

Original Research Article

# Findings From Talking Tech: A Technology Training Pilot Intervention to Reduce Loneliness and Social Isolation Among Homebound Older Adults

Emily A. Gadbois, PhD,<sup>1,\*</sup> Frances Jimenez, MPH,<sup>2</sup> Joan F. Brazier, MS,<sup>1</sup> Natalie M. Davoodi, MPH,<sup>3</sup> Amy S. Nunn, ScD,<sup>4,5</sup> Whitney L. Mills, PhD,<sup>1,6</sup> David Dosa, MD, MPH,<sup>1,7</sup> and Kali S. Thomas PhD<sup>1,6</sup>

<sup>1</sup>Health Services, Policy & Practice, Brown University School of Public Health, Providence, Rhode Island, USA. <sup>2</sup>Health Sciences, NORC at the University of Chicago, Chicago, Illinois, USA. <sup>3</sup>Department of Emergency Medicine, The Warren Alpert Medical School of Brown University, Providence, Rhode Island, USA. <sup>4</sup>Behavioral and Social Sciences, Brown University School of Public Health, Providence, Rhode Island, USA. <sup>5</sup>Division of Infectious Diseases at Brown University Medical School, Providence, Rhode Island, USA. <sup>6</sup>Center for Innovation in Long-Term Services & Supports, Providence VA Medical Center, Providence, Rhode Island, USA. <sup>7</sup>Department of Primary Care, Providence VA Medical Center, Providence, Rhode Island, USA.

\*Address correspondence to: Emily A. Gadbois, PhD, Health Services, Policy & Practice, Brown University School of Public Health, 121 South Main Street, Providence, RI 02912, USA. E-mail: [emily\\_gadbois@brown.edu](mailto:emily_gadbois@brown.edu)

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## Abstract

**Background and Objectives:** Social isolation and loneliness are common among older adults and associated with negative health outcomes including cognitive decline, depression, suicide ideation, and mortality. Information and communication technology interventions are often used to combat loneliness and social isolation; however, homebound older adults face barriers to access. This study reports findings from a novel pilot intervention, called Talking Tech, designed to reduce loneliness and social isolation in homebound older adults by providing one-on-one, in-home technology training, a tablet, and the internet, to promote digital literacy and participation in a virtual senior center.

**Research Design and Methods:** Twenty-one homebound older adults participated in this 14-week, volunteer-delivered program. We used qualitative interviews with participants, volunteers, and program staff, weekly progress reports from volunteers, and quantitative pre- and postintervention surveys with participants to examine experiences and to evaluate the impact of the intervention on loneliness and social isolation. Qualitative data were analyzed using content analysis and pre- and postintervention survey data were compared.

**Results:** Participants reported increased technological literacy and use, increased access to online activities, and improved facilitation of social connections to existing and new networks. Additionally, during interviews, many participants reported that participating in Talking Tech alleviated their loneliness. While not statistically significant, our quantitative analysis revealed trends toward decreased participant feelings of loneliness and increased technology use. Additionally, intervention adoption and retention were high, with only one participant withdrawing from the intervention.

**Discussion and Implications:** This evaluation of the novel Talking Tech pilot intervention provides critical insights into strategies to reduce loneliness and isolation for older adults, with implications for future research, policy, and practice. Findings demonstrate that individualized technology training may be an acceptable way to improve well-being for homebound older adults.

**Translational Significance:** Social isolation and loneliness are significant public health concerns for older adults. Findings from this evaluation of the Talking Tech pilot intervention demonstrate that one-on-one, individualized technology training may improve well-being for homebound older adults. The use of technology to address loneliness and social isolation is of particular relevance in light of coronavirus disease 2019 (COVID-19). The COVID-19 pandemic underscores the need for research–practice partnerships, like the one reported in this paper, to translate evidence into practice among service providers, as well as the need for cross-sector collaborations to leverage existing resources and infrastructure to deliver services to older adults.

**Keywords:** Community-based organization, Information and communication technology, Well-being

## Background and Objectives

Social isolation and loneliness among older adults are critical public health concerns associated with cognitive decline, comorbid conditions, depression, suicide ideation, and mortality (Beller & Wagner, 2018; Courtin & Knapp 2017; Heisel & Flett, 2016; James et al., 2011; Sakurai et al., 2019; Wilson et al., 2007). In addition to these health impacts, isolation and loneliness are associated with greater health care utilization and spending among older adults (AARP Public Policy Institute, 2017; Gerst-Emerson & Jayawardhana, 2015; Valtorta et al., 2018). Given these substantial negative outcomes, health care providers and payers are increasingly focused on designing and delivering programs to reduce loneliness and social isolation, and research is increasingly committed to understanding relationships among social connection, loneliness, and isolation (Blieszner et al., 2019).

Homebound older adults, who make up 8.3% of older adults living in the community in the United States (Xiang et al., 2020), are at increased risk of social isolation and loneliness due to mobility limitations caused by chronic illness, cognitive decline, or injury (Bedard-Thomas et al., 2019; Qiu et al., 2010). While traditional therapeutic approaches have demonstrated success in reducing social isolation and loneliness for older adults (Gardiner et al., 2018), such programs and services are most often offered in community-based settings, and typically do not reach homebound populations who experience unique barriers to access (Turcotte et al., 2015). A potential strategy to reach homebound older adults is through information and communication technology (ICT), which is increasingly used to reduce social isolation and loneliness among older adults (Poscia et al., 2018).

