Fly Like an Eagle: Measuring Transformational Social Outcomes Among Seniors Using Technology

How Technology and Training Drive Social Engagement for Low-Income Seniors

OATS OLDER ADULTS TECHNOLOGY SERVICES
FROM AARP

Humana Foundation

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OPENING NOTE: A Unique Partnership

At the height of the pandemic, as New York City hospitals were filled and our city labored under the tragic conditions of a modern plague, City agencies and leaders came together in a public private partnership to develop emergency plans for using technology to ease suffering and save lives. We knew one of the most daunting challenges was the lack of home connectivity, technology devices, and training available to low-income seniors, many of whom were forced to remain inside their homes without access to up-to-date information or ways to stay connected with friends and family.

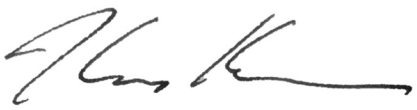
We decided to try a new approach to technology support for these individuals—an unprecedented distribution of 10,000 free tablet computers, free connectivity, training, and support for older adults who lived in New York City Housing Authority (NYCHA) apartments. We worked with city agencies, including the New York City Office of Technology and Innovation, the New York City Department for the Aging (DFTA), and leadership at NYCHA, while tapping into the resources at T-Mobile for devices and internet, and Older Adults Technology Services (OATS) for the training and hotline support. As a result of this galvanized effort, in less than two months' time, we connected 10,000 seniors to the internet.

"Connected NYCHA" was an all-hands-on-deck effort that represented the finest hour of our public servants, people who worked tirelessly to create a new program under the most difficult conditions. We can surely credit their efforts, as thousands of vulnerable older adults had critical new resources to access essential food, services, and support from home during the pandemic.

This new study from OATS, now an affiliate of AARP, provides compelling new evidence of the depth of impact that Connected NYCHA had for some of New York City's most at-risk residents. The statistics support what we suspected at the outset: that technology can be a lifesaver for people living in isolation. Through her analyses, Erin York Cornwell, Associate Professor of Sociology at Cornell University, show measurable gains in building social networks, improving mental health, and building well-being.

I hope this report will be widely read as these new approaches to digital inclusion and social impact technology take root across the nation. So many dedicated people worked long and hard to make a difference through Connected NYCHA, and these results are a testament to their efforts.

Sincerely,



Thomas Kamber,
Executive Director of Older Adults Technology Services (OATS) from AARP

WELCOME: Essential Evidence for Social Determinants of Health

Nearly five years ago, The Humana Foundation began collaborating with Older Adults Technology Services (OATS) to support innovative, community-based programs that leverage the power of technology to improve outcomes related to health. Our focus on those programs reflected recent advances in our understanding of "social determinants," the complex factors that contribute to health and wellness. Community partnerships, like the one between OATS and The Humana Foundation, have been essential to building knowledge about new models and interventions.

The Foundation supported a multi-year partnership in San Antonio which provided evidence that older adults benefit from training and technology access in community settings and provided a COVID emergency grant that helped launch a national campaign to get older adults online (spearheaded by OATS as Aging Connected). Notably, until now, we have not had a clear picture of the relative impact of these kinds of technology programs when viewed through a more structured experimental format that included a control group and a carefully designed survey model.

The results from this study, guided by Professor York Cornwell, are an important contribution to our understanding of the social determinants of health. Professor York Cornwell's analysis shows significant, measurable improvements in well-being, social connection, and mental health indicators for low-income older adults receiving electronic devices, connectivity, and computer training.

At Humana, we have been working for years to expand community partnerships to promote a comprehensive approach to improving the health of older adults, and indeed all residents of our communities across the country. This current report from OATS offers important new information that can help guide these efforts.

Sincerely,

Bruce Broussard
President and Chief Executive Officer, Humana Inc.
Board Chairman, Humana Foundation

EXECUTIVE SUMMARY

OATS OLDER ADULTS TECHNOLOGY SERVICES FROM AARP

During the height of the COVID pandemic, civic leaders in New York City embarked on an extraordinary program to provide technology access, devices, and training to 10,000 older adults living in public housing. This effort was conceived on an emergency basis, joining officials from multiple city agencies, executives from T-Mobile, and leaders from the nonprofit sector, who planned and implemented an emergency technology program of unprecedented scale to support low-income older adults. These technology assets were a critical resource for older New Yorkers, and they also provided a unique opportunity for learning more about the impact of such programs and what effect would they have on social engagement, symptoms of depression, or feelings of isolation.

An applied-research collaboration with Professor York Cornwell — employing validated statistical methods, including a control group for comparison purposes — provides important answers that are contained in this report. The data present a complex portrait of the social dynamics at work, and show several important new findings regarding the potential benefits of technology training (when combined with devices and connectivity) for older adults:

- Over 50 percent of the participants in the training group reported making a new social contact via email, social media, or text. This was more than twice the rate of the control group, which did not receive training.
- 60 percent reported participating in “something new” like an event or social group—more than double the rate of people who did not participate in training.
- Gains in social connectedness to friends and family during the program were approximately 20 percentage points higher among the group receiving training.
- While both groups reported similar outcomes on improvements in depression symptoms, those receiving training were about half as likely to report worsening symptoms, suggesting a possible protective effect.
- More than half of the participants in training reported less frequent feelings of loneliness after the program—more than 20 percentage points higher than the control group.

These are noteworthy gains and present a quantitative measure of social outcomes that are not commonly available in social science research. We can confidently say that technology training plays an important role in strengthening the benefits of technology adoption and usage. The results come at a critical time for those making policy or developing programs related to older adults and technology, presenting new data that can help demonstrate the value of these programs in terms of social engagement and well-being among a vulnerable population of low-income elders.

INTRODUCTION

OATS OLDER ADULTS TECHNOLOGY SERVICES FROM AARP

2021 was a terrible year for Maria Arnold.

In the space of 12 months, she lost her husband, her mother, and a child. Even though she lived in New York City and was surrounded by people, she felt alone and helpless, challenged to find new ways to take care of herself while managing her loss and grief. The uncertainty and restrictions of the pandemic simply made matters worse. She enrolled in grief counseling but found it difficult to act on the suggestions of her counselor.

