Equitable Digital Access in an Era of Uncertainty

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It is now hard to fathom a world without the Internet and the wide range of digital products and services to which we have become accustomed. As digital technologies have become fundamental, those without reliable digital access live in a precarious situation. In 2021, as many as 2.9 billion people were still living without a reliable Internet connection.[2] As described by Essie Workie, the Director of Human Services Initiatives for the Migration Policy Institute, "the same way that education is a doorway to economic opportunity," today, "digital transformation [...] unlocks opportunity in the modern world."[3] Without digital transformation, there is a serious risk of a deepening bifurcation between those living with digital resources and those struggling to secure them. To genuinely understand this divide, known as the "digital divide," it is important for communities to grasp its complexity. This inequitable situation is not merely about hardware and infrastructure. It is also about user experience design, visual communication, and having the skills and digital literacies to compete in a digitizing world, and about having access to employment, social networks, healthcare, and education-related platforms and services.

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1 Columbia University, US.

2 International Telecommunication Union, "Measuring Digital Development: Facts and Figures 2021," ITU, accessed June 25, 2022, https://www.itu.int:443/en/ITU-D/Statistics/Pages/facts/default.aspx.

3 Essie Workie, Migration Policy Institute, interview by author, online, April 12, 2022.

In imagining a just and well-designed society, it is now hard to imagine a life without being digitally connected. The ability or inability to access and use digital products and services is frequently thought of as an infrastructure or information technology (IT) failure or expense, but should also be acknowledged for its nuanced socioeconomic reasons and digital literacy barriers. User experience and user interface design are important to addressing these barriers, and designers can play a more integral role in helping address "digital exclusion." In order to explore contemporary challenges related to digital access, this chapter examines several organizations, policies, and projects working to improve equitable digital access.

Digital Divide Challenges and Misconceptions

In 1995, approximately "42 percent of American adults said they had never heard of the Internet."[4] By 2021 the Organisation for Economic Co-operation and Development (OECD) estimated that South Korea had household Internet access rates above 99% and that by 2022 Norway had also reached 99%, accounting for some of the highest percentages in the world.[5,6] In 2021 it was estimated that about 82% of US households had Internet access, and by comparison in the same year (among OECD member countries), Colombia saw household access at around 60.2% and Mexico at around 66%. These indicators speak to the ongoing effort toward being digitally connected, while at the same time a great deal of variance in terms of access exists. Many people have benefited from consistent access to Internet-connected devices, and others still live without reliable connections to fundamental technologies. These statistics only highlight part of a complex and evolving situation.

Many people now rely on online news sources, e-commerce "giants" like Amazon, digital payments, and platforms to access healthcare, educational

4 The Pew Charitable Trusts, "Internet & Tech," accessed on April 4, 2023, https://www.pewtrusts.org/en/topics/internet-and-tech.

5 OECD (2023), "Internet access (Indicator),"accessed on April 7 2023, https://doi.org/10.1787/69c2b997-en.

6 In the OECD's definition access is through a personal computer using ADSL, dial-up, or cable broadband access.

materials, and job prospects.[7] Uneven access to information—described as a "digital divide"—is now especially devastating to those living without dependable services. In decades, the importance of being digitally connected has become urgent. To get access to the best quality information, platforms, and social networks it is the expectation, at a bare minimum, to have a reliable Internet connection. Around the start of the COVID-19 pandemic, Anne-Marie Grey, executive director for the United Nations High Commissioner for Refugees (UNHCR), declared that "digital connectivity should be a human right" as it "enables access to information, education and opportunity."[8] Yet to be an empowered participant in the digital economy often requires more than a working connection, however, this is the baseline. It also means fostering "digital literacies," which can be a combination of technical or design-focused competencies along with the ability to be critically discerning of information presented online.[9]

Technical and design-focused digital literacies can include specific competencies such as understanding website navigation. This benefit would enable the designing and editing of original content found in photography, videos, and graphics which are intended for websites and social media. It can also include developing advanced skills in coding, data wrangling, and the flexibility to learn and adapt to use ever-emerging technologies. Discerning information online can mean developing the critical thinking skills needed to evaluate information sources as reputable or not, ensure e-safety, and understand others' social and emotional behavior online. It can also mean being sufficiently keyed into economic, social, and political events. [10] To be fully confident in digital spaces is like being a "digital citizen." Beth A. Buchholz, et

7 Carlo Combi, Gabriele Pozzani, and Giuseppe Pozzi, "Telemedicine for Developing Countries. A Survey and Some Design Issues," *Applied Clinical Informatics* 7, no. 4 (November 2, 2016), 1025–50, https://doi.org/10.4338/ACI-2016-06-R-0089.

