CSCI 77800 - Ethics and Computer Science
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Introduction

The digital divide is a major source of inequity in the United States. According to Robinson, Schulz, Blank, et al. (2020), research in the field on the digital divide focuses on 3 main components: access, use, and outcomes. Robinson et al.(2020) share how the term “Digital Divide” was first coined in1995 by the National Telecommunications and Information Administration (NTIA) in an article titled “Falling through the Net: A survey of the ‘have nots’ in rural and urban America.” This first report covered what Robinson, Schulz, Blank, et al. (2020) refer to as the “first-level digital divide” which is concentrated on who had or did not have access to hardware, such as computers, and Internet access. The “first-level digital divide” research also presented how demographic data would predict certain groups’ access to the Internet. Robinson, Schulz, Blank, et al. (2020) explain that over time the body of research on the digital divide shifted to shine a lens on who was able to effectively use digital technologies.

This second wave of research, referred to by Robinson, Schulz, Blank, et al. (2020) as the “second-level divide,” illuminates participatory inequities that exist in how the Internet is used, users’ digital skill level, as well as demographic data that might predict proficiency or lack thereof in these two areas. Robinson, Schulz, Blank, et al. (2020) purport that the research in these first two levels of the digital divide, that address access, usage and skill level, are all “inputs” and therefore do not reflect the “outcomes” of those “inputs,” such as information research and learning that could advance a user’s income or influence in society. Studies completed with research questions surrounding these “outcomes” characterize what Robinson, Schulz, Blank, et al. (2020) call the “third-level digital divide.” Robinson, Schulz, Blank, et al. (2020) found that these studies showed a consistent pattern of users of more privileged backgrounds using the Internet to increase their capital.

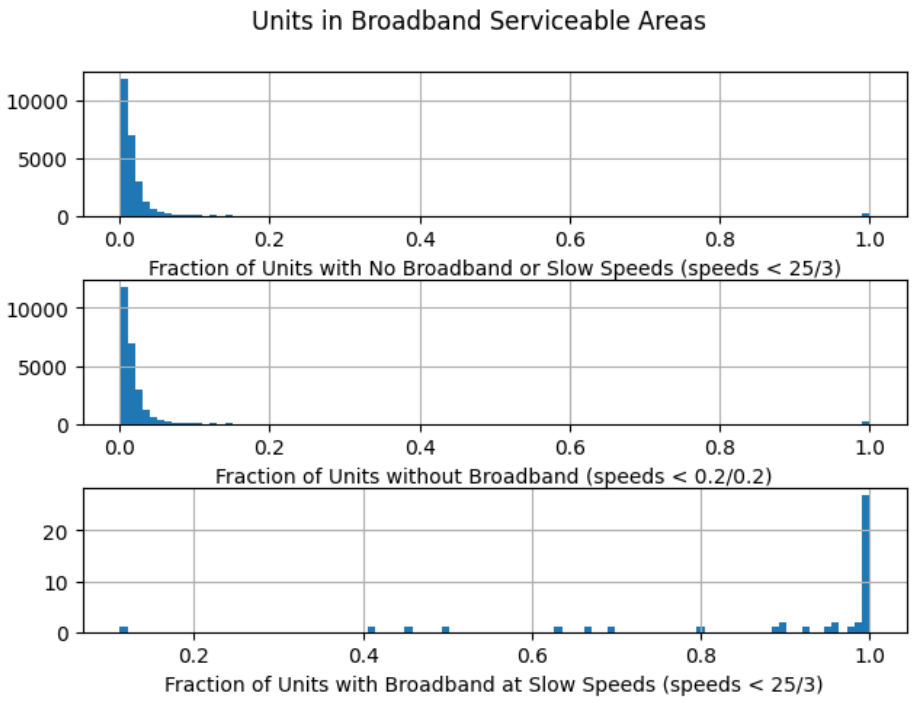
More than twenty-five years after the concept of the digital divide was first introduced, Robinson, Schulz, Blank, et al. (2020), claim that the 3 levels of the digital divide that emerged out of the initial body of research, remain. Robinson, Schulz, Blank, et al. (2020) refer to these 3 levels as “legacy digital inequalities”. Robinson, Schulz, Blank, et al. (2020) contend that “legacy digital inequalities persist vis-à-vis economic class, gender, sexuality, race and ethnicity, aging, disability, healthcare, education, rural residency, networks, and global geographies”. They maintain that while these “legacy digital inequalities” continue to exert a stronghold, that emergent forms of inequality are presenting themselves alongside the “legacy digital inequalities” uncovered in the initial body of research (Robinson, Schulz, Blank, et al., 2020).

