

Policy implications from a pandemic broadband adoption program for low-income job seekers

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ABSTRACT

In 2020, many organizations worked to increase broadband adoption in low-income households. Our study examines one Seattle effort that distributed 197 refurbished computers and 174 internet hotspots to low-income job seekers. Using mixed methods including audio diaries, we found that programs need to distribute technology based on individual needs, recipients want assistance from people that they trust, and programs need funding to support organization system and personnel capacity and development. Digital equity policy and funding interventions should go beyond funding physical infrastructure (connectivity and devices) to better support the social and organizational systems that enable meaningful broadband adoption.

INTRODUCTION

When libraries and other public internet access locations in the United States closed in Spring 2020 due to pandemic stay-at-home orders, many low-income households lost their sole source of computer and/or internet access.¹ In Seattle, much like the rest of the country, low-income households are significantly less likely to have a computer or internet at home.² In response to these new challenges, workforce development, social service organizations, nonprofits, public libraries, and community organizations worked to assist people remotely during a time of incredible need.

As one way to quickly deploy devices and internet connections into people's homes, a Seattle-based nonprofit, Seattle Jobs Initiative (SJI), implemented Digital Bridge. The program's main goal was to "offer job seekers the digital tools and skills they need to access online job training and career pathways." Digital Bridge provided low-income job seekers who were receiving employment case management services from SJI or other nonprofit partners, with a refurbished laptop and a free internet connection for one year. Between July 1 and December 31, 2020, the project distributed 197 laptops and 174 internet hotspots. To assist recipients in using their new technology and to help learn digital skills, all program participants also received access to the online NorthStar Digital Literacy Assessment and

¹ "Public Libraries Respond to COVID-19: Survey of Response & Activities," Text, Public Library Association (PLA), June 3, 2020, <https://www.ala.org/pla/issues/covid-19/march2020survey>.

² City of Seattle, "2018 Technology Access and Adoption Study" (City of Seattle, 2018), https://www.seattle.gov/Documents/Departments/SeattleIT/DigitalEngagement/TechAccess/City%20of%20Seattle%20IT%20Summary_Final.pdf.

curriculum and access to a technology assistance support line. Although the availability of jobs was low due to local pandemic restrictions, the program provided digital technologies so that low-income workers could learn to complete essential tasks and connect to online training.

During 2020, Digital Bridge and similar programs across the United States, underwent a massive effort to increase the number of households with home internet connections and computer access.³ Using Digital Bridge as a case study, we wanted to understand what organizational resources and program structure best support recipients of internet and devices in meeting their needs. We used a combination of survey, digital skills assessments, audio diaries, and interviews with participants, and audio diaries and a focus group with program case managers. With the passage of the 2021 Infrastructure Investment and Jobs Act, the federal government has allocated more dollars than ever before toward digital equity efforts. Understanding the types of needed programs and supports can inform funding and policy approaches as those dollars get distributed.⁴

LITERATURE REVIEW

The United States' digital divide and digital inclusion policy framework views home broadband adoption as a measure of economic importance and measures its progress through the number of home internet connections.⁵ Most federal policy and funding has focused on increasing physical broadband infrastructure through federal dollars supporting market-rate buildouts.⁶ In theory, increasing availability would increase internet subscriptions, but high, ongoing costs of internet and digital technologies prevents low-income households from maintaining access to home broadband connections.⁷ Additionally, using wired, home internet connections as the main indicator for internet adoption undercounts Americans' internet use, particularly Black Americans who are more likely to access the internet through community locations or smartphones.⁸ Gangadharan & Byrum argue that “meaningful broadband adoption” cannot simply be measured by the type of internet connection but also needs to include “a range of broadband-related activities and experiences that target populations and their supports construct, and often define for themselves.”⁹

³ Colin Rhinesmith and Susan Kennedy, “Growing Healthy Digital Ecosystems During COVID-19 and Beyond” (Evanston, IL: Benton Institute for Broadband & Society, November 2020), <https://www.benton.org/digital-equity-ecosystems-report>.

⁴ Kevin Taglang, “When Do We Get Our Broadband?,” Benton Foundation, November 15, 2021, <https://www.benton.org/blog/when-do-we-get-our-broadband>.

⁵ Daniel Greene, *The Promise of Access: Technology, Inequality, and the Political Economy of Hope* (Cambridge, Massachusetts: The MIT Press, 2021), 38–58.

⁶ Greene, 48–52.

⁷ Pew Research Center, “Demographics of Internet and Home Broadband Usage in the United States,” *Pew Research Center: Internet, Science & Tech* (blog), accessed July 29, 2021, <http://www.pewresearch.org/internet/fact-sheet/internet-broadband/>; Amy Gonzales, “The Contemporary US Digital Divide: From Initial Access to Technology Maintenance,” *Information, Communication & Society* 19, no. 2 (February 1, 2016): 234–48, <https://doi.org/10.1080/1369118X.2015.1050438>.

⁸ *Black Software: The Internet & Racial Justice, from the AfroNet to Black Lives Matter* (Oxford, New York: Oxford University Press, 2019), 130; Catherine Knight Steele, *Digital Black Feminism* (NYU Press, 2021), 7–8; 60–63, <https://nyupress.org/9781479808380/digital-black-feminism>.

⁹ Seeta Peña Gangadharan and Greta Byrum, “Broadband Adoption | Introduction: Defining and Measuring Meaningful Broadband Adoption,” *International Journal of Communication* 6, no. 0 (October 15, 2012): 2602, <https://ijoc.org/index.php/ijoc/article/view/1836>.

