and multiracial participants when searching for information. As mentioned earlier, several studies (e.g., Brownlee et al., 2010; Trejo & Schoua-Glusberg, 2017) examined specific apps and their feasibility in improving service coordination. Still, researchers have barely considered culture or English proficiency as a potential factor for technology use behaviors or preferences in the United States (Suny, Lee, & Law, 2019).

Furthermore, cultural influences could also be examined in relation to the educational opportunities that may lead to various aspects of literacy (e.g., media literacy, information literacy, digital literacy, network literacy) as the role of literacy is growing significant and diversified for understanding technological access (Koltay, 2011). Future research on cultural factors, therefore, will enlighten the disparity in technology use and access and how

human service professionals can implement culturally mindful practices in a digital environment. Nonetheless, the current findings highlight the relevance for human service professionals to examine ways to ensure that certain populations who may be of lower education have adequate access to needed services. Although the emerging focus on mhealth and other mobile-based technological service delivery could be useful for people in isolated places or hard-to-reach populations (Brownlee et al., 2010; McCurdie et al., 2012; Muessig et al., 2015), our findings point to a possible challenge of using such technologies due to low literacy and skill. Hence, a combination of field visits, phone calls, and mobile technological service provision channels needs to be considered in addressing possible gaps in service reach.

When contextualizing the qualitative response with previous literature, we confirm that participant responses correspond with the theoretical underpinning of TAM. Our study participants revealed that they prefer certain technological devices depending on their perceived ease of use and perceived usefulness. Besides, since our study examined not only technological tools but also traditional tools such as phone calls or printed materials, we identified that availability (e.g., physical access, affordability) still is one of the biggest factors for people to use or not use certain technological tools. Future studies can examine whether and how people's perceived ease of use and perceived usefulness change for people-based, paper-based, and technology-based solutions. While our study suggested personal values or situational needs affect the decision to adopt one solution over the others, future research can consider other variables such as social capital, disability, or traumatic experiences in seeking services through certain methods.

Moving forward, the limitations of this study need to be considered. The convenient sampling method and locally collected data must be noted for considering implications. Another limitation lies with some conceptual and methodological shortcomings that reside with TAM, including neglect of group, social, and cultural aspects of the decision-making processes and conceptual gaps in individual reactions, intentions to use, and actual use of technology (Bagozzi, 2007). Alternative theories about the technological acceptance (e.g., diffusion of innovation theory) or various psychological and instrumental steps can be considered for future studies.

Nonetheless, our study offers unique and applicable insights into what kind of devices people own and what kind of methods they prefer to use when they seek services and why. Considering the rapid development of ICT and the continuing digital divide, human service professionals must be mindful of the methods that people have access to and use and what barriers may be experienced during the process of searching service information in reality. Our study also encourages human service professionals to

make their service information available via multiple venues, not only through web pages but also through printed materials at the public libraries or mobile apps that are approachable to targeted populations. In doing so, it will be critical for human service professionals and developers to consider factors such as culture, affordability, and multiple forms of literacy to deliver services in a more inclusive way while reducing the gap in the digital divide in the long run.

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