Then, through communications efforts to reach older New Yorkers, she found out about a program that gave free tablet computers, along with free internet and training, to senior citizens living in NYCHA housing. She signed up for a new LG tablet and soon began taking free classes provided online by Older Adults Technology Services (OATS) from AARP, a social impact nonprofit organization working to change the way people age. The classes were a life-changer for Maria; tasks that had previously seemed beyond her capabilities now became achievable. She no longer depended on her grandchildren to support her whenever she had questions about computers or the internet. She also noticed that some of her technology-based activities were helping in the same way that grief counseling was intended – to reflect on and process her losses. Technology training became a window into a more empowered place in her life:

I was like a little bird in a cage, waiting for them to feed me," she says. "Now I fly. I am an eagle. I can fly wherever I want."

Recent public efforts to help low-income seniors get online are heightening awareness of the potential benefits of connecting older adults, but researchers are still learning about the impact of technology adoption and training on social connectedness and well-being. This report offers new information for policymakers and activists on the impact of combining effective training with technology and connectivity at home.

Social isolation is a major challenge for Americans, and technology solutions have long been viewed as a source of relief. For seniors who are grappling with attenuated social networks, faraway family members, and ageist stereotypes, the power of technology to connect and empower is undeniable. Social media enables one to track down old friends and stay up to date with new ones. Videoconferencing tools facilitate communication across vast geographies. The internet as a resource for learning and productivity and social relevance can offset a tendency for older adults to be pushed out of the mainstream.

In their 2020 report on social isolation and loneliness among older adults, published with support from AARP, the National Academies of Science, Engineering, and Medicine reported that nearly one-quarter of community-living Americans 65 and older are said to be socially isolated.[1] A review of multiple studies of socially isolated people found alarming correlations between isolation and morbidity—and even premature death.[2] The benefits to "moving the needle" on senior social isolation are manifest, from government agencies seeking public or population health outcomes, to private health insurers pursuing lower costs of care, and ultimately to the individuals themselves who may experience isolation as an irreducible burden of loneliness, boredom, or shame.

Technology access, adoption, and use have shown great promise in helping older adults overcome these problems. Cotten, Anderson, and McCullough (2013) conducted research among older adults in assisted living or living independently and found that as the frequency of going online increased, so did seniors' feelings of connectedness.[3] Seniors also reported feeling less isolated. Another study, using data from the Health and Retirement Study, found technology to be a predictor of lower loneliness, in turn predicting better health (physical and mental) overall.[4] Unfortunately, technology use is not evenly distributed by age; despite some improvements in recent years in closing the "digital divide," seniors still lag behind the general population by double digits on most measures of technology utilization.[5] A recent national study conducted by OATS with support from The Humana Foundation found that 42 percent of Americans over the age of 65 lack wireline broadband service at home—which translates into nearly 22 million people who lack this basic resource.[6]

[1] National Academies of Sciences, Engineering, and Medicine 2020. Social Isolation and Loneliness in Older Adults: Opportunities for the Health Care System. Washington, DC: The National Academies Press. https://doi.org/10.17226/25663, p 1.
[2] Holt-Lunstad J, Smith TB, Baker M, Harris T, Stephenson D. Loneliness and Social Isolation as Risk Factors for Mortality: a Meta-Analytic Review. Perspect Psychol Sci. 2015 Mar;10(2):227-37. doi: 10.1177/1745691614568352. PMID: 25910392.
[3] Cotten SR, Anderson WA, McCullough BM Impact of Internet Use on Loneliness and Contact with Others Among Older Adults: Cross-Sectional Analysis J Med Internet Res 2013;15(2):e39 doi: 10.2196/jmir.2306
[4] Chopik, William J. "The Benefits of Social Technology Use Among Older Adults Are Mediated by Reduced Loneliness." Cyberpsychology, behavior and social networking vol. 19,9 (2016): 551-6. doi:10.1089/cyber.2016.0151
[5] Faverio, M. "Share of Those 65 and Older Who are Tech Users has Grown in the Past Decade." Jan 30, 2022 https://pewrsr.ch/3HZd2ao, cited 4/6/2022
[6] The Humana Foundation and Older Adults Technology Services (OATS) from AARP. 2020. Aging Connected: Exposing the Hidden Connectivity Crisis for Older Adults. New York: OATS. https://agingconnected.org/report/

For those who do connect at home, participation in high-quality training programs appears to have a positive effect on their online experience. A 2014 survey of 1,200 older adults conducted by John Horrigan and OATS found correlations between technology training and positive outcomes when using the internet.[7] Respondents who received training on computers and the internet were more likely to report that the internet helped "a lot" with staying in touch with others, getting health and medical information, saving money on purchases, and accessing government services. While this study highlighted the potential importance of technology training in helping seniors get the most out of their online participation, more research was needed to ascertain how technology training could increase seniors' social engagement, reduce loneliness, and enhance well-being.

Connected NYCHA

In April 2020, the Mayor's Office of the Chief Technology Officer (MOCTO) and NYCHA launched Connected NYCHA, a COVID emergency initiative to help close the digital participation gap for low-income older adults in New York City. In the month that followed, the program distributed 10,000 free tablet computers to older adults living in NYCHA developments. The internet-equipped tablets were distributed in coordination with DFTA, with internet connection provided by TMobile, and training and support provided by OATS through its proprietary training program, Senior Planet. Connected NYCHA was the first program in the nation to provide devices, high speed connectivity, and training to low-income older adults at scale, and provided a critical opportunity to learn about the implementation and impact of efforts to close the digital divide among seniors.

This concerted effort to close the technology gap for older adults provided a unique opportunity to learn more about the role that technology training can play in optimizing social engagement. OATS has learned from years of experience that successful digital literacy models require three components: a catalyst partner providing funding and guidance, an intermediary partner with programmatic experience and a solid curriculum, and a network of community partners to support local delivery. Successfully empowering participants in communities with digital skills requires a programmatic framework that is appealing to the unique needs of the community and highly engaging.