8 Anne-Marie Grey, "The Case for Connectivity, the New Human Right," United Nations, December 10, 2020, https://www.un.org/en/un-chronicle/case-connectivity-new-human-right.

9 David Bawden, "Origins and Concepts of Digital Literacy," ed. Colin Lankshear and Michele Knobel, *Digital Literacies: Concepts, Policies and Practices* 30, no. 2008 (2008), 17–32.

10 Carole L. Jurkiewicz, "Big Data, Big Concerns: Ethics in the Digital Age," *Public Integrity* 20, no. sup1 (January 18, 2018), 46–59, https://doi.org/10.1080/10999922.2018.1448218.

al. argued that a full-fledged "netizen"[11] is in the position to engage in Internet-based civic discourse, act as a decision maker in digital spheres, and participate in creating more equitable communities online.[12] Exemplary "netizens," for example, could be defined as those who have donated their time to Wikipedia authorship,[13] monitored chat rooms,[14] shared open source code on GitHub, or contributed to building an online community as well as using a fundraising platform for a charitable cause.

Nevertheless, a large part of the world remains offline and are unable to build critical, digital competencies. Researchers Franz Drees-Gross and Pepe Zhang estimated that less than 50% of the Latin American and Caribbean (LAC) population has "fixed broadband connectivity, and only 9.9% have high-quality fiber connectivity at home."[15] In an International Telecommunication Union (ITU) report "Facts and Figures 2021," they estimated that only about 33 percent of people in Africa have reliable Internet access.[16] In another ITU report on "measuring digital development"[17] it was estimated that about 4.9 billion people were using the Internet in 2021 globally, while another 2.9 billion are still without reliable Internet use. The ITU described:

> The statistics reveal a connectivity 'grand canyon' separating the digitally empowered from the digitally excluded. This is exemplified through data indicating that 96 percent of the 2.9 billion living in the developing world are still offline. Location plays a big part: our figures reveal that the share of Internet users in urban areas is twice as high as in rural areas.

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11 Internet theorist Michael Hauben is widely credited with popularizing the term "netizen", a conglomerate word for a citizen of the Internet.

12 Beth A. Buchholz, Jason DeHart, and Gary Moorman, "Digital Citizenship During a Global Pandemic: Moving Beyond Digital Literacy," *Journal of Adolescent & Adult Literacy* 64, no. 1 (2020), 11–17, https://doi.org/10.1002/jaal.1076.

13 Hoda Baytiyeh and Jay Pfaffman, "Volunteers in Wikipedia: Why the Community Matters," *Journal of Educational Technology & Society* 13, no. 2 (2010): 128–40.

14 See Hector Postigo, "America Online Volunteers: Lessons from an Early Co-Production Community," *International Journal of Cultural Studies* 12, no. 5 (September 1, 2009): 451–69, https://doi.org/10.1177/1367877909337858.

15 Franz Drees-Gross and Pepe Zhang, "Poor Digital Access Is Holding Latin America and the Caribbean Back. Here's How to Change It," *World Bank Blogs*, August 12, 2021, https://blogs.worldbank.org/latinamerica/poor-digital-access-holding-latin-america-and-caribbean-back-heres-how-change-it.