Robinson, Schulz, Blank, et al. (2020) conceived of the term “digital inequality stack,” inspired from the computing stack. They share that just as the computing stack includes multiples layers: operating system, network, software, and user interface that must work together, similarly, there must be a partnership between the multiple layers of access, skills and usage in order to result

in better outcomes (gains in societal influence, financial growth and digital inclusion) for more people, thereby lessening the digital divide gap (Robinson, Schulz, Blank, et al., 2020).

One of the key underlying issues causing the divide is the lack of or inconsistency of quality Internet access. Browning (2021), describes the Internet as “the infrastructure of life” with Covid-19 resulting in more experiences like jobs and schooling, both K-12 and higher education moving online. According to Browning (2021), FCC (Federal Communications Commission) estimates show that 21 million Americans do not have access to broadband internet. Broadband internet is defined, by the FCC, as reliable and high-speed, meaning “download speeds of at least 25 megabits per second (Mbps) and upload speeds of at least 3 Mbps” (Browning, 2021). Browning (2021) claims that these numbers may in fact be an egregious underestimation. Browning (2021) argues that Microsoft, in its most recent reports, disclosed that “162.8 million Americans are not using the internet at broadband speeds.” What is more alarming is that “research shows that 40% of schools lack broadband, and 60% of healthcare facilities outside of metropolitan areas lack access.” (Browning, 2021).

The graphs below were generated from data provided to the FCC by internet service providers (ISPs). There are some shortcomings to the data used, namely that they represent only broadband serviceable areas (therefore neglecting areas that currently do not have access). Furthermore, ISPs can report that a census block is “covered” if they provide service to even one house in that census block. This results in significant underestimation of Americans without internet service (Busby & Tanberk, 2022). The graphs show that a true lack of service is a more pressing issue than slow speeds, even according to ISPs; the fact is that if tens of thousands of supposedly “serviced” residences are not actually able to get service according to the providers themselves, the issue is likely much more widespread.



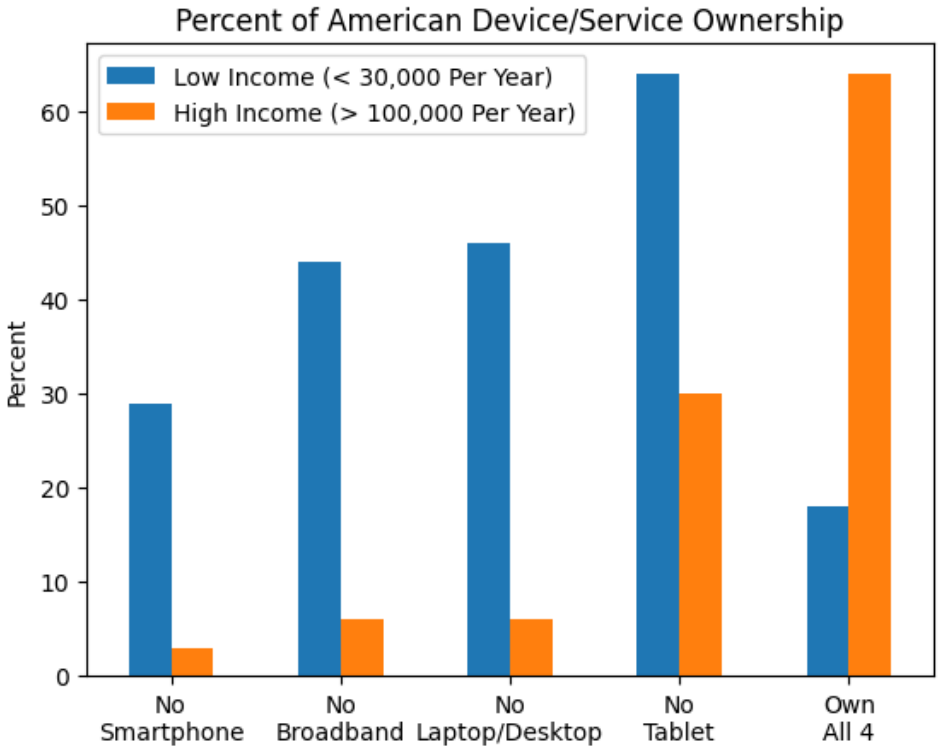
(FCC, 2022).