An important component of meaningful broadband adoption are infomediaries, those who use a combination of technological resources and coaching to meet someone's information needs.¹⁰ Infomediaries are a part of the "ecology of support" needed to help someone use the Internet; they "share social norms, practices, and processes related to using these technologies; and help...make sense of and exercise control over how broadband enters users' lives."¹¹ An infomediary can be a part of a person's family or social circle, though many are those who work or volunteer at public libraries, nonprofits, or community organizations that offer digital technology access.¹² Organizations like public libraries offer public access to the internet, digital technologies, and assistance through one-on-one help or formal classes.¹³ As individual technology use and needs increased, these organizations increased capacity to meet these needs, and in turn faced continually increased costs and the need for increased funding.¹⁴ These organizations and other spaces that offer Wi-Fi (including private businesses, parks and public buildings, and public transit) make up a community's "digital equity ecosystems."¹⁵ However, prior to the pandemic, federal policy and funding focused more on the broadband infrastructure and less on the community-based parts of the ecosystem.¹⁶

Public, in-person community access is critical, but individuals that solely rely on public access for internet and/or devices lack the same freedom and flexibility as users with home and personal access. Those that lack consistent access to digital technologies reflect societal inequities and are stratified by socioeconomic factors (age, income, and education), disability status, and race.¹⁷ For low-income job seekers, relying on the public access sites to charge their phones, use computers, and connect to the internet puts them at a disadvantage against those job seekers with homes with consistent access to technology.¹⁸ Public access users are also more vulnerable to privacy and security risks (e.g., having sensitive financial and health information in public view or accessed on shared, public devices), and

¹⁰ Ricardo Ramírez, Balaji Parthasarathy, and Andrew Gordon, "Infomediaries: Brokers of Public Access: Final Report," Global Impact Study Research Report Series (Technology and Social Change Group at the University of Washington Information School, 2013), https://digital.lib.washington.edu/researchworks/bitstream/item/25410/GIS_Infomediaries_final_report.pdf?sequence=1.

¹¹ Gangadharan and Byrum, "Broadband Adoption| Introduction," 2602.

¹² Dharma Dailey et al., "Broadband Adoption in Low-Income Communities" (SSRC, March 2010), https://webarchive.ssrc.org/pdfs/Broadband_Adoption_v1.1.pdf.

¹³ Samantha Becker et al., "Opportunity for All: How the American Public Benefits from Internet Access at U.S. Libraries" (Washington, D.C.: Institute of Museum and Library Services, 2010), <http://www.ims.gov/publications/opportunity-all-how-american-public-benefits-internet-access-us-libraries>; Colin Rhinesmith, "Digital Inclusion and Meaningful Broadband Adoption Initiatives" (Evanston, IL: Benton Foundation, 2016), <https://www.benton.org/sites/default/files/broadbandinclusion.pdf>; Michael D. Crandall and Karen E. Fisher, eds., *Digital Inclusion: Measuring the Impact of Information and Community Technology*, vol. 66 (ASIST Monograph Series, 2009).

¹⁴ Dailey et al., "Broadband Adoption in Low-Income Communities," 514.

¹⁵ "Growing Healthy Digital Ecosystems During COVID-19 and Beyond," 6.

¹⁶ John B. Horrigan and Jorge Schement, "Competition Won't Solve the Digital Divide — Communities Will," *The Hill*, June 24, 2021, <https://thehill.com/opinion/technology/560101-competition-wont-solve-the-digital-divide-communities-will>.

¹⁷ Bianca C. Reisdorf and Colin Rhinesmith, "An Asset-Based Approach to Digital Inclusion Research in the United States," in *Digital Inclusion: An International Comparative Analysis*, ed. Massimo Ragnedda and Bruce Mutsaers, Communication, Globalization, and Cultural Identity (Lanham, Maryland: Lexington Books, 2018), 43–44.

¹⁸ Ilana Gershon and Amy Gonzales, "You Got a Hole in Your Belly and a Phone in Your Hand: How US Government Phone Subsidies Shape the Search for Employment," *New Media & Society* 23, no. 4 (April 1, 2021): 853–71, <https://doi.org/10.1177/1461444820954184>.

digital literacy programs often fail to address issues of privacy and surveillance.¹⁹ And of course, as the pandemic hit the U.S. in March 2020, indoor locations closed and some of the only public places remaining to access the internet were Wi-Fi hotspot parking lots.²⁰

In response to the closure of schools and public access centers in March 2020, programmatic and policy efforts put an urgent focus on getting households computer and internet access. In 2020, digital inclusion activities were included in broadband infrastructure federal dollars distributed through Institute of Museum of Library Services (IMLS), National Telecommunications and Information Administration (NTIA), and the US Treasury.²¹ Digital equity ecosystems expanded and shifted to include new organizations and stakeholders, started providing online assistance and digital skills training, experimented with ways to offer assistance while socially distancing, and distributed devices and internet connections.²² The National Digital Inclusion Alliance (NDIA) helped popularize the term “Digital Navigator,” a type of infomediary that helps someone connect to digital technologies at home.²³ Although some pandemic policies and rules changes made it easier for organizations and groups to help get low-income households' devices and internet, some funding is still very restrictive and only allows technology lending and not ownership programs and/or includes internet filtering and student surveillance.²⁴ Overall, funding programs are still mostly siloed into the physical infrastructure and not the complex support systems to enable device ownership, technical support, online navigation and digital skills learning.

Additionally, the FCC implemented the Emergency Broadband Benefit (EBB) that gave households up to \$50 per month for an internet subsidy for low-income households; the most significant expansion since Lifeline of federal dollars explicitly allocated to help with the number one barrier to home internet access – cost.²⁵ Unfortunately, overall awareness of the program and uptake to EBB has been low among eligible households.²⁶ One reason may be that no dollars were allocated for local outreach and to community organizations for Digital Navigators or other infomediaries that can give one-on-one

¹⁹ Seeta Peña Gangadharan, “The Downside of Digital Inclusion: Expectations and Experiences of Privacy and Surveillance among Marginal Internet Users,” *New Media & Society* 19, no. 4 (April 1, 2017): 597–615, <https://doi.org/10.1177/1461444815614053>.

²⁰ Cecilia Kang, “Parking Lots Have Become a Digital Lifeline,” *The New York Times*, May 5, 2020, sec. Technology, <https://www.nytimes.com/2020/05/05/technology/parking-lots-wifi-coronavirus.html>.

²¹ Amy Huffman, “Treasury’s \$10 Billion Capital Projects Fund Will Advance Digital Equity,” National Digital Inclusion Alliance, September 24, 2021, <https://www.digitalinclusion.org/blog/2021/09/24/treasurys-10-billion-capital-projects-fund-will-advance-digital-equity/>.

²² Rhinesmith and Kennedy, “Growing Healthy Digital Ecosystems During COVID-19 and Beyond.”

²³ Sabrina Roach, “NDIA Announces Digital Navigator Concept,” National Digital Inclusion Alliance, April 21, 2020, <https://www.digitalinclusion.org/blog/2020/04/20/ndia-announces-digital-navigator-concept/>; “Digital Navigators,” *Digital US* (blog), accessed June 25, 2021, <https://digitalus.org/digital-navigators/>.