ICTs have been found to be an effective means for older adults to maintain contact with existing social relationships and to build new relationships (Baker et al., 2018; Chen & Schulz, 2016; Chipps et al., 2017; Cotten et al., 2013; Czaja et al., 2018; Ibarra et al., 2020; Khosravi et al., 2016). Despite the success of ICTs in reducing social isolation and loneliness (Schlomann et al., 2020), limited financial resources, lack of accessible technology support, and technology illiteracy limit adoption among older adults

(Pew Research Center, 2017), and present as increased challenges to those who are homebound (Choi & DiNitto, 2013). These barriers necessitate approaches tailored to homebound older adults, who have significant potential to benefit from ICT strategies to reduce social isolation and loneliness.

This study reports findings from a novel pilot intervention, called Talking Tech. This intervention was designed to reduce loneliness and social isolation among homebound older adults by providing one-on-one, in-home technology training to promote digital literacy and participation in a virtual senior center.

## Research Design and Methods

### Intervention Format

The Talking Tech intervention was embedded within and delivered by a home-delivered meals program, and provided training and assistance to participants using trained volunteers, called TechMates, over a 14-week period between October 2019 and May 2020. This training and support focused on how to use a tablet, access the internet, and participate in a virtual senior center program, called Well Connected. Well Connected is a national phone- and internet-based program, which provides over 70 sessions per week on topics including virtual travel, support and conversation groups, bingo, and language learning, among others. Participants were paired with a TechMate and given a tablet and a hotspot connection for 1 year (if they did not already have in-home internet access). While the intervention lasted 14 weeks, participants were encouraged to keep their tablets permanently, and relationships between participants and TechMates and between participants and the home-delivered meal provider staff were not severed upon completion of the 14 weeks, in case of participant questions or challenges. Similarly, although the hotspot connection was provided for 1 year, the home-delivered meal provider engaged with interested participants to explore options to maintain an internet connection.

During the first 4 weeks of the intervention participants received one-on-one in-home training on how to use the

tablet, access the internet, and join Well Connected programming from their assigned volunteer TechMate. At each visit, TechMates delivered a training module that was expected to last one and a half to 2 hr. TechMates were given a binder containing module objectives and instructions, program materials, and handouts for participants. During the following 8 weeks, the TechMate called the participant at a mutually agreed upon time to provide technical assistance and support. Telephone calls were anticipated to last approximately 30 min. During the final 2 weeks the TechMate was available to provide assistance if the participant reached out by phone with questions. See [Supplementary Table 1](#) for a description of the content covered in each week. Of note, although TechMates worked from prepared modules, individualization was promoted, with TechMates encouraged to determine and respond to participants' personal goals regarding technology.

The Brown University Institutional Review Board (IRB) determined that the present study did not meet criteria for human subjects research, and therefore did not require IRB review.

### Project Partners

This intervention involved a cross-sector collaborative partnership among a research university, a local home-delivered meal provider, the national parent organization of which that meal provider is a part, the virtual senior center provider—Well Connected, and a technology training company. The national parent organization, the research university, the local meal provider, and Well Connected all participated actively in pilot design. The national parent organization funded and coordinated the overall pilot, while the local provider delivered the pilot, which drew its sample from among their clients. The research university was responsible for evaluation, and the technology training company designed and delivered the training to volunteers and developed the materials used to train participants.

### Intervention Eligibility and Recruitment

Intervention participants were recruited from the local home-delivered meal program's client list. Participants were eligible if they received meals from the program, were aged 60 or older, and were homebound or had difficulty leaving their homes independently (a requirement for receiving meals from the referring organization; [Supplementary Figure 1](#)). Initially, meal delivery drivers suggested clients they thought were likely to be isolated and/or lonely. Program staff called approximately 50 clients from this list. Due to limited enrollment achieved through this method, a flyer was distributed to all meal recipients as part of their regular delivery, inviting interested individuals to reach

out to program staff. Additionally, program staff used responses from an annual client survey, in which clients were asked if the services they received from the meal provider helped them feel less lonely. A recruitment flyer was sent to those who indicated that the meal program did not help their loneliness, or who commented about being lonely in an open-response area, and included an email address. Using these methods, 21 participants were recruited into the pilot intervention in two waves: October 2019 ( $n = 8$ ) and January 2020 ( $n = 13$ ). Because recruitment was carried out by program staff who completed these activities in addition to their regular full-time responsibilities, time constraints restricted the documentation of detailed information about how many participants were recruited through each method.

Program staff also identified and recruited TechMates. Eligibility criteria included self-identification as computer and internet literate and interest in working with older adults one-on-one in their homes. TechMates were first recruited from the existing pool of 700 meal delivery volunteers at the program. Due to limited response from existing volunteers (many of whom are older adults themselves and likely less confident in their technological capabilities), the program then leveraged contacts with corporate partnerships to solicit additional volunteers and recruited volunteers at a local university. Eighteen volunteers served as TechMates (three volunteers signed up to work with two participants each).

### TechMate Training

A technology training company trained TechMates in a 1-hr, one-time session. Volunteers were given a manual containing program goals, expectations for TechMates and participants, lesson plans for each module, participant worksheets, and a Well Connected brochure including a schedule of classes. Instructional handouts on setting up the tablet and appropriate shortcuts, setting up the hotspot, and accessing Well Connected were also included. Training was offered in-person in November 2019 and by video recording. Sixteen volunteers attended the in-person training and two used the recorded training.

### Impact of coronavirus disease 2019

This intervention occurred as the coronavirus disease 2019 (COVID-19) pandemic began. For those participants who were recruited for the second wave in January 2020, intervention delivery had to be modified. While the training was designed to occur in participants' homes for the first four sessions, not all individuals were able to complete the four in-person training sessions before instructions to isolate were put in place. For these four participants, they and their TechMates were instructed to complete the sessions by telephone.