The Senior Planet training course required extensive time commitment from participants and followed a methodology and content designed for maximum relevance for older learners. Course curricula and methods considered age-relevant reflected more than a decade of design, training, revision, and evaluation and were carefully structured to encourage participants to feel a sense of confidence and purpose using technology devices and connectivity. For instructing participants in the use of the tablet, OATS offered "Android Essentials" (AE), an online Senior Planet course

[7] John Horrigan, PhD, "Senior Citizens and Information & Communication Technologies," a white paper produced for Older Adults Technology Services. This research is unpublished. Please contact info@oats.org for additional details.

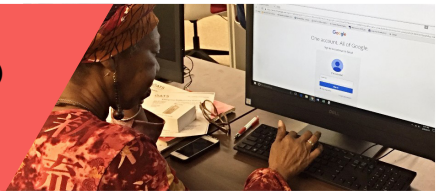
that met twice a week in a Zoom session over a period of five weeks; they also gave participants the option of attending open lab sessions, so many attended as many as four sessions per week. All participants were mailed a curriculum book before the start of the course, and class sessions were taught live by a qualified Senior Planet technology trainer. Some classes had as many as 30 participants per session and the program was highly interactive, covering topics such as navigating online, Gmail basics, internet safety, and managing device settings.

Instructional content consistently linked new skills to real-life applications in social engagement, health, financial security, and other areas prioritized by older learners. OATS also offered participants access to a contact center through which they could obtain continued technical support over the phone.

The role of training has emerged as a critical focus for policymakers: the Infrastructure Investment and Jobs Act of 2021, which allocated funds for modernizing broadband, included an appropriation of $1.25 billion for digital equity grants, along with $1.44 billion for state digital equity programs, funds that are anticipated to provide unprecedented support for digital skills training at locations across the country.

The stakes have never been higher for those who seek to understand the role of training in digital inclusion programs. The recent federal funding initiatives will commit unprecedented levels of public resources to help achieve digital equity and will certainly provide funding for widespread training and support programs to help underserved populations including low-income older adults. Research that informs our understanding of the impact of training programs in a comparative framework is particularly relevant at this time.

RESEARCH DESIGN AND DEMOGRAPHICS



In determining how best to measure the impact of their work, the Connected NYCHA team made the decision to employ a quasi-experimental design to study the effects of digital skills training and technology on social engagement, loneliness, mental health, and well-being among older adults. This type of study design established two groups – a treatment group that received training and is thus referred to in this document as participants who took Android Essentials (AE) and a control group that did not. Key indicators were measured for both groups before and after the treatment group underwent the training to compare changes in social engagement and related measures across the two groups. In developing the methodology for the study, OATS collaborated with Cornell University Sociology Professor York Cornwell, who is a prominent sociologist and has published widely on topics related to social capital, social isolation and wellbeing in later life. She advised OATS in the creation of a protocol for conducting phone interviews and a set of selected questions and data framework to be used in the surveys. Professor York Cornwell assisted OATS in identifying survey questions that meant to measure key indicators of social connectedness and well-being during Waves 1 and 2, as explained below.

Study participants were NYCHA residents, 60 years of age or older, who opted into the Connected NYCHA program after receiving a robocall from the City. All received the same LG G Pad tablet computer with mobile connectivity included. The tablets were “kitted” with identical Android-based software and apps, including links to information about services at NYCHA and free programs from Senior Planet, accessible online at www.seniorplanet.org. These characteristics of the program meant that all 10,000 program participants who engaged with the program had a comparatively uniform experience in terms of technology and support, sharing many demographic characteristics and environmental conditions. Consequently, a research design that examined changes between the two groups—one which received the technology training and one that did not—would have comparatively high validity because of the commonalities among participants in the Connected NYCHA program.

The tablet computers were distributed in May 2020. Between October and December of that year, OATS identified 461 participants who were willing to participate in the first part of the study, which was a baseline survey of demographic factors. From this group, 118 older adults enrolled to participate in Senior Planet training and were considered the "treatment group," while another 122, who had voluntarily opted out of training, agreed to be interviewed and served as the "control group." Older adults who had previously taken Senior Planet training were excluded from the study.

The training provided to participants included an orientation to the primary accessibility features on the LG G Pad. Participants were also provided a link to a pre-recorded video that reviewed those same features. Training and materials were provided in English and Spanish.

Data collection took place in two panels that each included a wave 1 (or pre-course) survey, training (for the treatment group only), and then a wave 2 (or post-course) survey. For the first panel, the wave 1 survey took place in March 2021, followed by training the same month, and the wave 2 survey in May 2021. The second panel began in April 2021 with the wave 1 survey and training and concluded with the wave 2 survey in June and July 2021. All surveys were conducted by phone by OATS staff members.

Once data collection was complete, Professor York Cornwell analyzed the results of the two surveys using ordinary least squares and a logistic regression model, among other statistical methods to enable a comparison of outcomes between the two groups.[8,9,10] Her analysis provided insight into whether there were differences between the two groups that were unlikely to be explained by random variation, and she was also able to show in some cases the strength of the relationship between the independent variable (participation in the treatment/training group) and the dependent variable (social engagement or well-being).

Notably, over half of the baseline survey participants (55 percent) indicated that their daily activities were limited due to a physical disability.

[8] Ordinary least squares is a technique for estimating the coefficients in a regression model.
[9] A bivariate logistic regression is a method of statistical analysis used to predict an outcome (for example, yes or no). In our model, we used data for one independent variable – i.e., received AE training vs. did not receive AE training.
[10] Analysis conducted using STATA, version 14.2.

TABLE 1 NYCHA Tablet Program: Characteristics of study sample, reported at baseline (N=461)*

Characteristic	n	Percent
Gender		
Female	358	80.1
Male	89	19.9
Race/Ethnicity		
Hispanic	162	60.0
Black, non-Hispanic	99	36.5
Asian	6	2.2
White, non-Hispanic	4	1.5
Education		
High school	233	53.1
Some college	88	20.1
Primary school	67	15.3
College degree	44	10.0
Graduate or professional degree	7	1.6
Physical disability		
Yes	243	55.2
No	197	44.8
Internet access at baseline		
Yes	299	65.6
No	157	34.4
Means of connecting (only among those reporting internet access at baseline)		
Internet at home	196	68.3
Smartphone data plan	82	28.6
Free public wi-fi	9	3.1
Frequency of online activity		
Never	131	29.8
Rarely	71	16.1
Once or twice a month	28	6.4
Once a week	12	2.7
A few times a week	93	21.1
Every day or almost every day	105	23.9

*Statistics exclude missing cases from calculations.