The best approach to alleviating the access level component of the digital inequality stack, what Robinson, Schulz, Blank, et al. (2020) refer to as the “first-level digital divide”, is to regulate internet access as a public utility. Browning (2021) asserts that the Federal Communications Commission (FCC) currently categorizes broadband as an “information service” rather than telecommunications. The result of this delineation is that the FCC has little power in regulation of information services versus telecommunications services. Changing how internet access/broadband service is defined would allow for oversight and regulation of the construction, maintenance, and resilience of internet infrastructure, as well as cost to consumers (Crawford, 2019). State public utility commissions are government agencies that have the responsibility of ensuring that utility services are reliable, resilient, and available. The degree of management and supervision of services varies depending on the industry and state.

The FCC actually did reclassify broadband as a utility in 2015, for the sake of enforcing net neutrality. The term “net neutrality” refers to a collection of rules preventing ISPs from blocking or slowing down applications or websites, as well as from offering prioritized consumer access to those sites in exchange for payment (Brodkin, 2020). The FCC ultimately did not take any other regulatory actions to manage costs, but even these limited protections were repealed in 2018 (Brodkin, 2018).

Background - what is the digital divide, and why is it a problem?

The digital divide has very real and tangible consequences across multiple demographic groups, which is why it is so important that it be addressed. For example, the data and statistics in the U.S. Pew data illuminate stark differences in level 1 access “between Americans earning less than $30,000 per year and those earning more than $100,000 per year”. (Robinson, Schulz, Blank, et al., 2020)



(Anderson and Kumar, 2019)

In conclusion, those who are economically advantaged use the Internet for a greater variety of purposes and in more skilled ways that have an informational or service focus than those who are economically disadvantaged who on average use digital resources for entertainment (Bonfadelli, 2002; Peter and Valkenburg, 2006 as cited in Robinson, Schulz, Blank, et al., 2020).

The digital inequality stack also has an affect on digital health technologies and the positive outcomes of lack there of for particular populations. According to Kvedar, et al. (2014), digital health technologies have quickly risen in number and usage and are an important part of the puzzle in the improvement of healthcare and promoting healthier life habits and choices (as cited in Robinson, Schulz, Blank, et al., 2020). Phelan (2010) states that new digital health technologies have little effect on social health inequities, as more advantaged populations, such as those in higher socio-economic brackets, are more likely to use and reap the benefits of these new technologies (as cited in Robinson, Schulz, Blank, et al., 2020).

Additionally, educational inequities are linked to every layer of the digital inequality stack (Robinson, Schulz, Blank, et al., 2020). Robinson, et al. (2018) asserts that students in low income areas, that lack access to digital resources, have a lower chance of earning high grades and leveraging skill-building opportunities to gain advantages (as cited in Robinson, Schulz, Blank, et al., 2020). Furthermore, Drabowicz (2014) explains that occupations are being transformed by the information economy, requiring employers to seek employees highly skilled in digital literacies (as cited in Robinson, Schulz, Blank, et al., 2020). Robinson, Schulz, Blank, et al. (2020) argue that the probability of youth, from low socioeconomic backgrounds, taking STEM classes in college is low, despite being a group that would have the most to gain from employment in thes high-salaried professions. Moller, et al. (2015) contends that "STEM intent is positively associated with school-based and extracurricular enrichment activities as early as primary school."