²⁴ Jessica Shahin, “Supplemental Nutrition Assistance Program – Questions and Answers, COVID-19, Set #4,” April 13, 2020, 4–5, <https://fns-prod.azureedge.net/sites/default/files/resource-files/SNAP-COVID-QA4.pdf>; Elizabeth Laird and Cody Venzke, “In the Matter of Establishing Emergency Connectivity Fund to Close the Homework Gap” (2021), <https://cdt.org/wp-content/uploads/2021/04/2021-04-05-CDT-FCC-Emergency-Connectivity-Fund-Comments-Draft-Final.pdf>.

²⁵ Colin Rhinesmith, Bianca Reisdorf, and Madison Bishop, “The Ability to Pay for Broadband,” *Communication Research and Practice* 5, no. 2 (April 3, 2019): 121–38, <https://doi.org/10.1080/22041451.2019.1601491>.

²⁶ Hernan Galperin, François Bar, and Thai V. Le, “Broadband Affordability and the Emergency Broadband Benefit in California: Connected Cities and Inclusive Growth (CCIG) Policy Brief # 8” (USC Annenberg School of Communication and Journalism, October 2021), <https://arnicusc.org/publications/broadband-affordability-and-the-emergency-broadband-benefit-in-california/>; John B. Horrigan, “Growth in Emergency Broadband Benefit Enrollment since June Has Been in Large Cities and Places with Low Broadband Adoption,” Benton Foundation, November 18, 2021, <https://www.benton.org/blog/growth-emergency-broadband-benefit-enrollment-june-has-been-large-cities-and-places-low>.

assistance.²⁷ Once again, federal policy ignored the importance of the entire digital equity ecosystem and ecology of support.

Early findings from Digital Navigator and pandemic programs, recommend strong, clear, consistent communications; clear, simple eligibility and enrollment requirements; and trusted sources for one-on-one assistance.²⁸ Findings from technology support provided to low-income Seattle Public School (SPS) families found that one-on-one assistance is most helpful when organizational technical support proactively calls program participants, doesn't assume familiarity with technology and jargon, and can communicate with families who prefer or require a language other than English.²⁹ Many of these emergency response programs focused on addressing individuals' immediate, pandemic-related needs but will need to shift, invest, and advocate for structural changes to reduce digital inequalities.³⁰

With the passage of the 2021 Infrastructure Investment and Jobs Act (IIJA), an additional \$2.75 billion has been allocated for the Digital Equity Act that funds digital inclusion and equity programs. The act also establishes the Affordable Connectivity Program (ACP), a longer-term household internet subsidy, reduced to a maximum of \$30 per month from the EBB rate of \$50, and with some limited improvements in program design.³¹ We hope that our study of the Digital Bridge program will contribute to understanding best practices from pandemic-response technology distribution efforts. At the same time, based on the literature, we know the importance of community supports and offer recommendations for design and policy to support people to meaningfully adopt home broadband.

STUDY DESIGN

We used a combination of quantitative and qualitative methods to understand the Digital Bridge program. Data collection was conducted by the evaluation manager at SJI and University of Washington (UW) researchers. SJI led the quantitative data collection from program enrollees (n= 197) which included a personal demographic survey and three Northstar Digital Literacy Assessments. Northstar Assessments are a collection of 14 online digital literacy assessments that cover topics such as basic computer skills, Microsoft Office Suite, social media, and information literacy.³² Quantitative data was collected July 2020 – December 2020 and analyzed using descriptive statistics. See the Table 1 for an overview of the quantitative methods used in this study.

Table 1: Quantitative methods

²⁷ Maria Curi, "Broadband Subsidy Program Sign-Ups Lag Amid Lack of Outreach Funds," September 23, 2021, <https://news.bloomberglaw.com/tech-and-telecom-law/broadband-subsidy-program-sign-ups-lag-amid-lack-of-outreach-funds>; Horrigan, "Growth in Emergency Broadband Benefit Enrollment since June Has Been in Large Cities and Places with Low Broadband Adoption"; Lloyd Levine, "Broadband Adoption in Urban and Suburban California: Information-Based Outreach Programs Ineffective at Closing the Digital Divide," *Journal of Information, Communication and Ethics in Society* 18, no. 3 (January 1, 2020): 431–59, <https://doi.org/10.1108/JICES-04-2020-0041>.

²⁸ Chris Goodchild et al., "Boosting Broadband Adoption and Remote K–12 Education in Low-Income Households" (Boston Consulting Group, April 30, 2021), <https://www.bcg.com/publications/2021/accelerating-broadband-adoption-for-remote-education-low-income-households>; Priyanka Sharma et al., "Digital Navigators: Trust Drives Impact," EdTech Center @ World Education, May 28, 2021, <https://edtech.worlded.org/digital-navigators-trust-drives-impact/>.

²⁹ Luanda Arai, "Navigating the Digital Divide: A Public-Private Partnership Between Seattle's Tech Industry and Public Schools" (sea.citi, July 2020), <https://www.seaciti.org/our-work/navigating-the-digital-divide/>.

³⁰ "Growing Healthy Digital Ecosystems During COVID-19 and Beyond," 13.

³¹ Taglang, "When Do We Get Our Broadband?"

³² "Assessment Info | Northstar Digital Literacy," accessed July 19, 2021, <https://www.digitalliteracyassessment.org/assessment-info>.

Method	Description	N=	Response rate
Demographic survey	Questions about personal descriptors such as race, income, number in household and current technology access. Collected by SJI case managers at intake or input in online form by partner CBO at Digital Bridge enrollment.	180	91.4%
Northstar Digital Literacy Assessments	Online assessment measuring digital literacy skills. Participants were encouraged to take three assessments: Basic Computer Skills (BCS), Basic Internet Skills (BIS), and Email Basics (EB). Taken shortly after enrollment.	BCS=49; BIS=33; EB=29	BCS=24.9%; BIS= 16.8%; EB= 14.7%

UW researchers led the qualitative data collection from a subset of program participants and case managers (Table 2).