## Data Collection and Measures

Several methods were used to assess intervention adoption, acceptability, and impact on participant well-being. These included in-depth semistructured interviews with participants, TechMates, and program staff designed to examine program adoption and acceptability, in addition to the impact on well-being, reports from TechMates, and quantitative baseline and follow-up surveys to measure impact on well-being. These methods are described below.

### Qualitative interviews: adoption, acceptability, and impact on loneliness

Upon completion of the intervention, qualitative interviews were conducted with participants, TechMates, and program staff to understand intervention acceptability. Participant interviews included questions about tablet and Well Connected accessibility and usability, use of Well Connected, perceived impact of internet and Well Connected use on loneliness and other aspects of well-being, and satisfaction with TechMate training and Well Connected sessions. Additional questions related to COVID-19 were added as needed. Staff and TechMate interviews explored implementation experiences, facilitators and barriers to program delivery, and suggestions for improvement. TechMate interviews also probed about intervention acceptability from the volunteer perspective, including challenges and barriers to participation for participants.

### TechMate reports: adoption, acceptability, and impact on loneliness

During the first 4 weeks of the intervention, TechMates submitted a report to the program coordinator after each session with a participant. Reports included prompts about the duration of the interaction, participant questions, participant comfort level and interest with the tablet and Well Connected, challenges, and ideas for program improvement. See [Supplementary Material Part A](#) for the TechMate report template.

### Quantitative baseline and follow-up surveys: impact on loneliness

Participants completed surveys at baseline and at Week 15 (1 week after the final session) to assess changes over time. Our primary outcome was loneliness, as measured by the Three-Item Loneliness Scale. This instrument assesses subjective feelings of loneliness and has been validated for use in older adults by telephone survey (Hughes et al., 2004). A score of 6 or greater is interpreted as “lonely” (Stephens et al., 2013).

Secondary outcomes included social isolation and technology use. Social isolation was evaluated using the Perceived Isolation Lubben Social Network Scale (LSNS-6), a validated tool which asks about the number of family members and friends with whom individuals have social contact and from whom they can receive social support (Lubben et al., 2006).

Questions modeled after the Technological Environment section from Round 7 of the National Health and Aging Trends Study were used to assess technology use. Questions asked about internet use, email and text messaging use, and smartphone, tablet, and computer ownership, as well as online information-seeking behavior. Additional measures used to understand the sample included health satisfaction, quality of life, self-rated health, activities of daily living (ADL) and independent activities of daily living (IADL) needs, and depression. Health satisfaction and quality of life were measured using questions from the World Health Organization Quality of Life (WHOQOL-BREF) Instrument. Questions from the Healthy Days Core Module (CDC HRQOL-14) were used to assess self-rated health and ADL and IADL needs. Symptoms of depression were measured using the Patient Health Questionnaire-2 (PHQ-2) scale. All primary and secondary measures were collected at baseline and follow-up. Basic demographic information, including marital status, education level, and Veteran status, was collected at baseline.