16 International Telecommunication Union, "Measuring Digital Development."

17 International Telecommunication Union.

While the ITU's assessment included a large share of offline users who were living in rural or developing areas, these statistics include people living in high-income countries. In 2021, researcher Emily A. Vogels reported that approximately a quarter of American adults with household incomes below $30,000 "do not have home broadband services (43%) or a desktop or laptop computer (41%)," with these households relying more heavily on smartphones.[18] By comparison, the share of households with Internet access across the European Union "crossed the 90 percent milestone" in 2021.[19] Even so, as many as 20 percent of children in the United Kingdom, for example, did not consistently have access to "a device for online learning." The pandemic lockdowns pointed to how precarious the connectivity situation, often defined as the "digital divide," can be.[20]

Historically, the term "digital divide" has been described by the Organisation for Economic Co-operation and Development (OECD) as "the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to both their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities."[21] Before the digital divide was more widely measured and addressed in forums such as the UN, ITU, and the OECD, author Don Tapscott, wrote that while widespread digitization would reshape our lives, networked intelligence could also result in "differential access" issues, employment displacement, and play a significant role in economic inequality.[22] In 2015 Laura Robinson, et al. observed that "the relationship between digital inequalities and other forms of inequality"

18 International Telecommunication Union; Emily A. Vogels, "Digital Divide Persists Even as Americans with Lower Incomes Make Gains in Tech Adoption," *Pew Research Center* (blog), June 22, 2021, https://www.pewresearch.org/fact-tank/2021/06/22/digital-divide-persists-even-as-americans-with-lower-incomes-make-gains-in-tech-adoption.

19 Joseph Johnson, "Number of Internet Users in EU Countries as of December 2020," *Statista*, July 21, 2021, https://www.statista.com/statistics/252753/number-of-internet-users-eu-countries/.

20 Zoe Kleinman, "Internet Access: 1.5m UK Homes Still Offline, Ofcom Finds," *BBC News*, April 28, 2021, sec. Technology, https://www.bbc.com/news/technology-56906654.

21 OECD, "Understanding the Digital Divide" (Paris: OECD, January 1, 2001), 5, https://doi.org/10.1787/236405667766.

22 Don Tapscott, *The Digital Economy: Promise and Peril In The Age of Networked Intelligence* (New York: McGraw-Hill, 1997).

was still largely unappreciated, finding that "digital exclusion" impacts underrepresented groups and those with economic disadvantages.[23]

Given these facts, it is easy to be drawn in by digital divide misconceptions.[24] One misconception is toward narrowly defining the *digital divide* itself, that it is merely a "problem of access to IT."[25] Author and professor, Lisa Servon, argued that it is a tripartite problem, where "access, training, and content" are all interrelated creating skill in the Information Age. Policies that disregard the latter cannot solve the digital divide.[26] Servon also argued that digital technologies should not be seen as a cure all, a quick fix to alleviate social problems, and technology use must be "combined with other first-order resources (such as food and housing)" and "second-order resources (such as economic literacy and education)" to truly empower low-income households and those below the poverty line.

Misconceptions can also surround what exactly household "internet access" is, and how to define it. It can depend on what type(s) of device(s) an individual or household owns. And without disposable income, buying and keeping up with electronics' maintenance can be financially prohibitive. Some organizations like Los Angeles- and Detroit-based organization Human I-T, and London-based organization The Restart Project, have dedicated their time to repairing devices and distributing them to those in need. There are strong design and sustainability advantages to diverting donated desktop computers, laptops, mobile phones, and Wi-Fi hotspots that would otherwise have become e-waste. Human I-T has recognized that "a device and the Internet are only as valuable to someone as their ability to use it without interruption", and has provided free "rapid-response" technical support.[27] The Restart Project has also hosted educational "Restart Parties" where attendees can "teach each other how to repair their broken and slow devices," improving Internet access

23 Laura Robinson, Shelia R. Cotten, Hiroshi Ono, Anabel Quan-Haase, Gustavo Mesch, Wenhong Chen, Jeremy Schulz, Timothy M. Hale and Michael J. Stern, "Digital Inequalities and Why They Matter," *Information, Communication & Society* 18, no. 5 (May 4, 2015): 570, https://doi.org/10.1080/1369118X.2015.1012532.

24 See Lisa Servon, "Four Myths about the Digital Divide," *Planning Theory & Practice* 3, no. 2 (January 1, 2002): 222–27, https://doi.org/10.1080/14649350220150080.

25 Servon, 225.

26 Servon, 225.

27 Human I-T, "Tech Support," accessed June 25, 2022, https://www.human-i-t.org/tech-support-overview.

through hands-on community repair as a type of repair activism to improve product longevity and increase access.

