

Examining the Potential Use of Technology in Permanent Supportive Housing

Benjamin F. Henwood¹, Jordy Coutin², Tabashir Z. Nobari³, Kiran George⁴, Anand Panangadan⁵

¹ Suzanne Dworak-Peck School of Social Work, University of Southern California

² Price School of Public Policy, University of Southern California

³ Department of Public Health, California State University, Fullerton

⁴ Department of Electrical and Computer Engineering, California State University, Fullerton

⁵ Department of Computer Science, California State University, Fullerton

Corresponding author: Benjamin F. Henwood, Suzanne Dworak-Peck School of Social Work, University of Southern California, 669 W. 34th Street, Montgomery Ross Fisher Building, Los Angeles, CA 90089, bhenwood@usc.edu, Twitter: @uscH3E, ORCID: 0000-0001-8346-3569

Abstract

Introduction: Research on using technology in permanent supportive housing (PSH) has been limited. This study conducted formative work on understanding how technology might benefit PSH tenants.

Method: Focus groups were conducted at five PSH sites in Southern California, with 42 tenants participating. Thematic analysis was carried out in which data were analyzed both deductively and inductively using the unified theory of acceptance and use of technology. Thematic findings were organized using the theory's constructs.

Results: Participants generally acknowledged that technology can improve the health and well-being of PSH tenants but noted that many barriers to uptake exist. Tenants identified that PSH programs could play a more active role in facilitating technology uptake by providing universal Wi-Fi access in buildings and assigning a staff member to help residents become more familiar with new technology. Limited expectations that residents should or will use technology, however, may impede programs from playing this role.

Conclusion: The unified theory of acceptance and use of technology proved useful in studying how technology could be used to improve the lives of PSH tenants. Future work should include the perspectives of service providers that will need to be considered during the development and piloting of specific technologies.

Keywords: homelessness, unified theory of acceptance and use of technology, focus groups, internet of things, smart home technology

Introduction

Disparities in technology access and use among those living in poverty has been well documented. For example, nearly a fifth of households below the federal poverty line do not have access to the internet as compared to only 3% of those with higher incomes (Swenson & Ghertner, 2020). Surprisingly, however, it is not clear that this “digital divide” exists for people experiencing homelessness who may rely on mobile technology differently than those living in poverty who have housing. For example, Rhoades et al., (2017) found that in a sample of 421 adults experiencing homelessness aged 45 or older, more than half owned a smart phone and could access the internet. Such findings suggest that integrating technologies into homelessness services, such as smartphones, mobile health, or social networking platforms, could improve the lives of people experiencing homelessness (Adkins et al., 2017; Heaslip et al., 2021; Rice, 2010; Thurman et al., 2021).

Currently, the extent to which technology is used to deliver homelessness services has not been a major focus of research, although there is substantial evidence that many social service organizations more broadly choose not to or fail in their efforts to implement new technologies. (Cronley, 2011). Since the start of the COVID-19 pandemic, this may have changed out of necessity, with research on the use of technology to deliver homelessness services, in particular, increasing. Most studies have focused on the use of telehealth (Adams et al., 2021; Brody et al., 2021; Pham et al., 2022). For example, a study that involved interviews with behavioral health providers serving people experiencing homelessness found that most providers initiated telehealth services during the pandemic (Marcus et al., 2022), whereas the U.S. Department of Veterans Affairs reported on the distribution of tablets for video telehealth during the pandemic to offer health care access to veterans experiencing homelessness (Garvin et al., 2021).

In research on permanent supportive housing (PSH), an evidence-based practice that has been recognized as the “clear solution” to chronic homelessness by the U.S. federal government (U.S. Interagency Council on Homelessness, 2010), investigation of the use of technology has been more limited. Pilot studies in PSH have examined the use of telehealth (Henwood et al., 2019; Stefancic et al., 2013) and a text messaging-based intervention to improve health (Rhoades et al., 2019), but research has not considered more broadly how emerging technologies could be beneficial. When considering affordable housing programs more generally, recent research suggests that policies to expand internet access as well as training and support to enable the use of technology with online services may be required to overcome multiple person- and organizational-level barriers to technology use (Ellison-Barnes et al., 2021). Whether such policies and training are needed in PSH has not been investigated yet are likely needed.