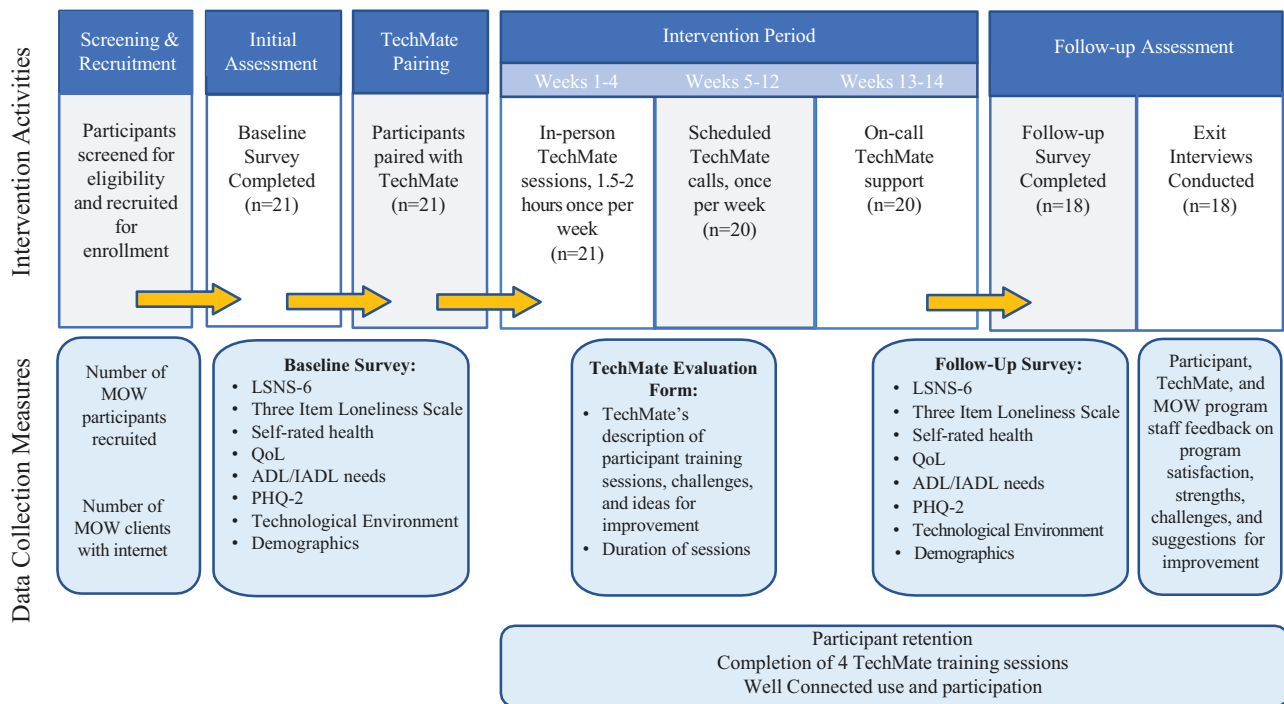
### Data collection

Two research assistants (RAs) conducted baseline surveys by telephone with participants prior to the intervention start (baseline), and again at 15 weeks. Surveys were conducted using Qualtrics software Version 2019 (Qualtrics, Provo, UT) and lasted approximately 15 min. After follow-up survey completion, one RA conducted semistructured interviews with participants. Participant interviews were designed to be conducted 1 week after follow-up survey completion in participants' homes; however, due to stay-at-home orders resulting from COVID-19, only four participant interviews were conducted in this manner. As a result, the remaining interviews were conducted by telephone and in conjunction with the follow-up survey. Participant interviews lasted between 20 and 90 min. In addition, after the intervention period, the RA conducted telephone interviews with two program staff members from the local meal provider and three volunteer TechMates. Staff interviews lasted 15–50 min and TechMate interviews lasted 30–60 min. [Figure 1](#) presents the time line of data collection and intervention activities. Verbal consent was obtained for all surveys and interviews. All interviews were audio recorded, with participant consent, and transcribed.

### Analysis

Qualitative data from program staff, TechMate, and participant interviews, and TechMate reports were qualitatively analyzed. A content analysis approach (Curry et al., 2006) was used to develop the coding scheme for interviews and TechMate reports. The analytic team initially coded the first three participant interviews independently and met to develop a preliminary coding scheme. This preliminary coding scheme included both a priori codes developed based on the questions asked in the interview guides, as





**Figure 1.** Intervention activities and data collection time line. *Notes:* ADL/IADL needs = activities of daily living/independent activities of daily living needs; LSNS-6 = six-item Lubben Social Network Scale; NHATS = National Health and Aging Trends Study; PHQ-2 = Patient Health Questionnaire-2; QoL = quality of life.

well as de novo codes that arose from unanticipated material. The coding scheme was then revised after the team independently reviewed and discussed all interviews. Coded transcripts were entered into NVivo Version 12 Plus (QSR International, Burlington, MA) to facilitate analysis. TechMate reports were reviewed for feedback relevant to program strengths, challenges, and lessons learned. Throughout analysis, a detailed audit trail was maintained (Ritchie & Lewis, 2012), cataloging team discussions and decisions and enabling the interpretation of themes, or patterns in the data.

Descriptive statistics, including mean, count, and frequency, were calculated for all outcome and descriptive variables. Scores were calculated for the Three-Item Loneliness Scale, LSNS-6, and the PHQ-2 for each respondent. Engagement in online activity was calculated by summing the number of activities respondents reported engaging in the past month, where each activity was awarded one point. Scores on these measures at baseline and follow-up were compared using paired sample t-tests. Fisher’s exact tests were used to analyze changes from baseline to follow-up among categorical variables. Statistical analyses were performed using STATA Version 16.1 (STATA Corp., College Station, TX).

**Results**

Twenty-one individuals were recruited and received a baseline survey. Their characteristics are included in Table 1. The

mean age of participants was 73 years, and the sample included 13 female (62%) and eight male (38%) participants. Twelve participants identified as White (57%), six identified as Black (29%), two identified as Native American (10%), and one identified as Hispanic (5%). Many were widowed ( $n = 10, 47\%$ ), had completed high school or higher education ( $n = 17, 81\%$ ), and lived alone ( $n = 15, 71\%$ ). Most did not own a computer, smartphone, or tablet prior to the intervention start. Results presented below include qualitative findings from TechMate reports and postintervention interviews with participants, TechMates, and staff, as well as quantitative findings from the baseline and follow-up surveys.

**Adoption and Acceptability**

Of the 21 participants who completed the baseline survey and enrolled in the program, 18 (86%) completed the intervention and were reached for the follow-up survey and interview. Of the three who were not reached, one withdrew after the second week on the intervention due to lack of interest, one entered a skilled nursing facility, and another was lost to follow-up for unknown reasons. These three participants did not appear different at baseline from those who completed the follow-up survey and interview. For four (22%) of the remaining 18 participants, COVID-19 affected intervention delivery, such that the first four training sessions, which were designed to be completed in the participants’ homes, were shifted to telephone sessions.

**Table 1. Participant Characteristics at Baseline (N = 21)**

Characteristic	Mean (range) or N (%)
Age	72.95 (61–93)
Sex	
Female	13 (62%)
Male	8 (38%)
Race	
White/Caucasian, non-Hispanic	12 (57%)
Black/African American, non-Hispanic	6 (29%)
Native American, non-Hispanic	2 (10%)
Hispanic/Latino	1 (5%)
Marital status	
Married	1 (5%)
Divorced	6 (29%)
Widowed	10 (48%)
Separated	1 (5%)
Never married	3 (14%)
Education level	
Less than high school	4 (19%)
High school diploma or GED	5 (24%)
Some college	5 (24%)
College degree or higher	7 (33%)
Living arrangement	
Lives alone	15 (71%)
Lives with others	6 (29%)
Veteran status	
Yes	4 (19%)
No	17 (81%)
Own a computer	
Yes	4 (19%)
Yes, but don't know how to use	3 (14%)
No	14 (67%)
Own a tablet	
Yes	4 (19%)
Yes, but don't know how to use	2 (10%)
No	15 (71%)
Own a smartphone	
Yes	9 (43%)
No	11 (52%)
Don't know	1 (5%)
Used the internet in the past month	
Yes	12 (57%)
No	8 (38%)
Not applicable (did not own computer, tablet, or smartphone)	1 (5%)
Health satisfaction	2.95 (1–5)
Quality of life	2.48 (1–5)
Self-rated health	3.48 (2–5)
Activities of daily living	1.76 (1–2)
Instrumental activities of daily living	1.14 (1–2)
Depression	1.76 (0–6)