A more bureaucratic feature of Internet access can depend on national or regional specifications of Internet speeds. Internet speeds are another dimension of digital inequality, and speed data has been historically unreliable in different regions.[28] In the US, for instance, high-speed Internet is defined by the federal government. Essey Workie, Director of Human Services Initiative at the Migration Policy Institute (MPI), has noted that a "bipartisan group of [US] senators and experts argue that the minimum speed is outdated and inefficient and should be raised."[29] MPI, who has worked to improve digital access and technology adoption among three US refugee resettlement programs, and first- and second-generation immigrant youth, have also seen that data caps and poor signals may affect service making it not continuous or reliable. This issue can also amplify disparities.[30]

Beyond these constraints, some individuals and communities have other reasons for staying unplugged. Some people with disabilities might use the Internet less frequently due to "accessibility barriers," like vision and hearing impairments.[31] Designers can play a proactive role in addressing readability, color contrast, and adding text alternatives (or alt text) to objects like images, tables, and video. Some people have mental health issues while In some cases, communities may limit Internet use for religious or political reasons.[32] Researcher, Jan Van Dyke, has also pointed out that some misconceptions about the digital divide can stem from the term "digital divide." Its oversimplification and depiction of "absolute inequalities" when it is more nuanced, could be related to a lack of "immaterial, material, social, and educational" technological resources. This lack of resources can mean different things to different people.[33] The need for reliable and varied digital resources

28 International Telecommunication Union, "Measuring Digital Development."

29 Essie Workie, Migration Policy Institute, interview by author, online, April 12, 2022.

30 Workie.

31 U.S. Department of Justice Civil Rights Division Disability Rights Section, "Guidance on Web Accessibility and the ADA," March 18, 2022, https://www.ada.gov/resources/web-guidance.

32 Jan A. G. M. van Dijk, "Digital Divide Research, Achievements and Shortcomings," *Poetics*, The digital divide in the twenty-first century, 34, no. 4 (August 1, 2006): 221–35, https://doi.org/10.1016/j.poetic.2006.05.004.

33 Van Dijk.

was especially evident during Covid-19 pandemic stay-at-home orders, with a lot of resource limitations exposed in a time of crisis.

Going Virtual in a Time of Crisis

When families went on stay-at-home orders during the Covid-19 pandemic, it quickly became clear that not all households had the same social protections. Children learning remotely, arguably, became the "biggest victims" of this crisis.[34] While some households felt fatigued by the overuse of technology turned to baking, gardening, and hands-on activities to offer some relief from extended periods of time on Zoom, and other learning management systems (LMS). Unfortunately, others could not find an affordable and reliable online connection.

Before the pandemic, many students were already in a precarious situation, and did not have adequate Internet access or the sufficient skills to use digital technologies.[35] Even decades after Internet adoption, it became increasingly clear that successful information and communication technology (ICT) programs were more challenging to design, execute, and maintain than many organizations originally anticipated. The Internet Society discovered that, for example, lack of "locally relevant content" and students' skills limitations meant that the design of ICT programming was not always as useful as it could be.[36] Ogunode Niyi Jacob, et al. conducted research on ICT programming in Nigeria. Challenges such as lack of funding to cover the cost of maintaining ICT facilities, sporadic electric power supplies, insufficient teacher training, and education policies were addressed in order to enhance programs.[37]

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34 UNICEF, "COVID-19 and Children," accessed June 25, 2022, https://data.unicef.org/covid-19-and-children.

35 Internet Society, "Internet for Education in Africa: Helping Policy Makers to Meet the Global Education Agenda Sustainable Development Goal 4," *Internet Society* (blog), April 11, 2017, https://www.internetsociety.org/resources/doc/2017/internet-for-education-in-africa-helping-policy-makers-to-meet-the-global-education-agenda-sustainable-development-goal-4.