The demographic baseline survey was intended to gather background information about individuals, as well as their internet access, tablet usage, and confidence with the tablet. Respondents reported the following characteristics during the baseline interviews (Table 1):

- Gender: Survey sample is about 80 percent female.
- Race/Ethnicity: A sizable portion of participants (41 percent) declined to identify their race and ethnicity. Of those who responded to the question, about 60 percent identify as Hispanic or Latino and 37 percent identify as Black or African American (non-Hispanic). Very few participants identify as White, non-Hispanic (1.5 percent) or Asian, non-Hispanic (2 percent).
- Education: Over two-thirds of participants (68 percent) indicated that the highest educational degree they had achieved was high school or less than high school. About 20 percent attended some college, and 10 percent received a college degree.
- Physical Disability: Notably, over half of the participants (55 percent) indicated that their daily activities were limited due to a physical disability, such as difficulty getting around, hearing or vision problems.
- Internet Access: About 34 percent indicated that they did not have a way to connect to the internet at home, before they had received the tablet. Of the 66 percent of participants that indicated they had a way to connect to the internet at home before receiving the tablet, about 68 percent of these participants had internet service through a cable company or internet provider, and about 29 percent used their smartphone data plan.
- Frequency of Online Activity: We observed a wide range of frequencies of online/internet usage, ranging from a high of 30 percent reporting they had never accessed the internet before they received the tablet, to a low of 3 percent indicating they had used the internet once a week. About 24 percent of participants said that they were online every day or almost every day.

Social Connectedness Indicators

TABLE 2

Key indicators of social connectedness in Waves 1 and 2:	Key indicators of well-being
Aspects • Frequency of social interaction via the tablet • Forging new connections • Feeling connected via the tablet • Wish for more connectedness (i.e., need/desire) Domains • Family who don't live with you • Friends who don't live with you • Social and cultural groups/events • Religious community and events	• Accessing resources via the tablet • Mental health and loneliness • Social well-being

As mentioned above, each of the two groups that participated in the before-and-after surveys had approximately 120 members. Table 2 presents key indicators of social connectedness and of well-being measured in this study. There was modest drop-off among participants between Waves 1 and 2; overall, 82.5 percent of respondents who participated in Wave 1 were retained for Wave 2.

Analysis of the survey results found no items where the OATS training adversely affected social connectedness or well-being. Respondents in both groups reported gains on multiple indicators, but there was a clear pattern of relative advantage in the group that received the training. Dr. York Cornwell identified four areas where AE training appears to have had a statistically significant positive impact on the treatment group.

There was a clear pattern of relative advantage in the group that received the training.

1 Forming New Connections

Figures 1 and 2 present the overall results of our logistic regressions, with details from that analysis listed in Appendix Tables A1-A3.

Figure 1: Percent reporting that they had carried out tablet-related activities

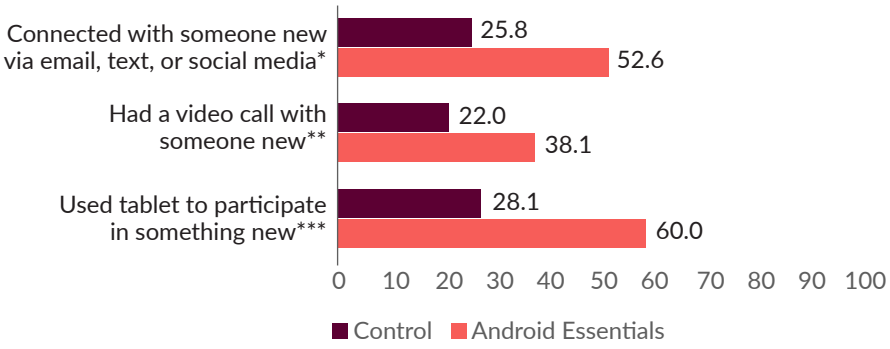
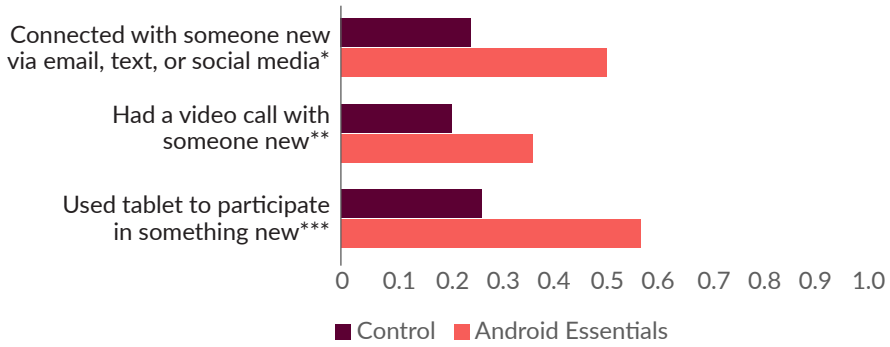


Figure 2: Likelihood of using tablet to form new connections, Android Essentials vs. Control



*n=186, p<.000; **n=188, p<.02; ***n=189, p<.000

When compared with the control group, the study found that participants in the AE course were more likely to use the tablet to form new connections or expand their social circles. Participants who took the course were significantly more likely to report that they had **connected with someone new by email, text, or social media message** in the month following the course – someone whom they had not emailed, texted, or messaged in the past.

- Notably, more than half (52.6 percent) of participants who took the AE course said they had connected with someone new, compared to only 25.8 percent of those who did not take the AE course (Figure 1).
- Participants who took the AE course had an odds 3 times higher of having connected with someone new in the month following the course, compared to those who did not take the course (Appendix Table A1). This difference is statistically significant (OR = 3.2, $p < .000$; based on bivariate logistic regression).
- Presented in terms of predicted probability or the likelihood of an event (in this case, the likelihood of connecting with someone new), findings showed that participants who took the AE course had a predicted probability of .53 compared to .26 (Figure 2). This suggests that participants who took the course were twice as likely to have connected with someone new, compared to those who did not take the course.

Participants who took the AE course were significantly more likely to say that they had a video call with someone new – that is, someone whom they had not video-called in the past.