Notes: GED = General Equivalency Degree. Health satisfaction and quality of life were measured using questions from the World Health Organization Quality of Life (WHOQOL-BREF) Instrument: “Thinking about the last 2 weeks, how would you rate your quality of life?” and “Thinking about the

**Table 1. Continued**

last 2 weeks, how satisfied are you with your health?” Likert responses ranged from 1 to 5, with scores of 5 indicating “very good” and “very satisfied”, respectively. Questions from the Healthy Days Core Module (CDC HRQOL-14) were used to assess self-rated health and activities of daily living (ADL) and independent activities of daily living (IADL) needs. Self-rated health was measured using the question, “Would you say that in general your health is ...?” with response options including excellent (1), very good, good, fair, and poor (5). Respondents replied yes or no to the following questions to determine presence of ADL and IADL needs, respectively: “Because of any impairment or health problem, do you need the help of other persons with your PERSONAL CARE needs, such as eating, bathing, dressing, or getting around the house?” and “Because of any impairment or health problem, do you need the help of other persons in handling your ROUTINE needs, such as everyday household chores, doing necessary business, shopping, or getting around for other purposes?” The resulting scores are thus a count of those activities individuals need assistance with. Symptoms of depression were measured using the Patient Health Questionnaire-2 scale. A score of 3 or greater indicates a positive screen for major depressive disorder.

Ten participants (56%) accessed Well Connected sessions by the time of the follow-up survey and interview (joining Well Connected sessions was a primary focus of the Week 2 and 4 training sessions). Sessions that were attended included virtual travel, conversation groups, museum tours, entertainment and music, health condition support groups, games, and reading and writing groups.

Regarding intervention acceptability, TechMate reports were received for 16 participants. Nearly all participants reported having a positive experience with Talking Tech. TechMate reports indicated that 15 of the 16 participants for whom reports were received were “very interested” in the program and “excited” to learn how to use the tablet (detail on Participant 6, who did not report a positive experience, included below).

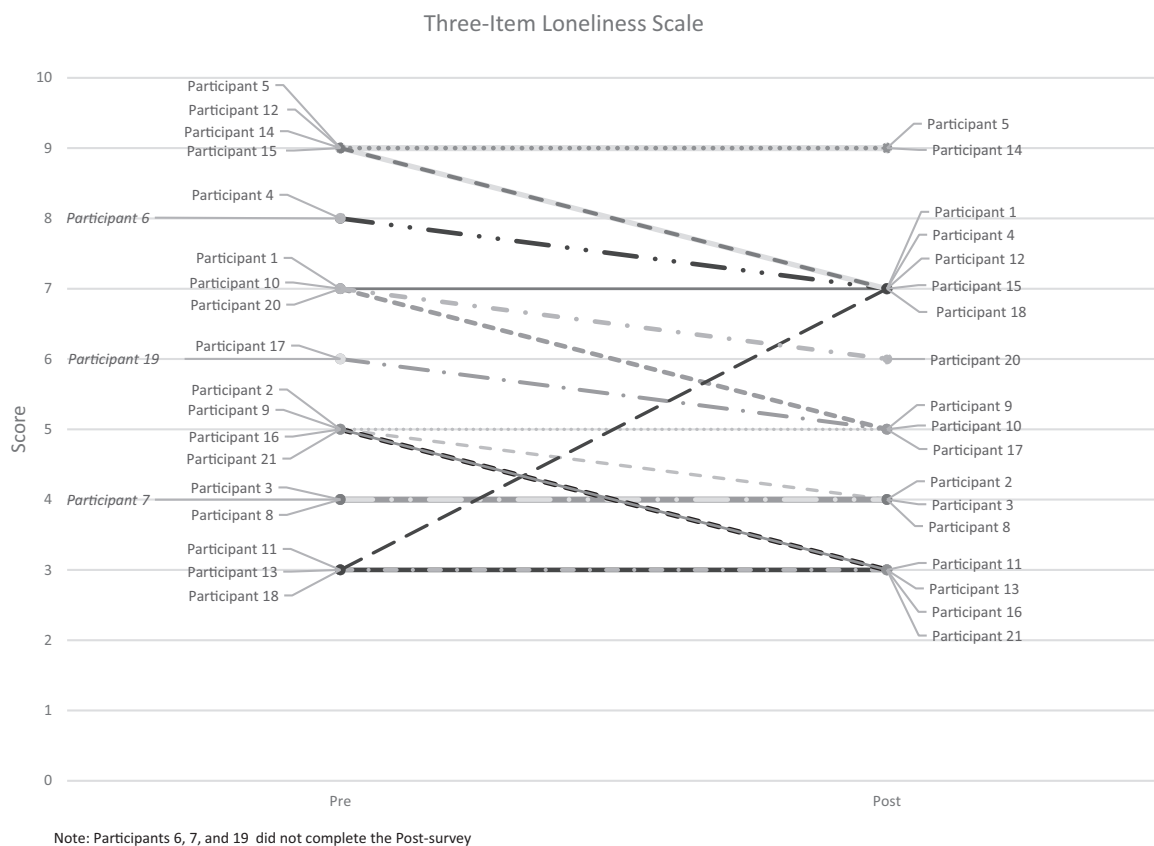
### Impact on Loneliness and Secondary Outcomes