36 Internet Society.

37 Ogunode Niyi Jacob, Okwelogu Izunna Somadin, Yahaya Danjuma M, and Olatunde-Aiyedun, T. G., "Deployment of ICT Facilities by Post-Basic Education and Career Development (PBECD) During Covid-19 in Nigeria: Challenges and Way Forward,"

Before the pandemic, those in need of Internet access could supplement it by going to Internet cafes, libraries, and public and commercial access telecentres. Telecentres, such as those in rural parts of India or access points developed by the Asia-Pacific Telecentre Network (APTN), are frequently run by non-profit organizations. Internet cafes have become fairly ubiquitous globally, and operate as niche businesses. Sometimes cafes are family-owned and function as mixed-use developments with bookstores and coffee shops on the premises.[38] In their research about Internet cafes throughout Africa and Asia, Bjørn Furuholt and Stein Kristiansen found that cafes could provide some relief by providing Internet access points to "a wide range of users" not only as locations for gaming and socializing[39] but also for "information retrieval and research."[40]

When the pandemic disrupted traditional face-to-face classroom education, it also cut off access to some alternative services like cafes. The pandemic also tested the feasibility of accessing virtual education services. As cities and entire countries went into lockdowns, youth in lower quality housing with poor energy supplies and unreliable Internet connections simply could not sustain remote learning, and parents along with their children were suddenly faced with "navigating the increasingly digital environment."[41] This proved to be much harder for those "without savings or safety nets" and interrupted school enrollment as well.[42]

In light of in-person closures and rising unemployment, some students had to drop out of school altogether. This was the case for more than half a million university students in the US who had to discontinue their education.

International Journal of Discoveries and Innovations in Applied Sciences 1, no. 5 (October 6, 2021): 19–25.

38 Nimmi Rangaswamy, "Telecenters and Internet Cafés: The Case of ICTs in Small Businesses," *Asian Journal of Communication* 18, no. 4 (December 1, 2008): 365–78, https://doi.org/10.1080/01292980802344208.

39 Internet cafes have become particularly popular as multiplayer gaming cafes throughout Asia, and as sweepstake parlors in Southern regions of the US.

40 Bjørn Furuholt and Stein Kristiansen, "Internet Cafés in Asia and Africa – Venues for Education and Learning?," *The Journal of Community Informatics* 3, no. 2 (September 14, 2007), https://doi.org/10.15353/joci.v3i2.2379.

41 Vogels, "Digital Divide Persists Even as Americans with Lower Incomes Make Gains in Tech Adoption."

42 Benigna Boza-Kiss, Shonali Pachauri, and Caroline Zimm, "Deprivations and Inequities in Cities Viewed Through a Pandemic Lens," *Frontiers in Sustainable Cities* 3 (2021): 15, https://doi.org/10.3389/frsc.2021.645914.

Even after some safety measures were implemented, "rates of Black, Hispanic, and Native American students returning to college were lower than of White students."[43] In their report on how the "COVID-19 crisis pushes students into an uncertain job market," Wan-Lae Cheng, Jonathan Law, and Duwain Pinder observed that around half of the Black men enrolled" at Southwest Tennessee Community College, or 826 students, dropped out between the Spring 2020 and Fall 2020.[44]

Community Tech NY Portable Network Kit (PNK) build event with the community organization El Puente.[45]

43 Wan-Lae Cheng, Jonathan Law, and Duwain Pinder, "COVID-19 Pushes US Students to Drop out and Fall into Unemployment" (McKinsey & Company, 2021), https://www.mckinsey.com/featured-insights/sustainable-inclusive-growth/future-of-america/covid-19-crisis-pushes-us-students-into-an-uncertain-job-market.

44 Cheng, Law, and Pinder, as reported by Southwest Tennessee Community College president Tracy Hall.

45 Community Tech NY, Photograph, 2022.

What happened in the US mirrored other global school discontinuation trends across secondary schools and colleges. For example, as many as "seven million university students in Africa could not continue their education in 2020."[46] In Spain and Italy, which already had some of the highest dropout rates in Europe,[47] school closures saw social workers overwhelmed with dropout cases, and lack of Internet access factored in sharply.

For the organization Community Tech New York (CTNY), which works to create "community-owned Internet infrastructure" since 2011, it was clear that the pandemic had intensified inequities and demonstrated that "the Internet is a lifeline for many, particularly the most vulnerable."[48] CTNY saw students and teachers searching for public Wi-Fi spots in order to attend classes while relying entirely on their phones, with connections that were "inadequate or unavailable at home."[49] As medical resources opened up during the pandemic, CTNY also observed that some community members without devices or digital literacies, or both, were also unable to access vaccines, medical appointments, and other medical services.