Table 2 Qualitative Data Collection

Method	Description	N
Participant audio diaries	Digital Bridge program participants were asked to leave audio diaries for seven consecutive days and afterwards to participate in a phone interview. Participants received \$5 for each voicemail on a Visa Gift Card. The audio diary prompt asked participants to tell us how they used technology that day (including phones, computers, and internet), if they could do the things they needed to do, and what else would have helped them to accomplish their tasks.	15 participants, 78 total voicemails.
Participant interviews	Audio diary participants were invited for an interview. Participants received an additional \$20 for completing the interview on a Visa Gift Card, and it was sent via email or postal mail. The interview followed-up on themes in the voicemails, their experiences in the program, and their employment and technology needs and goals.	13
Case manager audio diaries	We asked case managers to leave voicemails for one work week (five days). The audio diary prompt mirrored the participant prompt.	4 participants; 12 total voicemails
Case manager focus group	The focus group was designed as a participatory design to get case manager perspectives on the structure of the program and what possible changes could be made.	3

Previous research has shown audio diaries are a method to understand people's everyday experiences even if collected over a short period of time.³³ Diaries have the potential to provide insights into the participants' smaller daily successes and frustrations and to see if any trends emerged over time. We used

³³ Leysia Palen and Marilyn Salzman, "Voice-Mail Diary Studies for Naturalistic Data Capture under Mobile Conditions," in *Proceedings of the 2002 ACM Conference on Computer Supported Cooperative Work, CSCW '02* (New Orleans, Louisiana, USA: Association for Computing Machinery, 2002), 87–95, <https://doi.org/10.1145/587078.587092>; Iain Williamson et al., "It Should Be the Most Natural Thing in the World': Exploring First-Time Mothers' Breastfeeding Difficulties in the UK Using Audio-Diaries and Interviews," *Maternal & Child Nutrition* 8, no. 4 (2012): 434–47, <https://doi.org/10.1111/j.1740-8709.2011.00328.x>.

Palen & Salzman's 2002 methods paper detailing how to collect digital technology-oriented audio diaries via voicemail as a guide to structure our data collection.³⁴ Even though audio diary techniques have evolved since the early 2000s such as using voice-memos, we used voicemail since it did not rely on participants having knowledge of a particular app or require using a smartphone.³⁵ Although the qualitative sample is small, the audio diaries gave us deeper background and insight into individual experiences as compared to only an interview or focus group.

Due to COVID-related research precautions, we conducted all interactions with participants and case managers remotely using Zoom. Participant interviews were audio only and had participants call-in using a telephone number to allow for maximum flexibility. We collected qualitative data during October and November 2020. For analysis, UW researchers anonymized the participants and created a universal codebook through iterative and collaborative thematic coding. Each data set was analyzed separately using the qualitative coding software Dedoose.

To recruit program participants for the audio diaries and interview, a UW researcher attended an orientation session for Digital Bridge program participants and SJI distributed the sign-up form via email and text. To keep their participation confidential from SJI, an interested participant reached out the UW researchers by filling out the form, emailing, or via phone. To recruit the case managers, a UW researcher attended a SJI case manager meeting, and the evaluation manager distributed the information about the voicemail and focus group information to SJI and their nonprofit partner case managers. Case manager participation was optional and confidential. All names used in this report are pseudonyms.

Our research team includes UW researchers, SJI, and City of Seattle digital equity and workforce development staff. The City of Seattle funded the majority of the program and provided the initial framework for the evaluation. Comcast also provided additional funding to support the purchase of laptops. UW researchers received an internal COVID-19 economic recovery research grant to support the qualitative research. SJI and City of Seattle staff are not independent evaluators but helped create Digital Bridge, and SJI implemented the project. UW researchers did not assist in program implementation but did participate in ongoing meetings and gave feedback on project design. As of the writing of this paper, SJI and the City of Seattle have continued to refine and implement the program.

Due to the interlocking implementation and data collection roles, our positions and backgrounds likely influenced some of the collected data. During qualitative data collection, UW researchers tried to make clear to study participants that they were independent researchers and that all conversations were confidential. However, some participants still incorrectly inferred that we helped run the program and this may have influenced what participants were willing to share with us. For the case managers qualitative data collection, the potential pool was much smaller and more likely that their identities would be inferred even though their responses and participation was confidential.

Program participants

A total of 197 people participated in the Digital Bridge Program. All participants received a refurbished laptop, and 174 also received a mobile hotspot with 12 months of service paid and the option to continue the low-income rate after that. SJI worked with four nonprofit partners to recruit participants to Digital Bridge in addition to the participants who enrolled in SJI's job training and employment case management programs. To enroll, participant household income had to be 200% or less of the Federal Poverty Line (FPL) based on the last three months of income. The average participant was 37 years old (S.D- 12.6; Range 18 – 64), Black or African American (73%), not Hispanic/Latino (79%), female (61%), makes 50% or less of the FPL, and lives in a household with a total of 3 people. Of the 146 that

³⁴ Palen and Salzman, "Voice-Mail Diary Studies for Naturalistic Data Capture under Mobile Conditions."

³⁵ Ruth Bartlett and Christine Milligan, *What Is Diary Method?* (Bloomsbury Academic, 2015), 51–68, <https://doi.org/10.5040/9781472572578>.

responded to the question about their current housing, 51% rent a house/apartment and 34% were homeless (vehicle, street, tent/RV, transitional, emergency shelter, or couch surfing). We had 128 participants' citizenships status recorded, and of that number, at least 54% (n=69) were refugees, asylees, or immigrants. One nonprofit worked almost exclusively with immigrants and refugees and SJI recruited several participants through a relationship with another nonprofit that serves a specific immigrant and refugee community. Although we do not have specific numbers, some participants did not speak English as their primary language and had varying levels of English language fluency.

Technology access, skills, and comfort

Most participants had a device and internet access prior to enrolling with the program. The number of devices per participant ranged from 0-3 with an average of 1. 78% had a smartphone (for 69%, this was their only device), 25% had laptop/desktop/tablet, and 7% had no device. Just over half of participants (56%) had internet access prior to enrollment. Before joining the program, the most common way participants accessed the internet was through a monthly data plan (21%), but 17% participants already had home, wired internet. The average number of internet access points per person (includes home internet, mobile hotspot, monthly data plan, pay-as-you-go data, and free Wi-Fi) was less than 1 (.58, SD = .62) with a range of 0-2.