Baseline, preintervention survey data were compared with postintervention, follow-up data. Across participants, there were no significant differences for any of the measures between baseline and follow-up (Table 2). Loneliness scores were, however, trending in right direction, with a mean score of 6.00 at baseline reducing to 5.44 on the follow-up survey. There were also differences in loneliness within participants. Figure 2 presents baseline and follow-up scores for our primary outcome measure, loneliness, for each participant, with scores of 6 or higher indicating loneliness. Nine individuals (50%) were less lonely from baseline to follow-up, and for two of these participants, Participants 10 and 17, their scores changed from lonely to not lonely. One participant (5.56%) had a higher loneliness score from baseline to follow-up and eight participants (44.44%) stayed the same. Based on the cutoff score of 6 indicating loneliness, 11 participants (52.38%) were lonely at baseline and eight (44.44%) were lonely at follow-up.

**Table 2.** Changes in Loneliness, Social Isolation, and Technology Use From Baseline to Follow-Up (*N* = 18)

Measure	Baseline survey	Follow-up survey	<i>p</i> Value
Loneliness (Three-Item Loneliness), mean score ( <i>SD</i> )	6.00 (2.2)	5.44 (2.01)	.12
Social isolation (LSNS-6), Mean score ( <i>SD</i> )	12.11 (5.12)	10.39 (4.39)	.12
Technology use			
Sent email or text messages most days in past month, <i>N</i> (%)	14 (78%)	13 (72%)	1.0
Used internet in past month, <i>N</i> (%)	11 (61%)	13 (72%)	.27
Online activity engagement score, <i>N</i> (%)	1.44 (1.69)	1.89 (1.84)	.44
Shopping in past month, <i>N</i> (%)	4 (22%)	4 (22%)	
Order or refill prescriptions in past month, <i>N</i> (%)	3 (17%)	5 (28%)	
Pay bills or banking in past month, <i>N</i> (%)	6 (33%)	2 (11%)	
Social networking sites in past month, <i>N</i> (%)	7 (39%)	9 (50%)	
Contact medical provider in past month, <i>N</i> (%)	2 (11%)	6 (33%)	
Health insurance matters in past month, <i>N</i> (%)	2 (11%)	3 (17%)	
Sought health information in past month, <i>N</i> (%)	9 (50%)	10 (56%)	

Notes: LSNS = Lubben Social Network Scale; *SD* = standard deviation.



**Figure 2.** Changes in participant loneliness, baseline to follow-up. Notes: Participants 6, 7, and 19 were lost to follow-up and did not complete the postintervention survey. Scores of 6 or greater indicate loneliness.

While six participants (33.33%) had scores that indicated they were less socially isolated from baseline to follow-up, eight participants (44.44%) were more isolated and four (22.22%) stayed the same. There was a trend toward increases in technology use from baseline to follow-up (Table 2). Seven participants (38.89%) reported greater use of the internet for activities including shopping, prescriptions, social media, and health-related activities,

while three (16.67%) reported less use and eight (44.44%) stayed the same.

### Talking Tech Challenges

Areas for potential program improvement were identified during postintervention interviews. A few participants and TechMates suggested including more training sessions to

accommodate participants with a slower learning pace or for those starting with limited technology knowledge. One such participant reported a desire for more assistance: “Once I’m online or once I do it several times, I think I can learn how to do it, but I would need somebody working more of a full-time basis to assist me” (Participant 9). Alternatively, others with more computer experience described that aspects of the module content were too basic. Several participants found Well Connected confusing to use or had difficulty navigating the online platform to access classes. As described by a TechMate:

My participant was so good at using the tablet. She knew how to do everything. Then, as soon as we got to Well Connected, it was like all the skills went out the window. I just couldn’t get through to her to use it. (TechMate 2)

Additionally, some participants encountered registration and scheduling issues with Well Connected that led to delays in participation. While one participant reported being able to join Well Connected sessions that occurred by phone, they “didn’t get into the online ones because all the times were screwed up” (Participant 1).

For four participants, COVID-19 prevented them from completing their in-person training sessions. This inability to complete the training sessions in person was associated with a reported lack of ability to use technology. One such participant described a desire for additional training sessions that went beyond the basics of using the tablet and helped them get more comfortable going on the internet:

What I hoped for is somebody to help me learn more than ... how to use the laptop ... Online and all that. I know I can probably do it, but I have to have somebody to help me ... I think I only had three sessions with her. (Participant 4)

TechMate reports also provided information about challenges. One series of reports demonstrated an occasion where there was a lack of progress, resulting in the participant withdrawing from the intervention after the second week. The TechMate Week 1 report stated that the participant said “her brain would not allow her [to learn new things] ... After some discussion, she agreed to continue with the program ... I have followed up with a phone call to encourage her to practice using the computer. She has not been practicing” (TechMate report, Participant 6, Week 1). In Week 2, the TechMate reported that the participant continued to be uncomfortable using technology: “I had asked her to practice what was learned in the first session and though I called her twice to encourage her to practice she had not done so.” A benefit of the TechMate reports is that they were received by the program staff and study team in real time, which allowed an immediate response to this reported challenge. The program staff reached out to the participant to try to assess how they could be better-engaged, but the participant decided to withdraw. The TechMate,

however, was still very engaged and was reassigned to a new participant.