MPI, who works "to improve immigration and integration policies"[50] has been involved in ongoing work to improve "digital access and adoption to three refugee resettlement programs". This was accomplished through partnering with state library systems in Arizona, Maryland, and North Texas to provide affordable broadband services, and to refurbish and distribute laptops to refugee households with organizations such as the Baltimore Digital Equity Collective.[51] Seeing similar issues as CTNY, they observed that the pandemic amplified health and mental health risks while testing schools and immigrant-

46 Isabel Neto and Michel Rogy, "Too Many Africans Cannot Access the Technology They Need. A World Bank Initiative Aims to Help Reverse That," *World Bank Blogs* (blog), September 22, 2021, https://blogs.worldbank.org/digital-development/too-many-africans-cannot-access-technology-they-need-world-bank-initiative-aims.

47 Emma Bubola, "Italy's Problem With School Dropouts Goes From Bad to Worse in Pandemic," *The New York Times*, April 26, 2021, https://www.nytimes.com/2021/04/26/world/europe/italy-schools-covid-dropouts.html; Mostafa Mashhad, "Combatting School Dropout in Europe," United Way Worldwide, August 4, 2021, https://www.unitedway.org/blog/combatting-school-dropout-in-europe.

48 Community Tech NY, interview by author, online, April 11, 2022.

49 Community Tech NY.

50 "About the Migration Policy Institute," May 24, 2013, https://www.migrationpolicy.org/about/about-migration-policy-institute.

51 Essie Workie, Migration Policy Institute, interview by author, online, April 12, 2022.

serving organizations to their absolute capacities. Challenged to quickly transition to a remote format, many educators found themselves in a position to take on responsibilities like distributing devices, designing tutorials to teach students to use digital tools, and connecting students to basic goods like food and toiletries.[52] For Irin Akter, a teacher at the UNICEF-supported Surovi Learning Centre in Bangladesh, one way to support her students during the pandemic and through a school reopening campaign also meant taking online teacher training courses on her mobile phone to better support her students.

Irin Akter, a teacher at the Surovi learning Centre in Bangladesh, enrolled in online courses to learn how to support her students, September 20, 2020.[53]

In terms of usability design, MPI also saw that many LMSs were not designed for immigrant-origin students who primarily access their learning content on their mobile devices. MPI also found that on the onset of the pandemic, many educators lacked specialized teacher training and "expertise

52 Workie.

53 Paul Tapash and UNICEF, Photograph, "School Reopening Campaign," 2020.

with digital learning for English learners (EL)."[54] The pandemic also uncovered a gap in the breadth of resources available to EL versus general education educators in need of digital learning resources. Their 2020 report "Educating English Learners during the COVID-19 Pandemic: Policy Ideas for States and School Districts"[55] indicated that English learners had the additional burdens of language barriers, fear of accessing medical assistance, and "without persistent school engagement, ELs' English language development may stall."[56]As noted by MPI, English learners were already "among the students at the greatest risk of dropping out" even before the pandemic, highlighting an important at-risk group in need of more prioritization for increased learning time and digital skills development.

The challenges described by MPI and CTNY, which only represent a small sample of the wide-ranging threats to equitable digital access, emphasize the unceasing need for more comprehensive interventions to help communities get the digital learning resources they need, pointing to the fact that digital transformation challenges are both design challenges and pedagogical issues. Nevertheless, there is a way forward, and in many ways, digital access is a design problem, and a digital justice issue to be continually addressed in years to come.

Design, Digital Equity, and a Way Forward

Closing the digital divide and improving digital access is a massive challenge. Digital access has become a matter of digital equity, where designing access initiatives are much needed to create the fundamental pathways to better education, employment, social, and cultural opportunities which are created by MPI and CTNY. According to the Digital Equity Laboratory (DEL), founded in 2017 by Civil Rights lawyer and activist, Maya Wiley, , digital equity should aim to achieve "inclusive and healthy social, economic, educational, and civic outcomes for people of all races, incomes, genders and gender identities, and

54 Essie Workie, Migration Policy Institute, interview by author, online, April 12, 2022.

55 Julie Sugarman and Melissa Lazarín, "Educating English Learners during the COVID-19 Pandemic: Policy Ideas for States and School Districts," Policy Brief (Migration Policy Institute, 2020), https://www.migrationpolicy.org/sites/default/files/publications/mpi-english-learners-covid-19-final.pdf.