Digital Skills

After receiving their technology, participants were asked to complete three Northstar Digital Literacy Assessments: Basic Computer Skills, Internet Basics, and Using Email. SJI offered Northstar for participants to assess their skill levels and access tailored online digital literacy curriculum. Northstar assessments, developed by Literacy Minnesota, are widely used in adult education and digital literacy programs to measure and teach digital skills.³⁶ Northstar recommends a “mid-level English reading comprehension ability” to complete the assessments.³⁷ See Table 3 for a breakdown of tests and scores.

Table 3: Northstar Digital Literacy Assessment Scores

Test	Example skills covered ³⁸	Percent passed	Average Score	SD	Range
Basic Computer Skills; n = 49	Identifying computer hardware parts, drag and drop, locating camera, how to use the trash function	34.7%	78.8	11.0	48.0 – 98.1
Internet Basics; n=33	Identify browsers, fill out an online form, basic web safety, using internet search	21.2%	69.4	16.9	36.8 -95.6

³⁶ “Digital Blindspot,” Markle | Advancing America’s Future, October 21, 2019, <https://www.markle.org/digitalblindspot>; “Northstar Digital Literacy Assessments,” LINCS | Adult Education and Literacy | U.S. Department of Education, accessed August 2, 2021, <https://lincs.ed.gov/professional-development/resource-collections/profile-1089>; Angela Siefer, Bill Callahan, and Paolo Balboa, “Chapter 4: Digital Literacy Training,” in *The Digital Inclusion Startup Manual* (National Digital Inclusion Alliance), accessed August 2, 2021, <https://startup.digitalinclusion.org/ch4.html>.

³⁷ “About | Northstar Digital Literacy,” accessed November 22, 2021, <https://www.digitalliteracyassessment.org/about>.

³⁸ “Northstar Digital Literacy V2.0,” accessed July 19, 2021, https://assets.digitalliteracyassessment.org/static/main_website/docs/NDL-standards-current.183aef99d762.pdf.

Using Email; n=28	Log into and log out email, reply to email, open and download attachments, using email etiquette	39.3%	80.1	13.2	35.1 – 97.4
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Only 49 participants completed one of the three assessments, and case managers determined that 29 participants did not have digital skills and/or English language ability to successfully take the online Northstar assessment and conducted a paper-based screener instead (not shown). For a participant's Northstar score test to get registered with SJI, they had to use the link provided in an email from SJI and create an account. Based on conversations with participants, we believe that some participants took the assessments, but their scores did not get registered with SJI. English language ability may have also interfered with participants to successfully complete the assessments.

Assessment scores had large ranges, but most participants that took the assessments did not pass. Northstar classifies a passing score as 85%.³⁹ A downside to using digital literacy assessments, including Northstar, is that discrete skills are measured in isolation and not in the way that computers are used.⁴⁰ Despite their low scores on the assessments, participants described during interviews successfully completing a variety of web search or browser-based activities such as applying for unemployment, finding activities for their children, and comparison shopping. However, they had less knowledge of the more instrumental skills tested by the assessments such as how to recover deleted emails and using browser bookmarks.

Job training and employment

All Digital Bridge program participants received case management services that supported enrolling in training and searching for employment. Additionally, a sub-set (n=107) enrolled in formal, online training courses through SJI and nonprofit partners. The length of these differed depending on the course. Individuals enrolled in a training course due to a combination of interest, availability, which nonprofit they worked with, and existing skills. 50 of these participants were enrolled in a digital skills course through a nonprofit partner, and the others received industry-related training such as in healthcare or manufacturing. Those not enrolled in a formal training program received case management support in the form of resume building and assistance enrolling in educational opportunities and job searching. The goal of SJI and nonprofit partners' job training and employment support is moving individuals towards a career path with family-sustaining wages, but the initial outcomes are typically entry-level positions to prepare for more training and education. Out of the 143 participants that SJI received data on, as of June 2021, 25 were placed in new, full-time positions and one in a new part-time position. The overall average hourly wage was \$18.39 and included a mix of career path jobs and interim positions. This data does not include temporary positions that some participants had prior to enrolling in Digital Bridge.

ANALYSIS

The experiences of participants and case managers in Digital Bridge emphasize the need for and value of home technology access programs but also the need of these programs to intentionally create support structures to enable meaningful broadband adoption. Almost all of the interviewees described

³⁹ "Assessment Info | Northstar Digital Literacy."

⁴⁰ Jen Vanek, Kathy Harris, and Alisa Belzer, "Digital Literacy and Technology Integration in Adult Basic Skills Education: A Review of the Research" (ProLiteracy, June 2020), 5, <https://www.proliteracy.org/Blogs/Article/562/Digital-Literacy-and-Technology-Integration-in-Adult-Basic-Skills-Education-A-R>.

how important it was to receive the laptop and internet connection. As one East African immigrant, Gabriel, described, you cannot learn if you do not have basic access to the internet and a computer:

It was difficult for me to learn because I do not have the internet, I'm offline...I now have the computer, you know. I know I can learn how to check something on the internet, how to read [and] check the information [from my] country. - Gabriel, interview

Gabriel had no access to the internet before receiving the technology from Digital Bridge, but even for participants that had some access such as through a smartphone, having the laptop and free internet connection increased their ability to complete tasks – especially since everything had to be done online due to the pandemic. Additionally, participants described learning new digital skills in the process. Sometimes participants' learning was driven by their own tasks and needs, but others described learning how to do tasks on behalf of others such as remote K-12 schooling.

However, the distribution and use of technology did not go smoothly for everyone. Others ran into roadblocks to using their technology either due to technical challenges or lack of familiarity with the devices. In a voicemail from Marie, a case manager, she describes some of the challenges participants had with their technology and difficulties case managers had helping them:

I [spoke] with 10 participants about Digital Bridge...Most of them...they don't have any way to get access when we have meetings, because the computer batter[ies] don't work...And some of them also, they told me that they have a problem setting Zoom application[s] on those laptops. And some of them also told me that their Internet hotspot is very slow...I tried to help as much [as] possible. – Marie, voicemail

Some participants had overlapping technical challenges exacerbated by digital skills gaps. Some participants had never owned a laptop and hotspot connection. Marie's clients were also mostly English language learners which also compounded technology issues. Even though Marie came from the same immigrant background as most of her clients and could speak their primary language, she lacked the specialized training and time needed to work through these issues. These would have been challenges in many new digital inclusion programs, but during a pandemic, case managers and Digital Bridge had the additional challenge of trying to do all of these tasks remotely.