- About 38 percent of participants who took the AE course reported that they had video-called with someone new, compared to just 22 percent of those who did not take the AE course (Figure 1).
- Compared to those who did not take the course, participants who took the AE course were 2 times more likely to have had a video call with someone new compared to those who had not had the course (OR = 2.2, $p < .02$; based on bivariate logistic regression analysis) (Appendix Table A2).
- Those who took the AE course had a predicted probability of 0.38 compared to 0.22 among those who did not take the course (Figure 2).

Participants who took the AE course were significantly more likely to say that they had used their tablet to participate in something new – like a virtual group or type of event that they hadn't joined in the past.

- Fully 60 percent of those who took the AE course reported that they used their tablet to participate in something new – compared to just 28 percent of those who did not take the course (Figure 1).
- Compared to those who did not take the course, participants who took the AE course have about 3.8 times higher odds of reporting that they participated in a new social group or event (OR = 3.8, $p < .000$; based on bivariate logistic regression) (Appendix Table A3).
- Among those who took the AE course, the predicted probability was 0.60 compared to just 0.28 among those who did not take the course (Figure 2).

2 Connection with Friends, Family, and Congregation

At the start of our study, prior to the AE course, respondents were asked how much the tablet had helped them to feel connected with their family members and friends. About 60 percent of all participants "strongly agree" that the tablet had helped them to feel connected with family members – and this did not significantly differ between those who enrolled in the AE course (61 percent) and those who did not enroll (58 percent) (Table 3).

TABLE 3

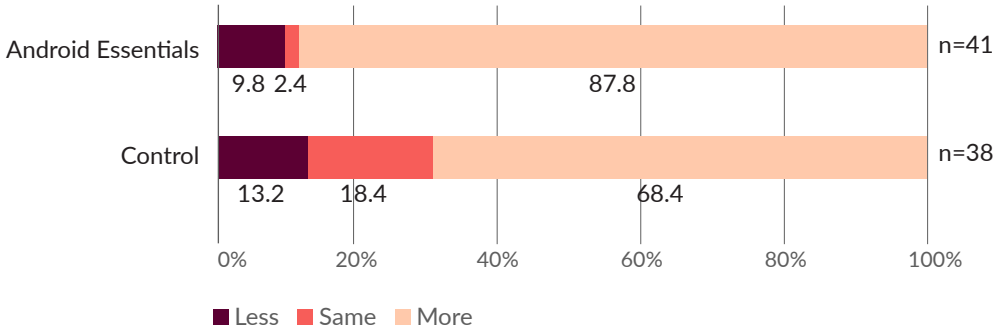
Question	Group	Strongly disagree		Somewhat disagree		Neither agree nor disagree		Somewhat agree		Strongly agreed		Total	
		n	%	n	%	n	%	n	%	n	%	n	%
Tablet helped them feel connected with family	Android Essentials	2	1.89	10	9.43	12	11.32	17	16.04	65	61.32	106	100
	Control	4	4.4	4	4.4	14	15.38	16	17.58	53	58.24	91	100
Tablet helped them feel connected with friends*	Android Essentials	2	1.89	12	11.32	14	13.21	16	15.09	62	58.49	106	100
	Control	10	11.49	5	5.75	13	14.94	14	16.09	45	51.72	87	100
Tablet helped feel more connected with religious community or congregation[1]	Android Essentials	1	1.61	1	1.61	3	4.84	9	14.52	48	77.42	62	100
	Control	0	0	0	0	0	0	6	21.43	22	78.57	28	100

[1] Participants who indicated that this question was not applicable to them were excluded from the analysis (n=89).
*p=.05

To look for gains in feelings of connectedness, we focused on the 40 percent of participants (n = 79) who did not "strongly agree" that the tablet had already helped them to feel connected with their family members at Wave 1. We wondered whether taking the AE course would help them to use the tablet to increase their feelings of connectedness.

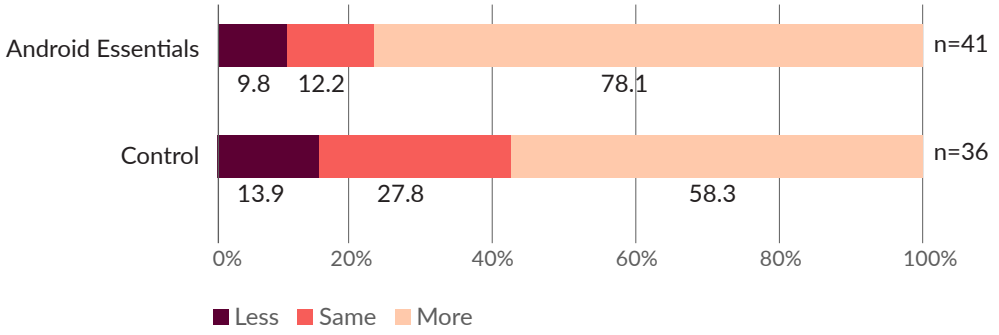
In fact, we observed clear gains in feelings of connectedness among those who took the AE course within this subgroup. About a month after the conclusion of the course, nearly 88 percent of participants who took the AE course reported feeling more connected to their family members (See Figure 3). (That is, they increased the level of agreement to the question about whether the tablet had helped them to feel more connected with family members). Only 68 percent of participants who did not take the AE course reported a similar gain in feelings of connectedness. The differences between the two groups are statistically significant (p=0.05).

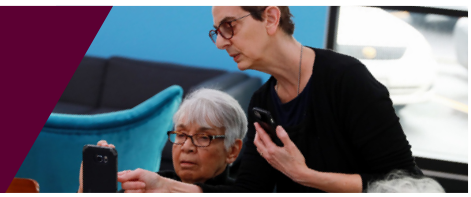
FIGURE 3: Tablet helped me feel more connected with family, Wave 1 vs. Wave 2 (in percent)*



We also asked, at Wave 1, to what extent the tablet had helped participants feel connected with their friends. About 55 percent of participants said that they "strongly agree" that the tablet had helped them to feel connected with their friends (Table 3). Would we see bigger gains in feelings of connectedness with friends among those who took the AE course? Looking at the 45 percent of participants who did not report the highest level of feelings of connectedness with friends at Wave 1 (that is, they did not respond "strongly agree"), we again observed a distinctive gain in feelings of connectedness among participants who took the course (Figure 4). About a month after the course ended, 78 percent of those who took the course indicated that the tablet made them feel more connected with friends – compared to only 58 percent of those who did not take the course. This difference is marginally significant (p = .06) in a two-sample test of proportions.