The current qualitative study conducted this formative work to understand how the use of technology might benefit PSH tenants, in particular, as well as any barriers to technology uptake. In order to guide this inquiry, we used the unified theory of acceptance and use of technology (UTAUT), which is empirically grounded and considers the environment in which a given technology is being implemented in addition to the technology itself (Ahmad, 2014). UTAUT expands on the technology acceptance model, which posits that perceived usefulness and perceived ease of use predict technology uptake, by including two additional predictive constructs—facilitating conditions and social influences—that may be particularly important in PSH. UTAUT posits that these four key constructs—two regarding the environment in which a technology is implemented (facilitating conditions and social influences) and two regarding the technology (perceived ease of use or “effort expectancy” and perceived usefulness or “performance expectancy”)—determine the success of adopting new technologies (Ahmad,

2014). Importantly, the influence of these constructs can be moderated by individual characteristics (age, gender, experience) and structural factors (voluntariness). For the current study, which is part of a larger project to develop and test specific technologies for PSH programs, the various constructs of the UTAUT informed the development of the study protocols and were used as part of the analytic approach.

Methods

Overview and Theoretical Framework

As part of a larger project funded by the National Science Foundation, the study team collaborated with two agencies that provide PSH in Southern California. In these agencies, focus groups with tenants were conducted at five PSH locations to elicit feedback on the use of different technologies. Focus groups were chosen as the most appropriate data collection method to encourage interaction among tenants that could enhance the richness of the data (Kreuger & Casey, 2009). These focus groups were conducted in March and April 2022.

Recruitment and Data Collection

Flyers advertising the focus groups were posted at each site, and resident case managers requested that tenants sign up. One focus group was conducted at each PSH location. Focus group participation ranged between 3 and 15 participants per group, with each group lasting between 60 and 90 minutes. At the beginning of each group, a research team member reviewed an information sheet that was distributed to all participants. Participants agreed to having the focus group digitally audio recorded and were informed that the research team would keep their identities confidential. This study received human subjects approval from the project lead's university institutional review board that allowed for a waiver of signed consent.

Focus group discussion was facilitated by a member of the research team with at least one other team member present at each group, which allowed for notetaking throughout the meetings. Researchers used an interview guide informed by the UTAUT that included questions about current services received by PSH tenants, general use of smartphones, and general use of technologies. The guide included open ended questions such as “If we are to develop any technology to help PSH residents, what features should it include?”, as well as questions using examples of technologies that could be developed to elicit feedback. Examples included the use of a smart pill box, smart cooking pot, sensors to detect falls, and smartphone-based apps for communicating with other tenants or service providers.

Data Analysis

Thematic analysis was carried out in which the data were analyzed both deductively and inductively (Joffe & Yardley, 2004). Researchers engaged in constant comparative analysis, moving cyclically between data sources and theory to refine codes until themes crystallized (Padgett, 2012). Data included notes taken during the focus groups, audio recordings, and transcripts of audio files.

The analytic process involved four phases to ensure rigor and validity: joint review of notes, memo writing, coding of transcriptions, and negative case analysis. Initially, the research team jointly reviewed the notes taken at each focus group and added observations deemed missing based on having been present during the focus group. Audio recordings were then reviewed to systematically collect salient observations, which were recorded in an analytic matrix used to identify technologies that could be the target of development and testing. During this process, analytic memo writing also occurred. Memos were discussed jointly by the research

team and grouped into categories. Researchers compared observations across focus groups to identify similarities and differences observed in the data. Finally, transcripts of the audio recordings were reviewed and coded using a co-coding process. Codes were developed through close reading of the transcripts, notes, and codes developed through memo writing. A priori codes were also drawn from UTAUT. Researchers used NVivo software to code transcripts. The four constructs of UTAUT were then used to organize the coded material and identify themes that emerged from reviewing the data. A final review of transcripts was used to validate the themes developed by the team, with a focus on any data that did not support the identified themes through a process known as negative case analysis (Padgett, 2012).