Furthermore, inequalities represented across all three layers of the digital inequality stack reveal themselves when looking at the differences between rural and urban communities. Robinson, Schulz, Blank, et al. (2020) describe how Internet users in U.S. rural communities "not only lack high-speed Internet infrastructure but also have lower adoption levels of Internet devices compared to urban users." Robinson, Schulz, Blank, et al. (2020) found that, with resources and intervention, however, the negative effects of these differences in use and access for have and have nots, could be lessened. For example, Robinson, Schulz, Blank, et al. (2020) share how equipping disadvantaged populations in rural areas with improved Internet access and the computer classes helped close the digital gap for residents in Taiwan.
Moreover, inequities are also illuminated in individuals' abilities to maintain social and professional networks. Robinson, Schulz, Blank, et al. (2020) detail how individuals who spend no time or less time participating fully in digital networks live the consequences of becoming less connected to other individuals or groups. Conversely, those who are considered "networked" may have multiple and/or complex networks in which they connect with others who may have greater diversity of thought and resources. (Burt, 2001 as cited in Robinson, Schulz, Blank, et al., 2020). Hampton and Wellman (2018) explain how those with digital resources are able to create networks across large distances and can easily rekindle relationships through digital communication when those ties have faded (as cited in Robinson, Schulz, Blank, et al., 2020). They also afford the digital "haves" the potential to connect with a larger number of social networks (Hampton and Wellman, 2018 as cited in Robinson, Schulz, Blank, et al., 2020). It is not difficult for one to extrapolate how these larger and more diverse social networks, spread across greater distances, might serve as the underlying fabric in supporting the professional and social success of said digitally networked individuals.

The digital divide is not a problem that is localized to the United States. It is a global issue that research has illuminated across nations. Statistics from 2018 illustrate that the highest levels of Internet adoption and use exist in North America, with a 95 percent adoption/use rate, and Europe, with an 85 percent adoption/use rate. The data story in Africa and Asia, however, unveils a very different reality, with adoption/use rates reported at 36 percent for Africa and 49 percent for Asia (Robinson, Schulz, Blank, et al., 2020). These divides, which researchers continue to seek solutions for, have consequences for individuals and nations such as reduced

quality of life and decrease participation in the global economy (Ragnedda and Muschert, 2013; Boas, et al., 2005 as cited in Robinson, Schulz, Blank, et al., 2020). Several key efforts include ICT4D (Information and Communication Technology for Development), One Laptop per Child, and the UN 2030 Agenda (Ragnedda and Muschert, 2013; Boas, et al., 2005 as cited in Robinson, Schulz, Blank, et al., 2020). Robinson, Schulz, Blank, et al. (2020) note that "National communication solutions must include improvement of literacy levels, professional education, multi-stakeholder cooperation, appropriate and flexible regulation, and user-friendly access to governmental and institutional information." They suggest that more research needs to be done on some of the social problems that digital technologies are creating, or emergent digital divides, such as the uneven distribution of digital production and consumption as well as the exploitation of digital laborers (Robinson, Schulz, Blank, et al., 2020). Robinson, Schulz, Blank, et al. (2020) assert that these issues are "the new face of global digital inequality."

The Ethics

There is no question that the digital divide is complex and encompasses many interconnected components (Robinson et al., 2015; Sanders & Scanlon, 2021; Winslow, 2019). In order to tackle the majority of these components in the US, we must first establish broadband (high-speed Internet) access to all. Further, based on the research reviewed and the execution of communities with documented success, we propose that broadband be established as a utility in the US as the best approach to ensure broadband access reaches every household across the country.

In 2016, the United Nations General Assembly declared access to the Internet a fundamental human right. Since then, access to reliable broadband has been essential for the US in the 21st century (Sanders & Scanlon, 2021). Access to information, public services, health care, education, income, and communication increasingly depend on reliable internet access. It is important to note that "reliable internet access" or "broadband" is defined as "high-speed, reliable internet with actual download speeds of at least 25 megabits per second (Mbps) and upload speeds of at least 3 Mbps" (Winslow, 2019).
Broadband as a Utility is an Ethical Solution

The COVID-19 pandemic increased the urgency of the need for connectivity for all Americans. The protocols for social distancing, quarantine, and closures transformed daily life. The public reliance on technology experienced exponential growth as more and more activities transitioned to fully remote, virtual, and online or app-based. Basic daily tasks such as shopping, banking, staying in touch with family and friends, working and schoolwork suddenly required access to broadband and were a challenge for people who did not have access. With the increased reliance on uninterrupted high-quality internet access in households across the country, broadband became a necessity to be a productive member of society.