56 Sugarman and Lazarín, 6.

backgrounds," while ensuring affordable access, and "should not reinforce or exacerbate harms and risks for vulnerable groups."[57] Sharing a similar view, CTNY has described digital equity through the lens of "digital justice," which means that CTNY "prioritizes the participation of people who have been traditionally excluded from and attacked by media and technology."[58]

The public's conception of digital equity and digital justice is relatively new. However, it relates to a long history of structural inequalities such as discriminatory practices like redlining, insufficient investments in public infrastructure development, and the growth of telecommunication company monopolies.[59] In his research on "enhancing digital equity," Massimo Ragnedda remarked that digital inequalities expand with the growth of digital services and products, and algorithm designs and predictive modeling can rationalize and normalize social injustices when designed unethically.[60] He calls it the "algorithmization " of society. Ragnedda stresses the importance of promoting digital equity, stating that there is a need to "rethink the design process" to protect sensitive data like personal information.[61]

In a climate complicated by a pandemic and ongoing resource and information wars,[62] it has been promising that design-led interventions have been rethought to prioritize digital access and combat digital inequality. Furthermore, as noted by CTNY, the pandemic has also helped communities to see that the "digital divide exists" and directly impacts so many people, and this paves "the way for digital justice."[63] Through the pandemic, organizations, designers, and educators have created collaborative approaches to solving digital access challenges. Interventions like maps of free Wi-Fi hotspots, free or subsidized home Internet connection programs, lending programs, and digital skills programs were crucial to people's wellbeing, providing

57 "Our Story," Digital Equity Laboratory, accessed June 26, 2022, https://www.digitalequitylab.org.

58 Community Tech NY, interview by author, online, April 11, 2022.

59 Community Tech NY.

60 Massimo Ragnedda, *Enhancing Digital Equity: Connecting the Digital Underclass* (Cham, Switzerland: Palgrave Macmillan, 2020), 2.

61 Massimo, 6.

62 Kate M. Murray, "Digital Equity In Access To Justice" (Vancouver, BC: Legal Services Society, BC, October 2021), https://legalaid.bc.ca/sites/default/files/inline-files/Murray_2021_LABC_Achieving_Digital_Equity_Final_Report_0.pdf.

63 Community Tech NY, interview by author, online, April 11, 2022.

sustenance during long periods of psychological and financial distress.[64] The City of Los Angeles partnered with organizations EveryoneOn and the California Emerging Technology fund to offer low-cost devices, low-cost Internet access, and financial literacy coursework.[65] The City of San Jose in California, partnered with "AT&T, Verizon, and Mobilitie to invest $1.5 million in providing 4,200 small-cell wireless network antennas on streetlight poles."[66] This partnership with the City of San Jose has made additional announcements to become one of the first cities in the US to pledge to close the digital divide and "connect 50,000 San José households with universal device access and universal connectivity at speeds of at least 25 Mbps download/3 Mbps upload over the next 10 years."[67]

Some nations have already taken significant steps to design and implement universal connectivity or a universal service obligation (USO), with Switzerland becoming one of the "first nations to include broadband Internet access as a component of their USO."[68] In Botswana, plans to deploy mass Wi-Fi, or a Wi-Fi "blanket" have been piloted by the Botswana Telecommunications Corporation (BTC) initially in cities like Francistown, Gaborone, and Kasane. Where reliable Internet access has not been possible, some communities have embraced broadcast media like "edutainment" television and radio, emphasizing that even while the world goes online and media continues to digitize, there is also value in designing alternative types of media. In their research about educational television use during the pandemic, Sharon Zacharia and Alex Twinomugisha found that while many countries, particularly developing ones, have been using educational television since the 1950s—countries recently found innovative ways to utilize television networks.[69] Ubongo, for example, was incorporated in thirty-three

64 National Digital Inclusion Alliance, "Local Government COVID-19 Digital Inclusion Response," accessed June 26, 2022, https://www.digitalinclusion.org/local-government-covid-19-digital-inclusion-response/.