Based on the experience of Digital Bridge, home connectivity and technology distribution programs need to be tailored to recipient needs and accompanied by technology support and assistance from trusted sources. For organizations implementing these types of programs, these supports need to be intentionally integrated into services and not just added on to existing jobs and structures. We break down our analysis into three parts: participant technology needs, program structure, and program staff needs.

Participant technology needs

Hotspots

Digital Bridge, like other pandemic digital inclusion programs, gave participants a year of free internet access via a portable internet hotspot.⁴¹ Originally, the program intended to offer participants the

⁴¹ Angela Siefer, Bill Callahan, and Paolo Balboa, "Chapter 6, The Digital Inclusion Startup Manual" (National Digital Inclusion Alliance), accessed July 17, 2021, <https://startup.digitalinclusion.org/ch6.html>; Sharon Strover, "Public

option of the local ISPs' low-income wired broadband subscription, but the program quickly discarded this option. For case managers, enrolling participants was too complex and burdensome on top of their other job duties. SJI could not directly enroll a person due to client privacy protections. Case managers would have needed to schedule a phone call with the participant and with the ISP and then walk-the participant through the sign-up process.

Logistically, it was just easier to deploy the hotspots. Case managers could easily add the hotspot to an order through the refurbisher which participants received in the mail along with their laptop with no additional enrollment and installation scheduling process. Additionally, the mobility of the hotspots was an important affordance for participants. 34% of Digital Bridge participants are homeless and even a greater percentage are insecurely housed. A wired internet subscription would require them to navigate the ISP's systems to disconnect and reconnect service every time they moved (assuming their residence was in the ISP's service area) to receive the full 12 months of service. Each additional task – identifying ISP providers, using customer support, and moving internet services – creates additional burdens for someone surviving housing insecurity. Additionally, the mobility and flexibility of the hotspots was an added benefit for some participants in their day-to-day use:

Today I used my [hotspot] to file my unemployment. I was out of town, really, and luckily, I had my [hotspot] with me which gave me internet access and I was able to file for my unemployment. And I really can't think of nothing that could've help me more. I'm really grateful. – Jasmine, voicemail

In her interview, Jasmine described how she keeps her hotspot in a fanny pack so that her smartphone has connectivity wherever she goes. Like Jasmine, several participants mentioned the mobility of the hotspot helped them connect to the internet outside their home – using their laptop and smartphone without paying for mobile data. However, others worried about losing their hotspots and did not take them outside their home.

However, the hotspots did not work for all participants. Five of the interviewees reported not having a good connection at their home and lacked the download and upload speeds sufficient to reliably connect to Zoom. This caused major disruptions to their ability to participate in online training. As a result, case managers and instructors spent time during and after class trying to troubleshoot connections and helping participants catch up on material they missed. It was unclear why some participants did not get clear signals on their devices; they could live in geographic dead zones or buildings where the building's architecture interferes with the signal.⁴² Participants that struggled with their hotspots would use their phone's data plan or go to someone else's home for connectivity.

Refurbished laptops

Even prior to the pandemic, many digital inclusion programs help people acquire personal computers and internet connections for free or at reduced costs. For device distribution (either free or low-cost), programs either mass purchase new laptops or use refurbished computers (either refurbishing themselves or partnering with an established refurbisher).⁴³ Using refurbished computers has positive ecological

Libraries and 21st Century Digital Equity Goals," *Communication Research and Practice* 5, no. 2 (April 3, 2019): 188–205, <https://doi.org/10.1080/22041451.2019.1601487>.

⁴² "Student Home Internet Connectivity Study" (Consortium for School Networking (CoSN), Spring 2021).

⁴³ Siefer, Callahan, and Balboa, "Chapter 6, The Digital Inclusion Startup Manual."

impacts, and refurbishers have multiple sources of machines from consumer donations to large sets of decommissioned machines.⁴⁴

For many of the Digital Bridge participants, the refurbished laptops worked well, but two main recurring problems emerged: battery life and device fit. Due to living situations, battery life was important; participants might not always have access to electricity or an outlet. Particularly during the most stringent shut-down periods, many participants experiencing homelessness did not have regular access to an outlet to charge their device, making long battery life of paramount importance. Refurbished computers generally have shorter battery lives than newer laptop models, but a subset of laptops received by SJI had very short battery life (30 minutes – 1 hour).⁴⁵ SJI then had to coordinate with the participant to return the laptop to the refurbisher. Trying to coordinate these returns with participants added another task for SJI case managers and staff. These returns also interfered with participants' job training and prevented them from completing other tasks. And while many participants sought help from their case managers when they encountered these problems, some just gave up on using the device, and case managers found out about problems only by happenstance.

Finding the correct device fit, the complexity of the computer operating system and software to the participants' need and capabilities, proved more challenging than expected. All participants received PCs installed with Windows 10 and Microsoft Office Suite. Case managers felt like participants, especially those with lower English language ability were overwhelmed with all the software and menus that PCs have and that simpler devices without so much software such as Chromebooks would better fit participant needs. However, Chromebooks require an internet connection to function, and some training programs require Windows operating system; there is no one-size-fits-all.

Program structure

The speed in which this program was implemented meant the technology components were layered on top of existing SJI and nonprofit programs and procedures. SJI and the local government created Digital Bridge as a pandemic emergency response program to get people connected with digital technologies as quickly as possible. SJI had not distributed technology or provided remote services prior to March 2020. In addition, in late Spring 2020 during program planning Washington State had changing pandemic guidelines for businesses and strict social distancing rules.⁴⁶ All of these factors influenced program structure and service deployment and meant that staff supported technology needs in addition to their existing job duties.

Technology support services were highly reliant on self-learning and discovery including how participants received and got oriented to their devices. Program participants did not receive any one-on-one orientation to their new devices but were given written instructions on how to set-up and get online. To maintain social distancing, program participants received their technology either by picking it up outside at a distribution point or were directly shipped the device. Regardless of the method, participants were supposed to set up their devices on their own and reach out for help, but that did not always work:

⁴⁴ Amy L. Gonzales and Harry Yaojun Yan, "Non-Profit Reuse as a Solution to Reducing Digital Divides and Technology Maintenance Inequalities," in *Organizing Inclusion: Moving Diversity from Demographics to Communication Processes* (Routledge, 2020); Siefer, Callahan, and Balboa, "Chapter 6, The Digital Inclusion Startup Manual."