Despite these challenges, overall, participants were optimistic about their future use of the tablet and Well Connected and “eager” (Participant 13) to continue learning how to use the technology. Additionally, despite disruptions in lessons due to COVID-19, participants viewed the program positively and reported that a technology intervention would benefit older adults. As one participant stated: “It’s just bad timing, but the program itself, I think, was a great idea. Really I don’t know how I got this lucky” (Participant 21).

### Talking Tech Benefits

Participants and TechMates reported a number of benefits participants received from Talking Tech, including several ways that Talking Tech helped reduce loneliness and social isolation. First, participants noted that the support and weekly visits they received from their TechMate made them feel less lonely. Speaking of their TechMate, one participant said:

She came for four sessions and then we had so much fun. So I was really appreciative. My first impression was just so perfect. “Thank you for taking the time out to come and spend time with me and go over things with me.” (Participant 16)

Another participant described the social benefit of their connection with their TechMate: “She was so kind. We hit it off right away ... She’s my friend, my young friend. She’s like my granddaughter” (Participant 8). Another primary social benefit was that learning how to use a tablet and access the internet allowed participants to connect with friends and family. As one TechMate explained, “She was really interested in being able to reach out to her family through the computer” (TechMate 1). A participant described her appreciation for being able to connect via email: “It does help with giving me a purpose and helping me stay in contact with people ... I haven’t had email in years” (Participant 2). Participants also reported using videoconferencing platforms to stay connected: “The best part of the program is ... now, I don’t get to talk to my family out of town much, so to find out what they’re doing ... I mean, I can see them, and they can see me” (Participant 12). Others engaged using social media: “I’ve got friends in California, older friends that we talk on the tablet, I talk to my son in Maine on the tablet” (Participant 3). In addition to the reported benefits of the connection to the TechMate and existing networks, most participants described Well Connected as a tool that could decrease feelings of loneliness or reported feeling less lonely because of Well Connected. For example, one participant stated, “it knocked me right out of my loneliness ... Just hearing of a voice, education, gave me a little hope” (Participant 5). Another participant discussed joining sessions on hearing loss and becoming part of a community:



One was on hearing. I have hearing problems, I got two hearing aids and it was all about that. People talking about how they have difficulty ... which helped me understand my problem ... It was a little hard at first, but then it's like, once you talk to them for a little bit, all of a sudden it's like you've known them for years. (Participant 1)

In addition to the social benefits, another primary benefit was receipt of the tablet, as was reported by this TechMate: "You just had to see [Participant's] face when I gave her the tablet, and informed her it was hers to keep. It was like Christmas Morning" (TechMate report, Participant 10, Week 1). Receiving a tablet at no cost was discussed as a primary benefit of the program, with participants describing the tablet as a "source of life" (Participant 14) and "open[ing] up another world" (Participant 10).

Another reported benefit was cognitive engagement associated with learning a new skill. One participant highlighted the value of lifelong learning, "I mean, what's better than learning? Do we stop growing because we hit a certain age? It shouldn't be that way" (Participant 3). Other participants noted how easily the program fit into their current routines and lifestyle. One such participant described the value of virtual travel and museum sessions:

Well, it takes you out of your bedroom into another country. It takes your mind off your loneliness. But it also opens up, if you can't travel, to travel, bedside travel I call it ... The museums. That's totally my favorite. I just love art. I love history, and I love museums, which I never loved anytime else in my life. All of a sudden, I have this newfound desire to learn. (Participant 5)

Participants used their tablets and internet for varied purposes. One TechMate said: "He is confident using the internet to read news articles, get recipes, and watch news videos" (TechMate report, Participant 9, Week 2). Another TechMate reported that their participant was interested in using the tablet and internet for educational purposes: "For instance, she was watching a television program the other day on polar bears and melting ice and wanted to know more about that, but didn't know how. I told her how to 'google' that and that she should then see a slew of articles on the subject come up. Her eyes lit up" (TechMate report, Participant 8, Week 2).

### Progress described by TechMates

Over the course of the intervention, comments from TechMate reports indicate progress made by participants. TechMates noted that "Client seems increasingly at ease with computer and technology" (Participant 4, Week 2), and "She said she has been practicing and using the materials from past lessons. I think she is getting more comfortable" (Participant 15, Week 4). TechMates also reported that as participants grew more comfortable with ICT, they expanded their use: "[Participant] gave me an

update on how he has been using the email more. He's getting pictures of his friends' kids who are now living in a different state. He is very comfortable navigating through the different websites to get news and read about topics that he enjoys" (Participant 2, Week 4). When prompted on the TechMate report to comment on if the participant seemed to be getting more comfortable with technology, one TechMate said:

Absolutely! [Participant] had the tablet all set up on the kitchen table all ready for us to begin ... When I arrived for this visit, [Participant] was like "Hey, when can we get started on this?" I love the enthusiasm [Participant] shows for this program, and she always has so many questions ... the TechMate report document would exceed its file size limit if I tried to capture all of the inquiries we have during our sessions! (Participant 10, Week 2)

In response to the same prompt, one TechMate reported progress across multiple weeks. Early in the intervention, this TechMate said their participant "is learning more every day" (Participant 21, Week 3). A few weeks later, they reported: "She has continued to learn new skills, such as saving pictures to her documents, as well as to solidify the skills she already has developed, such as searching things on the internet" (Week 6). Then, this TechMate commented on the variety of uses the participant had for their tablet and new technology skills: "I am proud of her for showing so much confidence in using her tablet and I am glad that she has been using her tablet to keep herself busy with learning new hobbies, watching videos, reading the news, etc., throughout this quarantine" (Week 9). Overall, qualitative findings indicate increased technology proficiency, confidence, and use, and benefits to well-being.