Nevertheless, broadband remains elusive to the public as either too expensive or out of reach for millions of people (FCC, 2019; Sanders & Scanlon, 2021). The Federal Communications

Commission (FCC) deployment report (2019) estimated that roughly 3 out of every ten people in the US, or 21 million Americans, still do not have broadband internet access (27% of rural and 2% of city residents). This problem goes further when the FCC data is flawed and the number is much higher (Robinson et al., 2015; Sanders & Scanlon, 2021; Winslow, 2019). An independent study by Microsoft (2019) found that 162 million people in the US are not using the Internet or do not have broadband speed, agreeing that most of those without access are in rural areas.

Consumer Reports surveyed Americans to measure the importance of Broadband Internet. Results showed that 75% of Americans rely on consistent access to services provided by their ISP (internet service provider) to carry out their daily activities seven days a week (Winslow, 2019). In addition, 76% of Americans surveyed agree (or strongly agree) that internet service is as essential as electricity or water service in today's world (Winslow, 2019). The majority of Americans feel that some regulated community-centered broadband should be allowed to ensure that broadband access is treated like other vital infrastructures, give everyone equal access, and have it maintained (Reddick et al., 2020).

While Internet access has grown overall, significant differences for historically marginalized groups, including low-income, (non-Asian) minorities, the elderly, the disabled, and adults with limited education, persist. Many low-income Americans lack access because they cannot afford the monthly bills that come with connecting a computer to high-speed Internet.

As an essential infrastructure to participate and function in society, broadband places those without access or adoption in the digital divide (Robinson et al., 2015). The ethical concern here, coined by the term "digital redlining," is that those groups which have been historically marginalized are disproportionately represented in the digital divide (Sanders & Scanlon, 2021). Digital redlining creates a vicious cycle and widens the gap between the haves and the have-nots, with the same groups losing out on opportunities for education, job, and career readiness skills and advancement, income, and information that would increase community and even civic engagement (Sanders & Scanlon, 2021).

Some argue that these groups would not benefit from full access because they would not utilize it. This argument is why we are clear that our proposal for broadband as a utility in the US is only the first step. Broadband adoption refers to the extent to which US households subscribe to and use broadband when available(Sanders & Scanlon, 2021). Populations that continue to lag in broadband adoption are people with low income, unemployed, the elderly, minorities, multilingual, less educated, single adult households, and adults with limited education (Sanders & Scanlon, 2021). Once again, this creates a vicious cycle of digital redlining. Of course, not having the digital literacy skills or equipment will decrease the likelihood of broadband adoption. However, they are more likely to seek programs to acquire digital literacy skills or motivation to acquire equipment (there are charitable and non-profit organizations that can help) with broadband access.

Whether living in rural areas or part of the marginalized population of households without access, children are also paying the price. A 2015 center report found that 35 percent of lower-income households with children in school did not have a broadband connection at home (Winslow, 2019).

This disparity in access is also seen in what researchers call the “homework gap”—the differences between school-age children who have access to high-speed Internet at home and those who don’t (Winslow, 2019). Without broadband, kids are left behind,” says Schaffer. The Pew Research Center reported in May that 44 percent of adults in households with incomes below $30,000 don’t have broadband (Winslow, 2019).

Regulating broadband as a public utility would allow better allocation of state and federal funding to ensure that expanding internet connectivity does not fall solely within the control of ISPs. Under the current system, they have no incentive to expand service to low-population areas; the expense of laying down infrastructure is not financially worth the limited profit they can earn from a location (Reddick et al., 2020). As a result, people in poverty and especially in minority ethnic groups are disproportionately affected by lack of broadband access. While access to the Internet has increased overall, access disparities for Blacks, Latinos, and Native Americans persist compared with Whites (FCC, 2019) (FCC 2020). For example, 78 percent of Whites nationally used the Internet in 2015, compared to 68 percent of African Americans and 66 percent of Hispanics. In rural areas, 70 percent of White Americans had adopted the Internet, compared to 59 percent of African Americans and 61 percent of Hispanics.