⁴⁵ Jackie Dove, "Should You Buy a Refurbished Laptop?," LaptopMag, March 17, 2017, <https://www.laptopmag.com/articles/refurbished-laptop-tips>.

⁴⁶ "Documenting Washington's Path to Recovery from the Coronavirus (COVID-19) Pandemic, 2020-2021," Ballotpedia, accessed November 13, 2021, [https://ballotpedia.org/Documenting_Washington%27s_path_to_recovery_from_the_coronavirus_\(COVID-19\)_pandemic,_2020-2021](https://ballotpedia.org/Documenting_Washington%27s_path_to_recovery_from_the_coronavirus_(COVID-19)_pandemic,_2020-2021).

[At first], I didn't know the password [for the Wi-Fi hotspot]. I didn't use [it] ...because I didn't find the password. But after, I think, one month, one day [my case manager] called me...I said, I didn't know the password. She told me, "Just open the cover and you will see the password." Then when I opened that I saw the password. It's very easy, just know the name of your [hotspot] and the password. – Solange, interview

Solange's problem only got resolved after a case manager reached out to confirm that Solange's laptop and hotspot were working. Even some people who were more proficient with technology and figured out how to set up their computer on their own wished that someone could have provided in-person step-by-step guidance and answered questions.

The lack of orientation meant that some were unaware of the capabilities of their devices or the resources available with their program. For example, several interviewees did not know they could connect other devices to their hotspot and thought it could only be used with their laptop. In the interviews, most people were unaware of a technical support line or the availability of the Northstar Assessment or online learning resources. At the request of the program, the refurbisher pre-loaded the computer with desktop short cuts and browser bookmarks to online resources such the state employment security website and Northstar. The program thought that linking to items on the desktop would make it easier to find. However, based on the interviews, most people never clicked on these links.

Digital Bridge was designed so that participants were expected to reach out and get help by calling the refurbisher's technical support line. However, very few participants successfully used this resource. Instead, participants resolved technical issues through their own troubleshooting, via personal support networks such as family, friends, and other community members, and through case manager assistance. Case managers provided a large of amount of assistance during routine check-ins and during online training.

The refurbisher's support line was underused for three primary reasons: lack of integration into programming, refurbisher capacity, and nature of participant technology issues. First, many participants simply did not know the support line existed. The number was given out in orientation materials along with a lot of other information about the program. It was just too much information all at once for participants, many of whom were experiencing crisis and have extremely busy lives – caregiving, working, attending training, seeking and accessing services, and looking for jobs. Second, the refurbisher's staff suffered increased demand and additional constraints because of the pandemic. Of participants who did call, some were met with long wait times. Third, when technical issues arose, they often needed immediate help (e.g., getting online for a training or a job interview), and case managers and family members were the easiest to access.

Many participants did not use self-discovery resources (desktop icons, preloaded resources) that came with the program because they would not click on unknown icons or links; they worried about "messing up" their new computer. Even if they knew about the online learning available through Northstar, several said that self-paced format did not fit their learning style:

It will be not easy if I learn by my own. Other than that, if a friend can teach me, or if there is any class I would love to join that, because that would be easy for me to learn. – Zahra, interview

In her interview, Zahra described a variety of online activities she could do on her laptop and smartphone (finding children's craft activities, looking for jobs and daycares, using telehealth services), but at the same time, she struggled with basic computer skills such as using bookmarks or reopening closed browser

windows. In the interviews, participants talked about wanting to become “more efficient” with their laptops and phones and felt that more help or a digital skills class could help them achieve their goals as opposed to doing it on their own.

In short, the support model should be structured as proactive assistance and outreach instead of passive – especially during the orientation phase. A process should be set-up at the beginning of the to ensure that each participant has been able to get online at a minimum and that basic functionality in their home environment is working for their main tasks (e.g. run Zoom and make sure that they can connect before they need to for a class, etc.).

Program staff needs

Due to the pandemic, case managers, already stretched thin during normal operations, faced increased needs from their clients. Case managers had to learn not only how to work remotely during pandemic conditions but also how to provide remote technology support and assistance. In their audio diaries and focus group, case managers described spending a significant amount of their time helping participants with technology during job training classes, typical case manager-client interactions, or in direct phone calls and text messages. Marie, a case manager who shares a similar immigrant background as some of the Digital Bridge participants, spent a particularly large amount of her time on technology issues:

I have to spend like four hours and half just to help my participants set their laptop and set [up] Zoom... Everyone is coming at the same time, which is not easy for me to handle, but I try to do the best one at a time. – Marie, voicemail

Many immigrant participants in their interviews specifically mentioned Marie as a resource of technology assistance. In the focus group, case managers discussed that for some of the immigrant and refugee participants, a lack of English language fluency compounded the lack of digital skills to make technology use particularly challenging. These participants required more one-on-one time to gain comfort using technology.

When asked during the interviews how they received help, some participants were less likely to mention case managers, but did mention it in their audio diaries. When prompted in the interviews, these participants did recall assistance from case managers. Since the voicemails were done daily, the case manager interaction may have happened more recently and thus participants were more likely to remember getting help. For example, when first asked, participant Jasmine said in the interview that she only received technology help from her family, specifically, her son who she called her “IT Man,” but in her audio diaries, she described getting help from her case manager on multiple occasions on creating her resume and redeeming a clothing voucher. It seems that since this assistance was so integrated into existing services that participants often forgot that it happened until prompted. Although most interviewees did recall getting help from their case managers, the amount of help received differed greatly between participants.

Providing technology assistance on top of the program-specific paperwork (documentation to establish and maintain federal benefit programs, required surveys, and digital skills assessments) created a great deal of stress and additional time burdens for case managers, already stretched thin by their caseloads. In the focus group, case managers emphasized that everything should be as simple as possible. Participants would have benefited from receiving step-by-step instructions, walk-throughs, and reviewing new skills multiple times. Providing this additional assistance and support materials would have required more resources to either have more integrated technology support and/or reduce case manager’s caseloads so that they could offer more one-on-one assistance.