FIGURE 4: Tablet helped me feel connected with friends, Wave 1 vs. Wave 2 (in percent)





Participants who took the Android Essentials course experienced distinctive gains in feelings of religious connectedness.

Next, we examined whether those who took the AE course had larger increases in their feelings of connectedness with their religious community after the course, compared to those who did not take the course (Table 3). As above, we focused on the participants who did not "strongly agree" that the tablet helped them feel connected, which rendered a sample of just 20 participants.

However, using the data available, we found evidence that participants who took the AE course experienced distinctive gains in feelings of religious connectedness. About a month after the conclusion of the course, about 71 percent of participants who took the course reported that the tablet was helping them to feel more connected to their religious community or congregation —compared to about half of those who did not take the course. This is a small sample size, so the results can be considered inconclusive.

3 A Bulwark Against Depression

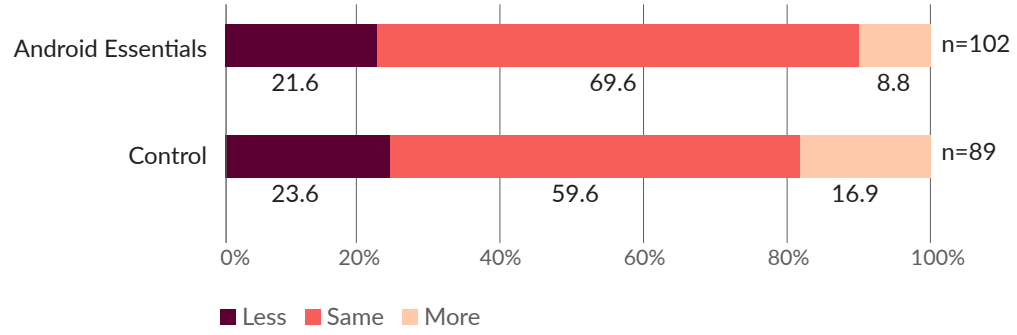
We found some evidence that participants who took the AE course were less likely to report an increase in feelings of depression over the course of the pandemic. At Wave 1, we asked participants how often they had been bothered by feeling depressed since the beginning of the pandemic. Overall, about 66 percent of all respondents reported that they were "rarely or never" bothered by feeling depressed. Participants who enrolled in the AE course were a bit more likely to fall into this "rarely or never" depressed category, compared to those who did not enroll in the course, but the difference is modest (69 percent compared to 64 percent, Table 4).

We hypothesized that those who took the AE course would experience a reduction in feeling depressed – or those who did not take the AE course would experience more frequent feelings of depression. About a month after the conclusion of the course, 22 percent of those who took the course reported less frequent feelings of depression, compared to about 24 percent of those who did not take the course. So, we do not observe a difference across the two groups in their likelihood of having a reduction in depressive feelings (Figure 5).

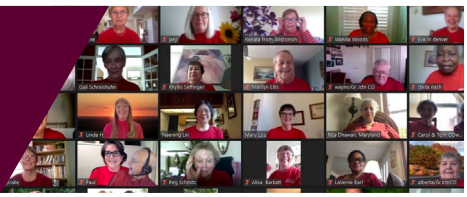
TABLE 4: Comparison of AE vs Control Group, Depression at Wave 1 (N=198)

Question	Group	Rarely/Never		Some of the time		Occasionally		Most of the time		Total	
		n	%	n	%	n	%	n	%	n	%
Bothered by feeling depressed in the past 30 days**	AE	70	68.63	10	9.8	16	15.69	6	5.88	102	100
	Control	58	63.74	23	25.27	6	6.59	4	4.4	91	100

FIGURE 5: Bothered by feeling depressed, Wave 1 vs. Wave 2 (in percent)



We nevertheless did identify some evidence that the AE course may have a protective effect, reducing the likelihood that participants experience more feelings of depression over time. For example, nearly 17 percent of respondents who did not take the course reported more frequent feelings of depression at Wave 2, compared to the frequency they reported at Wave 1. Only 9 percent of those who took the AE course reported an increase in the frequency of being bothered by feelings of depression. These differences are observable, but not statistically significant, which may be due to our small sample size.



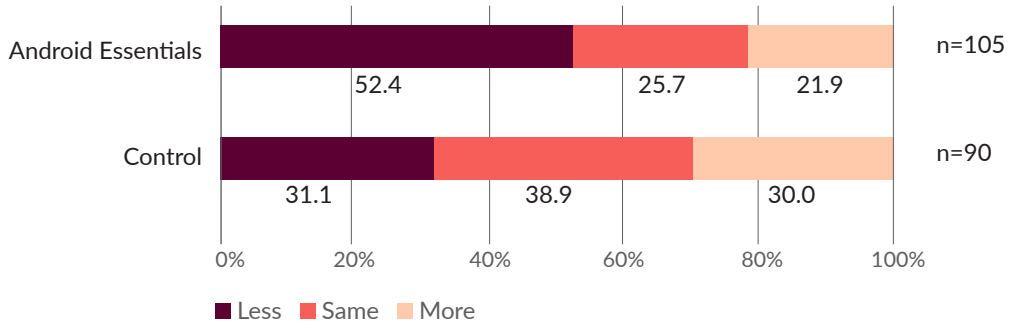
4 Reduced Loneliness

Participants who took the AE course were more likely to experience a reduction in loneliness over the course of the pandemic.

We assessed loneliness at Waves 1 and 2 using a modified version of the three-item UCLA Loneliness Scale.[11] This set of questions asked individuals how often they felt they lacked companionship, how often they felt left out, and how often they felt isolated from others. We expanded the response categories from three categories to a range from 1 "never" to 10 "always," to allow greater variation that could be compared across the two waves. At Wave 1, participants who enrolled in the AE course reported more frequent feelings of loneliness. They had an average loneliness score of 3.42 (on the scale of 1 to 10), compared to a score of 2.82 among those who did not enroll in the AE course. However, this difference was not statistically significant in a two sample test of means (t=-1.49; p=.14).