65 National Digital Inclusion Alliance.

66 National Digital Inclusion Alliance. Also see "Programs," EveryoneOn, accessed June 26, 2022, https://www.everyoneon.org/programs.

67 San José Digital Inclusion Partnership, "About,"accessed June 26, 2022, https://www.sjdigitalinclusion.org/about.

68 Swisscom, "Fulfilling Universal Service Obligations," SES, July 16, 2020, https://www.ses.com/case-study/swisscom.

69 Sharon Zacharia and Alex Twinomugisha, "Educational Television during COVID-19: How to Start and What to Consider," *World Bank Blogs*, April 24, 2020, https://blogs.wo

African countries to deliver educational content. State- and private-broadcast networks were identified to broadcast a mix of live and pre-recorded content throughout Morocco, Mexico, South Africa, and Spain, with live content being particularly effective in "countries with limited or no education television experience."[70]

The COVID-19 pandemic was not the first twenty-first-century pandemic, but it far exceeded the 2009–10 Swine Flu (H1N1) and the 2002–2003 severe acute respiratory syndrome (SARS) outbreaks. While difficult to pinpoint the timing, there could be another pandemic and meanwhile climate-related disasters have surged—all of which can disrupt work and school for prolonged times. Thoughtfully designed digital products have proven to play a successful role in aiding communities. These products and interventions have empowered the rapid submission of information about possible earthquakes in "sparsely equipped regions" on Twitter.[71] It has enabled citizens to use Facebook's "Safety Check" feature[72] to let family and friends know their locations. Facebook's Safety Check expanded for non-natural disasters during the Paris terrorist attacks of 2015.[73] Najeeb Abdulhamid, et al. have also cited how social media has enabled the organization of community clean-ups after the 2011 London riots, enabled outreach to financial donors, allowed the formation of digital volunteer groups, and the use of crisis mapping to aggregate data on reported needs for water, food, medical care, and shelter in affected areas during natural and non-natural crises. While not exhaustive,

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rldbank.org/education/educational-television-during-covid-19-how-start-and-what-consider.

70 Zacharia and Twinomugisha.

71 Oya Benlioglu Gulesan, Emrah Anil, and Pinar Sarisaray Boluk, "Social Media-Based Emergency Management to Detect Earthquakes and Organize Civilian Volunteers," *International Journal of Disaster Risk Reduction* 65 (November 1, 2021): 102543, https://doi.org/10.1016/j.ijdrr.2021.102543. Other emergency response products have included major social media platforms like Twitter, Facebook, and Telegram, and niche apps like Zello's push-to-talk walkie-talkie app and safety and location-sharing app Namola. Among platforms, Twitter has a longer history of use in disaster and crisis relief to transmit critical information, used by government agencies, media, citizens, and NGOs.

72 Facebook, "Crisis Response," accessed June 26, 2022, https://www.facebook.com/about/crisisresponse/v2.

73 Tajha Chappellet-Lanier, "A New Use for Facebook's Safety Check," *The Atlantic*, November 14, 2015, https://www.theatlantic.com/international/archive/2015/11/facebook-safety-check-paris/416028.

these are a few examples of design and collaboration made possible just through having a reliable connection.

The growth of digital inclusion resources is promising, but to truly see the advancement of digital equity, design must play an integral role. Designers must consider all the ways that digital products and services are differentially accessed and whether that has implications for design choices selected for under-resourced users. In the most challenging moments of the pandemic, successful designs have, arguably, reframed the public understanding of the digital divide. Communities must take the necessary steps to become more technologically literate, creative, and innovative, particularly when it comes to digital access. CTNY director Monique Tate described, "Digital transformation means supporting community members to identify their own potential and genius when it comes to technology. Sometimes, we see community members who may not recognize themselves as technologists, but have been inspired to tap into their natural abilities and to build their own confidence. This transformation happens when these communities go beyond textbook education and book knowledge, and are empowered to create their own technologies."