In addition to the participants, case managers wanted more training covering general digital skills, technology distributed to participants, and basic technical support. Case managers needed guidance on how to help participants work through common technical stumbling blocks and when to refer them to someone else with more technical expertise. Case managers needed tools to help participants troubleshoot common issues and with basic technology concepts. For example, in this interview, participant Jasmine describes a miscommunication with her case manager around taking a screenshot:

I had got a voucher for some clothing. And so my case worker was like, "Pick your clothing on Amazon and then send it to me, your total." And so, I was like, "What?" So, I sent him something, but...what he wanted me to do is take a screenshot on the computer, and then go back in and send it. And that's where I had my biggest problem...My case manager did not understand that I did not know what he was talking about. We had a total miscommunication and I ended up getting angry with him. I ended up talking to his boss...So he walked me through on the computer. I guess he was like my technical support. –

Jasmine, interview

Jasmine's case manager could have benefited from knowing how to identify gaps in Jasmine's familiarity with digital tools and how to give basic how-to steps over the phone. In addition, basic troubleshooting support knowledge can help case managers determine more quickly if it is an easy fix they can help with or something beyond their capacity and helps them make a better handoff to more comprehensive support (e.g., tell the participant what to ask help for). More training and support for case managers can set up themselves and their clients for success.

CONCLUSION

Due to the COVID-19 pandemic, new attention has been placed on increasing home broadband adoption. The Infrastructure Investment and Jobs Act (IIJA) funding provides for new and longer-term digital equity support for affordable internet, planning, and locally responsive projects that go beyond infrastructure deployment.⁴⁷ Based on learnings from Digital Bridge, allocated dollars should be targeted to develop community-level digital equity ecosystems that enable meaningful broadband adoption. Going forward this will still include physical, community spaces support that offer tangible access in the form of plug-ins where people can charge devices, adequate work space, and in-person technical support, both formal (e.g., a person at a help desk) and informal (e.g., someone sitting at the next table one can ask for help), that is far more accessible for people with low digital literacy, particularly those who also have a language barrier to accessing help online or via the telephone. However, people will also need support in their own personal spaces. To do this, organizations will need the funding to build capacity to deliver intentionally designed, proactive technical assistance and digital skills support. Funding for digital equity research can also help best leverage those dollars to better understand programmatic impacts, identify and share best practices and policy needs.

The positive impacts of the Digital Bridge program did not happen from device and internet connection alone but because of each participant's "ecology of support."⁴⁸ Digital Bridge participants used their own personal and community resources (e.g., religious and ethnic communities) and case

⁴⁷ Amy Huffman, "The Infrastructure Act and Digital Equity Act Passed ... Now What?," National Digital Inclusion Alliance, November 16, 2021, <https://www.digitalinclusion.org/blog/2021/11/16/the-infrastructure-act-and-digital-equity-act-passed-now-what/>.

⁴⁸ Gangadharan and Byrum, "Broadband Adoption | Introduction."

manager assistance but wanted more structured support from SJI. In response to early learnings from the program, SJI restructured Digital Bridge to create a program manager role to manage logistics and help with technology issues. The program manager develops a relationship with each participant early in the program to build comfort and trust when other technology issues arise. Even with a specialized role leading technology assistance, case managers still field technology questions and need to troubleshoot with participants on an ad hoc basis. By deliberately designing technology support and learning within their program, SJI and other organizations can better support participants technology, information, and education needs. As a local funder, the City of Seattle has and continues to support in-person and home-based technology support through nonprofits and community groups.

IJA can fund the organizational capacity that SJI and other organizations need to provide technology assistance and digital skills acquisition their communities need over the long-term. (This includes places such as public libraries that have long supported technology needs and more recent partners.) For example, SJI wants to offer training for digital skills and basic technology troubleshooting for case managers at SJI and partner nonprofit. The training would help case managers complete their own daily tasks, support participants' technical issues, and develop a familiarity with participants' technology. To continue the program, SJI needs funding for inventory management, digital skills training for staff, basic technology support training for staff, and instructor-led digital skills training for participants. This is what SJI and the communities they serve need and is likely similar in many organizations. However, each local community and organization has differences and should be supported to design locally responsive service delivery based on listening to those they serve and their current systems capacity and resources.

Digital Bridge highlighted the supports English language learners need to meaningfully adopt broadband. Marie, the case manager that served most of the immigrant clients, described the highest workloads in assisting her clients—working on the technology itself took most of her day. Although she expressed feeling overwhelmed by the volume and technical troubleshooting, in the interviews and audio diaries, her clients talked about how much help she provided and gratitude that she could help. Case managers or other navigators assisting English language learners need the time to provide the care needed to address the compounding challenges English language learners face learning new technologies. Digital literacy demands a specialized vocabulary that makes it even less accessible for digital novices who are also English language learners. Having digital literacy help and technical support in-language is necessary to make digital equity programs truly functional. However, deliberate, targeted, and ongoing investment in organizations in these communities for this purpose is necessary.⁴⁹

For policy to build off best practices, more digital inclusion research funding is also needed to better understand successes and challenges of digital equity ecosystems and to disseminate best practices. Much of digital inequalities research tends to focus on individual deficits and not as much on people's existing skills and resources and policies and programs to alleviate inequalities.⁵⁰ Longer-term investigations could better reveal organization and participant needs and solutions. Examples include longitudinal studies of recipients of devices and internet connectivity, investigation of community-wide support networks (including public libraries, CBOs, and community organizations), lowest barrier options for internet delivery, program delivery costs, successful support frameworks for English language learners, and more focus on digital skills development. The uptake and implementation of the Affordable

⁴⁹ Negin Dahya et al., "Technology Access & Education for Refugee Women in Seattle & King County," Technical Report (Technology & Social Change Group, August 2020), <https://digital.lib.washington.edu:443/researchworks/handle/1773/46221>.

⁵⁰ Virginia E. Eubanks, "Trapped in the Digital Divide: The Distributive Paradigm in Community Informatics," *The Journal of Community Informatics* 3, no. 2 (September 14, 2007), <https://doi.org/10.15353/joci.v3i2.2373>; Bianca Reisdorf and Colin Rhinesmith, "Digital Inclusion as a Core Component of Social Inclusion," *Social Inclusion* 8, no. 2 (May 14, 2020): 132, <https://doi.org/10.17645/si.v8i2.3184>.

Connectivity Program (ACP) as well as other cost barriers to technology maintenance should be closely monitored and adjusted to best serve the greatest number and those most in need. The Digital Bridge project demonstrates how critical it is to resource and provide a wholistic system of support for job-seekers' technology access, digital skills development and support needs. Insufficient investment and lack of whole system program design and development risks increasing digital inequity and barriers to economic opportunity.

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