Results

Sample Characteristics

As depicted in Table 1, 42 individuals participated across the five focus groups. Approximately half (48%) identified as cisgender men and 43% as Hispanic or Latinx. Although 36% of the sample identified as White, the overall sample was racially diverse, with 12% identifying as Asian, 10% as Black, 7% as multiracial, and 21% as other. One focus group only involved women, and another consisted of individuals living in housing for veterans. All participants reported owning a smartphone.

[Insert Table 1]

Thematic Findings

The discussion of technology use, including how technology could benefit PSH tenants along with some challenges to uptake, are depicted in Figure 1 and presented here, organized based on the four constructs of UTAUT.

[Insert Figure 1]

Performance Expectancy (i.e., Perceived Usefulness)

Participants generally recognized the benefit of technology, with one person stating “I’m lost without this” when referring to having a smartphone. Participants explained that they regularly used apps like Google Maps, Facebook, or Zoom and likewise, had experiences using smart devices to receive telehealth or virtual communications. One person explained: “We do use the phone and Zoom and stuff for some of our meetings, you know, which is really, really good for us because not all of us want to come to the meetings, or whatever.” Residents also expressed optimism about the role of other smart technologies in improving their lives. For example, in a discussion about the generally poor health of tenants, many participants noted that they were aware of other residents dying in their units. Participants agreed that motion sensors or an alert system could be used to either signal to neighbors or the staff that a resident had not exited their apartment for an extended period of time or needed emergency assistance, with one resident stating, “I think everybody would want something like that.” Across all interviews, residents expressed a belief that technologies akin to Life Alert, a medical and emergency alert system, could be valuable especially for residents who are more isolated.

Although participants generally agreed that technology could be beneficial, some residents were skeptical that technology could replace in-person human interactions, as expressed in the following exchange:

Interviewer: So, you already have enough information about what’s happening here?

Resident: Yeah, this used to be online, you see, and they probably didn’t get this many people. And now look at us. We’re all sitting here. We’re all talking. We’re knowing who each other is. You know, I’m sorry. I enjoy your guys’ technology ... but ain’t nothin’ better than person-to-person, voice-to-voice.

Another participant critiqued technology in human services:

But no one has ever come back to the foundation: personal touch. ... That's missing from technology. I hear what you guys are, what you have to say. It will be nice, if anything, it will be nice to just go back to the basics.

Most of the discussion focused on the use of telehealth, which had become more widely used during the pandemic, with one person commenting, "Like me myself, personally, I have a hard time talking to a TV. I'd rather be talking to somebody in front of me. You know, I see their, you know, eye to eye, you're talking to him."

Beyond concerns that technology could not replace human interaction, several residents expressed concern that technology could work against certain health goals. One participant noted that technology can be distracting and cause a loss of focus:

For people who have mental health issues like that, it's—that's why I tried to minimize. ... If I go down that rabbit hole, I'm afraid what else I might, you know, discover, what else I might find interesting. And next thing you know, I'm [on a] completely different tangent.

Others questioned whether technology could make people more vulnerable to financial or identity theft.

Effort Expectancy (i.e., Perceived Ease of Use)

Despite high rates of engagement with some forms of technology, participants noted a high degree of effort expectancy, meaning that the use of technology was generally perceived to be challenging. Most often, this had to do with identifying as an older adult, such as one female veteran who said about technology:

It's just so complicated like that. We're very computer illiterate. So, sometimes a lot of programs are like, "Oh my God, how do you do this?" You know, just a lot simpler would be nicer. I mean, I'll—come on, you guys are smart, make it simpler for us old people, we weren't raised [laughs], you know, with Zoom and all that.