## Discussion and Implications

This study reports findings from Talking Tech, a novel pilot ICT intervention to reduce loneliness and social isolation among homebound older adults. Pilot participants report benefits including greater technological literacy and use, social connections to existing and new networks, and use of a virtual senior center, despite a lack of significant quantitative findings on the impact of the intervention on loneliness. Participants reported distinct and diverse uses for their new technology skills and access, including for facilitating social connection and interaction, entertainment, banking and bill paying, and health management. Further, adoption and acceptability of the intervention were high.

These findings are consistent with the prior literature, which has demonstrated the value of ICT for facilitating social connection among older adults (Baker et al., 2018; Chen & Schulz, 2016; Chipps et al., 2017; Cotten et al., 2013; Czaja et al., 2018; Ibarra et al., 2020; Khosravi et al., 2016). Our findings extend the prior literature, demonstrating that with tailored approaches, ICT may be

an effective tool to increase socialization specifically among those who are homebound. Our findings regarding diverse uses of technology bear further investigation, as prior research has found that among older adults, while use of technology for social purposes is associated with decreased loneliness, use of technology for entertainment purposes is associated with increased loneliness (Wang et al., 2018). Future research should focus explicitly on which aspects of technology and which types of use are best able to meet the diverse needs of older adults.

In addition to the increased knowledge and use of technology, and the use of technology for social purposes, participants in this intervention reported the benefit of the relationship with their volunteer TechMate. While our intended intervention was technology training, the substantial time TechMates spent with participants may be viewed as its own intervention. Future research is needed to determine whether this interaction with the TechMate or the technology intervention itself contributed to the outcomes observed. It is worth noting that research has demonstrated that these social benefits may be reciprocal, with volunteerism among older adults associated with reductions in social isolation and improvements in quality of life (Hood et al., 2018; Thomas et al., 2020).

The state of the research on effective interventions for loneliness and social isolation in older adults is still preliminary, with critical gaps in understanding how interventions may be applied to the community setting and homebound older adult population (Cohen-Mansfield & Perach, 2015; Gardiner et al., 2018; Poscia et al., 2018). This evidence gap makes translating research into practice difficult, with challenges further exacerbated by the COVID-19 pandemic. In response to COVID-19, service providers have increased urgency to develop and deliver solutions to reduce loneliness and isolation among older adults. Such community-based organizations have prioritized ICT programming (Smith et al., 2020; Wilson et al., 2020), yet many of these services and their adaptations to a remote or virtual format have yet to be studied. The COVID-19 pandemic underscores the need for research–practice partnerships, like the one reported in this paper, to translate evidence on isolation and loneliness into practice among frontline service providers, as well as the need for cross-sector collaborations to leverage existing resources and infrastructure to continue to deliver services to older adults (Smith & Lim, 2020; Smith et al., 2020).

Our pilot was designed to be implemented both one-on-one, in-person, and then shift to telephone calls after completion of the in-person sessions. Our results indicated that while this approach helped many of our participants gain technology skills and connect to new and existing networks, for some, and especially those who were not able to complete the in-person sessions due to COVID-19 or with limited prior technology experience, remote training was insufficient. Organizations that implement a program like Talking Tech need to weigh considerations that

those with the least technology experience and resources to support engaging via technology may be those with the greatest need for social connection. In order to avoid excluding those with the highest need, greater resources including volunteer support may be required.

Although our sample is diverse for a small pilot study involving older adults, replication and expansion are needed in order to determine whether benefits reported by participants may be found more broadly. Such future research might benefit from the feedback from participants and TechMates about the need for greater individualization of the training: while some reported a desire for more training sessions and greater technological support, others found some of the content to be too introductory. COVID-19 and resulting stay-at-home orders were another limitation, as the mode of intervention delivery needed to be modified from in-person to telephone, making the already-difficult task of teaching and learning new technology skills additionally challenging. A related limitation is our pre–post study design. The use of a control group in a quasi-experimental study may help to address exogenous factors like the COVID-19 pandemic. Despite these limitations, strengths of this pilot include the low loss-to-follow-up rate and the value of partnership with a community-based organization. The success of participant retention is likely due to the existing relationship and trust between participants and the delivering program, highlighting the importance of engaging community-based organizations in research and leveraging existing resources and relationships. Successful participant and TechMate retention suggest that the intervention is feasible and acceptable, and a larger study could better examine the potential efficacy of the intervention to reduce loneliness and social isolation in a randomized controlled trial.

This pilot study demonstrates several strengths of a novel intervention to facilitate older adults' use of technology for socialization. Participants' reported program benefits included the in-person, one-on-one training sessions which provided additional socialization opportunities, receiving a tablet, and learning how to use the tablet and internet for connecting with friends, family, and a virtual senior center. Additionally, nearly all participants reported that participating in a program like Talking Tech could alleviate feelings of loneliness. With expansion and further evaluation, this intervention has the potential to improve well-being for vulnerable older adults. This evaluation of the novel Talking Tech intervention provides critical insights into strategies to improve well-being for older adults, with implications for both future research, policy, and practice.

## Supplementary Material

Supplementary data are available at *Innovation in Aging* online.

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## Conflict of Interest

None declared.

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