Opponents of regulating broadband as a utility argue that this solution does not address the problem; expanding broadband access is still expensive, especially in remote areas with dense forests and mountains (Wallsten, 2021). This can be improved by implementing a Dig Once policy, which mandates that fiber infrastructure should be installed while other right-of-way excavation is in progress. This can lead to significant cost savings of 25-33% in urban areas and about 16% in rural areas. A Dig Once policy is still under discussion in Congress, but has already been adopted by some state and local governments (Aman, 2020).

Furthermore, regulation as a utility would allow for control of consumer rates. In 2015, 73.3 million (almost a quarter of the nation’s population) lived in neighborhoods where access was possible, but in-home broadband subscription rates fell below 40% (Sanders & Scanlon, 2021). Residents cited cost as a reason, it is expensive and they simply cannot afford it (Sanders & Scanlon, 2021). Advocates for allowing the current free-market system for ISPs argue that regulating broadband as a utility creates monopolies, removing competition and therefore increasing costs (Downes, 2016).

However, many households already face a monopoly due to only one ISP providing service to their address. BroadbandNow, a research and data aggregation firm, says that the average price for broadband is about 15 percent lower for those living in an area with at least three providers compared with those with only one. And it’s 40 percent lower in the cities with the most competition (Winslow, 2019). ISPs that have a monopoly in an area (which often occurs in

rural areas) can charge essentially whatever they want; areas with two or more ISPs available consistently show lower rates, but no incentive exists for other ISPs to expand into these areas. Current federal financial support exists for laying fiber in locations where it is not already present, but there is no support for a second or third ISP (Schwantes, 2022). Even if such funding were available, laying fiber multiple times for different providers in locations where doing so is already expensive would be a tremendous waste of resources. Regulation as a utility would allow regulatory bodies to limit an ISP's ability to hike prices. It would not leave rural areas to the mercy of whatever single ISP received enough funding to make it worthwhile to build the infrastructure.

Additional case opponents of utility broadband make is that regulating broadband as a utility will stifle innovation and cause technological stagnation because of the lack of competition and limited profits. They point to electrical infrastructure as evidence of this (Downes, 2021). The problem here, however, is not that utilities are inherently immune to progress but rather that the United States struggles to fund the construction and maintenance of its infrastructure effectively. Experts and policymakers disagree on how best to address this, which slows down and often stops funding completely (McBride & Siripurapu, 2021). This is a policy failure, not a conceptual failure.

But expansion often comes down to how much will providing service cost and who will pay for it. And, as Sural notes, "Cable is labor intensive and not cheap." (Winslow, 2019). There is no question that the federal government and states are starting to invest funds to improve this situation, but there is no unity or plan. Research also shows that these efforts vary from state to state, with communities tailoring approaches to fit their unique needs (Winslow, 2019). The problem is that without a united effort the efforts are not reaching everyone equitably, "What policymakers need is a comprehensive overview of what's been tried and what's been successful, so they can continue to learn from one another," says de Wit (Winslow, 2019).

The economist's report, which helped spur the new funding, said: "Every dollar invested in broadband returns nearly 4 dollars to the economy. It's unusual to see returns that significant" (Reddick et al., 2020). A key difference here is that the money being returned to the economy does not equal profit for the ISP's(Reddick et al., 2020), this is a unique situation where for profit businesses making the investment are not receiving the returns(Reddick et al., 2020). Instead, by extending opportunities to residents that did not have access, returns are going back into the community, the economy, to society(Reddick et al., 2020). This is why establishing broadband as a utility can make a huge impact. There is no question that companies providing these services, the necessary labor, fiber, towers, and cables need to see a profit in order to achieve expansion, as a utility, these companies could receive returns from the community revenue rather than looking at profit margins based on one household at a time(Reddick et al., 2020).

We all need to work together for communities to thrive in the future. Making broadband a utility will give more Americans opportunities and fair chances. Only then can we determine the next phase necessary to eliminate the digital divide.

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