Some participants discussed how given their age, technology did not increase efficiency for them: "Yes, 'cause you want to get a number, this and this. I'll take paper and write it down, it's frustrating, you know? It takes too long on smartphones sometimes. You do old school. Just paper, pen, write it down." When discussing concerns related to being taken advantage of, one person expressed needing guidance on "how to tell when an app is good or bad." In an extreme case, one tenant mentioned, "I stopped, I mean, [using] technology; I started, [but] I don't even know how to use [it] half right."

Facilitating Conditions

As noted in Table 1, all participants indicated that they owned a smartphone that could facilitate increased uptake of technology. Still, some mentioned that not having access to the latest technology could be an issue, with one person stating that "my smartphone is a dumb phone at the moment." They frequently discussed cost as a barrier to accessing technology and the ability to use the internet. When discussing possible technologies, one participant stated, ""Would these devices be provided? Because that's an additional device, [which] means spending more money, and we don't have a lot of money." Another participant said, "Their phones, is like four or five hundred dollars. You can't afford them. You gotta pay your rent, you know, all that." Some participants noted that free phones available to low-income individuals had low quality. "Obama phones or whatever you call them, it's not updating. I don't care what

you do, you go here and go here and get the phone. That's why I don't get them no more. You know? They're not updated."

Not having more recent technologies meant that residents felt left behind, as one participant stated:

You're thinking about a phone, thinking it's gonna [inaudible], right? But it doesn't have updating, constantly. These people are on [Version] 12, 13, you still stuck on 6 or 7, whatever. So, I'm just saying, how [inaudible] improved from that way back in the day, when you first came in line, even though before that, and now you've got 50 years later, it's still guessing how to do this stuff. You know? I understand things change every day. I understand that. But how're you gonna keep up? How?

Residents also reported the need for Wi-Fi and cell phone plans with sufficient data. Wi-Fi was typically not available throughout the PSH site and instead was only available in a common area during specific times. As one resident noted, "That's something that we've continually asked [the managers] about, because I don't see why they can't have building internet." Because residents had tight budgets, they reported being unable to afford individual data plans and Wi-Fi. Some residents noted that this impeded their ability to access Zoom meetings with other residents during the pandemic and do essential tasks like contacting their health care provider and grocery shopping.

"We just need more access and services to the internet ... [and] everyday things that we need because, you know, like, like she was saying in data, it's all about data. And getting things done. We could get more done if we had more data. I don't understand the data crap anyways. Why buy data? I don't understand all that. But it shouldn't be like that. Should just be able to use it and not have to worry about sucking your, um, your data to

look up. Because you have to go online to look up your doctor to call. You know that takes data to do that. There shouldn't be—a majority of your apps ... shouldn't—it shouldn't be [like] that. It should be the crucial ones. Now, the data ones should be for the stupid ones, the stupid stuff you want to get online and look up, all that. I understand that. But when it comes to your everyday things you need, and the shop, and stuff like that, you shouldn't have to use your data up to go grocery shopping and use your data. I don't have no data. How am I gonna do my grocery shopping?

Although they identified cost as a main barrier, some participants said they simply struggle with technology and it would be helpful to have someone who could explain how to use the technology. As one resident noted, “A lot of people that can't do, have trouble with their phone, trouble with the computer understanding and stuff like that. Providing somebody with understanding and just basic direction [would help].” Another person concurred, stating, “There is some cool technology that I would like to know how to use. Uh huh. And there is some cool apps that I wish somebody would show you.”

Social Influence

Across focus groups, participants expressed a clear interest in using technology to promote health and facilitate social interaction. One resident suggested using social media apps to support a monthly get-together across PSH projects—“so that we could interact with each other and stuff, you know, and see what they're working on, what they're, what they're doing over there ... do some, like uh, outings and stuff like that.” Still, residents recognized that not everyone would be supportive of using technology in this way. As one resident noted:

There's a guy that's lives across from us. I never see him. He never comes out of this room. And I know a lot of people do that. It's like, are they dead in there or what? You know? I don't know. I hope no!

Residents noted that not everyone had access to and used technology regularly. At least one person talked about prolonged periods without having a cell phone:

I didn't have cell phone for four or five months, you know. When I just didn't have one, there was no way for you to get a hold of me, period. It was just like if I happened to go inside. ... I just didn't have that ability.