We hypothesized that taking the AE course would lead to a reduction in feelings of loneliness. In fact, we found clear evidence of a distinctive reduction in loneliness among those who took the AE course. About a month after the conclusion of the course, more than half – 52 percent — of those who took the course reported less frequent feelings of loneliness (Figure 6). Only 31 percent of those who did not take the course reported less frequent feelings of loneliness. This difference in proportions is statistically significant (p = .003).

FIGURE 6: UCLA Loneliness Scale*, Wave 1 vs. Wave 2 (in percent)



We also observed that those who took the AE course were less likely to report feeling more lonely, compared to those who did not take the course. About 30 percent of those who did not take the AE course reported a higher frequency of feelings of loneliness at Wave 2 – as the pandemic continued through the spring and early summer of 2021 – compared to only 22 percent of those who took the course. This gap is modest and is not statistically significant.

[11] Russell, D. (1996). UCLA Loneliness Scale (Version 3): Reliability, validity, and factor structure. *Journal of Personality Assessment*, 66, 20-40.

DISCUSSION

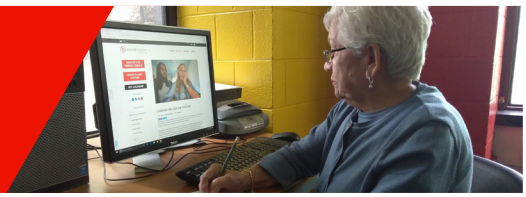
The older adults who participated in this study were experiencing a period of intense disruption due to the collective impact of the COVID-19 virus. The pandemic challenged them to rebuild frayed social networks, sustain relationships with friends and family, self-manage their mental health, and combat feelings of loneliness and isolation. The portrait that emerges from this study is complex, but there is evidence to support the hypothesis that access to age-relevant training, combined with technology and connectivity, can positively affect many of these processes.

While the population of NYCHA residents in the study had distinctive characteristics compared to the population of the United States at large, it is important to note that communities with the characteristics identified in the current study are likely to be priority areas for policy makers and nonprofits seeking to promote digital inclusion over the coming years.

By comparing participant responses at two points in time using a pre- and post-test model and employing a control group for comparison purposes, this study enables the use of statistical tools such as logistic regression to analyze changes in the target population. We can determine if differences between the treatment and control groups are statistically significant (not likely due to random chance), and we can estimate how much more likely an outcome is for the treatment group when compared to the control group. No prior studies on this subject have utilized these techniques to study the social impact of training combined with technology access for older adults. It is also important to note that, as Wave 2 data were collected 5-7 weeks after the completion of the OATS training, there is some evidence that persistent gains were made, at least over the short term.

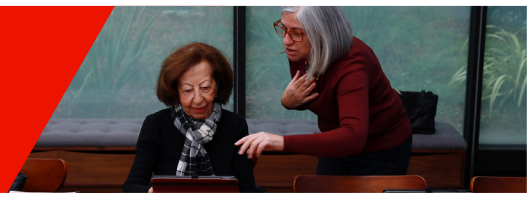
The data on forming new connections are striking, both from the size of the effect and the importance of these variables to the social life of older adults. Training participants were 3 times as likely to contact someone new, nearly 4 times as likely to participate in a new activity, and 2 times as likely to do a video call with a new contact. These are significant indicators of the potential impact of technology training on social network formation for older adults. To the extent that these variables provide insight into the role of training on objective levels of social engagement by older people, the data from this study point to strong possibilities from training and technology interventions in helping older adults build social networks.

In terms of the quality of connections with friends, family, and congregation, the study finds that training plays an important role in strengthening the benefits of technology adoption and use. This group of variables was included to explore changes in feelings of connectedness among study participants, which is a subjective dimension of social engagement that has long been examined in sociological literature. The results show increased feelings of connectedness in both groups (possibly because they all received tablets and connectivity), but those who participated in training showed markedly higher increases in feelings of engagement. In fact, respondents who received training increased their feelings of connectedness to friends, family, and congregation by approximately 20 percentage points more than the control group.



Experts agree that high-speed wireline access is essential in the near term to create a level playing field for residential internet users.

The data related to depression shed light on an important topic in the social determinants of health among older adults: the value of reducing the rate of decline. Most interventions seek material improvements in the health and well-being of older adults, but leading gerontologists also point out that, for the many individuals who are managing chronic or recurrent conditions, the best outcome may be to reduce their rate of decline or stabilize symptoms. There are other social determinants of health that were not addressed in this study, yet may also increase with digital access and confidence through technology training. These might include access to health information, quality healthcare through telemedicine, digital tools to promote fitness, sleep, and nutrition, and opportunities to learn and stay cognitively engaged.



The reduction of the rate of decline due to technology training may represent very meaningful outcomes and add substantially to quality of life.

The present study offers evidence of this principle at work. About 20 percent of both groups felt less depressed during the Wave 2 interviews, with no detectable advantage for the group who had taken the AE course. But when we looked at the segment whose condition declined during the study period (i.e., felt more depressed in Wave 2), we found that nearly twice as many seniors in the control group reported feeling more depressed, as compared to the group who took the course. More research is needed to ascertain whether this pattern would become statistically significant with a larger sample size, but these results point to an important potential value of technology training that is often ignored: it may help stabilize individuals who would otherwise experience mental health or other declines. For these people, the reduction of the rate of decline due to technology training may represent very meaningful outcomes and add substantially to quality of life.

Finally, the surveys found marked improvements for participants in both groups on the three item University of California, Los Angeles (UCLA) Loneliness Scale, as modified by Professor York Cornwell, but 52 percent of the treatment group which took the AE course improved between Waves 1 and 2, while only 31 percent of the control group did—a large difference between the groups that is statistically significant. When examined through the lens of slowing decline, as discussed above, we find similar outcomes; more people in the control group declined than in the treatment group, though again the numbers are too small to achieve statistical significance. Still, the UCLA Scale is often considered the gold standard for measuring subjective feelings of isolation, and our findings indicate substantial benefits from a combination of technology distribution, connectivity, and training among the target demographic.