Other residents noted that during the pandemic when in-person contact with staff members was not an option, many residents did not access services, as indicated in this exchange:

Participant 2: If you didn't have Wi-Fi, you weren't going to be able to get on.

Participant 4: Right. They would do meetings by Zoom, but you had to have access to data and or Wi-Fi and a device ... to go on Zoom.

Participant 7: And even when they did have some meetings, we had a feeling that a lot of people didn't get on it.

In general, participants described no expectation from PSH staff members or other residents that all residents would use technology.

Discussion

Similar to findings in affordable housing programs more generally (Ellison-Barnes et al., 2021), these focus group findings reveal a general recognition that technology can improve the health and well-being of PSH residents but that many barriers to uptake still exist. Most notably, findings related to affordability underscore that PSH residents continue to live in poverty and struggle financially, even after having secured affordable housing. While participants noted that

there are existing programs such as the federal Lifeline program that provides reduced-cost phones (cellular and landline) or internet service to low-income individuals that could be used to address a digital divide (Hunter et al., 2020), such programs are not sufficient. Residents noted that PSH programs could help fill this gap by providing universal Wi-Fi access in buildings and assigning a staff member to help residents become more familiar with new technology, but currently do not include this as part of PSH services. It is not clear the extent to which this is a resource issue or whether it suggests that there is limited expectations from service providers that residents should or will use technology. This is a topic that could be further explored along with ways that service providers working in PSH feel technology could be most useful to improve their job functioning.

We should note that this study focused on single-site PSH, and it is not clear the extent to which these findings apply to PSH programs that provide scatter-site apartments that do not necessarily have on-site support services (Dickson-Gomez et al., 2021; Henwood et al., 2023). These focus group findings also do not reflect the views of residents who may not have been inclined to participate in a group format and have different views on the use of technology. Moving forward, these findings are informing the development of a survey that will be sent to all residents of these various buildings to provide anonymous feedback that can guide the development and pilot testing of specific technologies, currently envisioned to include a smart pill dispenser, a smart cooking pot, and an automatic request for a staff wellness check. Whether or not such technologies will be adopted will ultimately depend on the interaction between their perceived utility and ease of use along with the facilitating conditions and expectations involving both tenants and support service providers.

Conclusion

The various constructs of the UTAUT proved useful in informing the development of these study protocols and analytic methods to better understand how technology could be used to improve the lives of PSH tenants. Future work should include the perspectives of service providers that will need to be considered during the development and piloting of specific technologies.

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Statements and Declarations

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Table 1. Focus Group Demographic Characteristics

Characteristic	Group 1	Group 2	Group 3	Group 4	Group 5	Total
	(<i>n</i> = 15)	(<i>n</i> = 9)	(<i>n</i> = 3)	(<i>n</i> = 12)	(<i>n</i> = 3)	(<i>n</i> = 42)
Age, <i>M</i> (range)	55 (38–66)	47 (34–56)	59 (51–70)	59 (32–79)	46 (33–59)	54 (32–79)
Cismale, <i>n</i> (%)	9 (60)	1 (11)	2 (67)	8 (67)	0	20 (48)
Hispanic or Latino, <i>n</i> (%)	7 (47)	6 (67)	0	5 (42)	0	18 (43)
Race, <i>n</i>						
White	7	3	1	1	3	15
Black	1	0	1	2	0	4
Asian	1	0	1	3	0	5
American Indian or Alaska Native	0	0	0	1	0	1
Pacific Islander	0	0	0	2	0	2
Bi- or multiracial or ethnic	1	1	0	1	0	3
Other	5	3	0	1	0	9
No answer	0	2	0	1	0	3
Owns a smartphone, <i>n</i> (%)	15 (100)	9 (100)	3 (100)	12 (100)	3 (100)	42 (100)

Figure 1. Technology Uptake in Permanent Supportive Housing using the Unified Theory of Acceptance and Use of Technology