CONCLUSION AND RECOMMENDATIONS

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Behavioral conditions such as social isolation, loneliness, and depression are often seen as intractable challenges where social and educational interventions have limited measurable effect. This study, however, presents strong evidence that technology interventions can play a significant role in driving behavioral change for low-income older adults, and can generate beneficial outcomes that are highly sought after by policymakers, health care professionals, social workers, and of course, seniors themselves. The results indicate consistent effects to increase social engagement and well-being (as well as stabilize declines in depression and loneliness). As with all research, results should be interpreted with appropriate considerations of the limitations of the methodology.

- This study utilized a control group, but the assignation was voluntary rather than random. There is some chance that the characteristics that led individuals to choose to take the course also affected their outcomes.
- The Senior Planet AE course is comparatively intensive and robust — delivered by highly experienced trainers using a carefully refined curriculum and methodology. Not all community training settings can replicate this level of program intervention.
- The study was conducted during the height of the COVID pandemic. Results may have been influenced by the events of the pandemic and may not be repeatable in less stressful circumstances.
- While most of the effects measured by the surveys were large enough to achieve statistical significance given our sample sizes of 120 respondents, further research using larger samples and a broader demographic group of participants would help confirm or adjust the findings.

These findings offer strong support for new efforts to bring older adults online and provide them with quality training and continued support. Overall, the data points to significant benefits in terms of building social networks, reducing loneliness, and improving feelings of connectedness with friends and family. Most of the variables showed improvement over time for both groups, with the treatment group achieving relatively better outcomes. Also important is the improvement among social determinants of health indicators related to isolation, well-being, and mental health—objectives that public policymakers have long sought to achieve. The value of these benefits for the seniors who experience them can be incalculable; as Maria Arnold says, “I can fly like an eagle.”

CONCLUSION AND RECOMMENDATIONS

Several recommendations emerge for the consideration of policymakers, based on this research:

1. Expand programs that combine technology, connectivity, and training for low-income older adults.
2. Ensure meaningful levels of training that include well-established curriculum and methods, printed materials, phone support, and integrated evaluation, all tailored to the needs of older learners.
3. Enhance the targeting of programs by screening for those who report higher levels of social isolation, depressive symptoms, and openness to learning new technology.
4. Support additional research to explore questions of cost-effectiveness, technology and connectivity options, and participant journey mapping.

The findings from this study have far reaching implications that go way beyond the pandemic and the NYCHA program.

The social challenges that digital inclusion efforts seek to address are of the utmost importance to older adults in America: social isolation, depression, loneliness—not to mention the myriad quality of life issues related to financial security, culture, and education. As new federal legislation promises to increase the funding available for digital inclusion efforts across the nation, the current study offers support for the potential value of these initiatives. Our expectation is that low-income older adults who participate in digital inclusion programs that combine state-of-the-art technology, high-speed connectivity from home, and high-quality training will achieve significant social outcomes. Not everyone will fly as far as Maria, perhaps, but the evidence shows that many will likely feel a lift under their wings.

ACKNOWLEDGEMENTS

OATS OLDER ADULTS TECHNOLOGY SERVICES FROM AARP

It has been a privilege for OATS to participate in the Connected NYCHA initiative and put together a report of this kind which foundationally supports the work that we do. To our friends at The Humana Foundation, thank you for your continued partnership and aligned vision to mitigating the digital divide among older and low-income adults across the country.

Thank you to Professor York Cornwell for her research contributions to this report. It is an honor to work so closely with a professional of her caliber. To the NYCHA residents who participated in the Connected NYCHA initiative and the subsequent research component, thank you for your time, effort, and commitment to inspire others during such a difficult time.

Many thanks to the New York City government agencies who led the Connected NYCHA initiative from ideation to delivery: the New York City Department for the Aging, the New York City Mayor's Office of the Chief Technology Officer, and the New York City Housing Authority. Thank you for your partnership and continuing to serve some of the most vulnerable New Yorkers.

Thanks to T-Mobile for providing internet service and support to the tablet devices that were provided to Connected NYCHA participants and their continued efforts in supporting OATS.

Our gratitude goes to the staff members at OATS for all of the work done on the Connected NYCHA initiative: Fiona Adams, Luis Taveras, Annerys Diaz, Adrienne Gregoire, Brian Rapsey, Eva Pacheco Perez, Gabriel Flores, Johnny Hernandez, Umme Mahmud, Wanda Woods, Anabel Rivera, Audrey Hilliard, and Lila Botero. Thanks also to the following amazing volunteers: Barbara Lewers, Lynda Feld, Malvina Abbott, Marilyn Stolove, and Paul Fleischer.

A special thanks to those who contributed to and supported the creation of this report: Thomas Kamber, Alexander Glazebrook, Amanda Gimble, Ines Escandon, Suzanne Myklebust, Colette Buscemi, and Jay Swartz.

Thanks to our colleagues at AARP for their support throughout the Connected NYCHA initiative and the report review process. A special thank you to: Kamili Wilson, Michael Phillips, Kristin Walus, Dawit Kahsai, and Beth Finkel for their indispensable contributions.

Table A1. Logistic Regression Analysis: Formed Connections with Someone New by Email, Text, or Social Media Message

Predictor	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Android Essentials	3.1814740	1.005953	3.66	0.0000	1.711930	5.912493
Constant	0.3484849	0.0843807	-4.35	0.0000	0.216809	0.560132

Note: N = 186; Likelihood Ratio Chi-Square=14.11; p<0.000; Pseudo R2 = 0.0564

Table A2. Logistic Regression Analysis: Had a Video Call with Someone New

Predictor	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Android Essentials	2.189167	0.7186944	2.39	0.017	1.150357	4.166053
Constant	0.2816902	0.0713096	-5.00	0.000	0.1715105	0.4626501

Note: N = 186; Likelihood Ratio Chi-Square=14.11; p<0.000; Pseudo R2 = 0.0564

Table A3. Logistic Regression Analysis: Used their Tablet to Participate in Something New

Predictor	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Android Essentials	3.84000	1.197758	4.31	0.0000	2.083664	7.076763
Constant	0.3906250	0.0921287	-3.99	0.0000	0.2460394	0.620177

Note: N = 189; Likelihood Ratio Chi-Square=19.8; p<0.000; Pseudo R2 = 0.0761