Higher Education, Digital Divides, and a Balkanized Internet

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Most of today’s educational technology depends on users having Internet access. Students, staff, and faculty must be online in order to participate in learning management systems, digital tests, student information systems, licensed databases, and the entire web. They not only must be reliably online but also need to do so through high-speed connectivity. The digitally networked world is increasingly predicated on users having broadband access.
Unfortunately, Internet access has remained deeply uneven and unequally distributed in the United States.\textsuperscript{1} This has serious implications for higher education. Inequitable digital connections can warp access to learning, which in turn can help drive and escalate social inequality. Indeed, the “new” digital divides—which create a Balkanized Internet—may constitute one of the most important issues confronting the U.S. higher education technology community.

A Short History of Digital Divides

Uneven Internet access is not a new problem. It has been an issue since the invention of the Internet in the late 1960s. With the inception of the U.S. Defense Department’s Advanced Research Projects Agency Network (ARPANET) in 1969, the number of computers, modems, connections, and nodes grew slowly through the 1970s and 1980s. Owning or otherwise having access to a networked computer was by no means ubiquitous. Although the burgeoning networked ecosystem gradually, then more rapidly, increased opportunities for access, those opportunities depended on who had access to the right combination of hardware, networking, and software. As connection speeds began to advance past dialup, they too were unevenly distributed, as per science fiction writer William Gibson’s famously cited observation that the future is already here—it’s just not evenly distributed yet.\textsuperscript{2}

By the 1990s, the importance and size of the Internet and its new face, the World Wide Web, became popularly recognized, as did inequalities of access. Accordingly, the United States took steps to identify and mitigate what many were referring to as the \textit{digital divide} by kicking off a generation of research, activism, policy development, and practice. Under the Clinton administration, federal and state government initiatives joined with nonprofits and businesses to expand Internet access across multiple fronts. The E-Rate program of 1996, for example, compelled telecommunications companies to divert resources in order to link public schools to the burgeoning Internet.

Efforts to address the digital divide continued in the first two decades of the twenty-first century, with the advent of programs such as One Laptop per Child and state-driven broadband initiatives. Meanwhile, Internet technology continued to change. Mobile phone access came belatedly to the United States after connecting much of the rest of the world, since America had both excellent land-line phone service and more Internet-connected computers than most other nations. But once it came, the cell phone revolution offered an alternative to land lines, fiber, and cable boxes. Maximum Internet speeds grew, partly through competition between Internet service providers (ISPs) and also due to research and development, with Internet2 serving as an advanced outlier. Public libraries became community Internet anchors, as librarians not only provided computers, networks, and software but also offered the widest possible range of user training and support. More and more of education, work, and life migrated online, especially once social media took off in popularity and usage. Richer media that required more bandwidth became increasingly popular: animated images, sound files (music and podcasts), streaming video, video-conferencing and webinars, software updates and downloads, and gaming. And yet, broadband remained less than ubiquitous throughout the 21st century. By May 2013, to pick one data point, only 70 percent of households had high-speed broadband\textsuperscript{1}—and “high-speed” was defined at a lower speed than what we expect now, in 2017.

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The Current Digital Divides

Where does the Internet access gap stand now, at the end of 2017? We can look back on these historical transformations and see that Internet access inequalities have altered in some ways while persisting in others. The concept continues to deeply determine our Internet experience, dividing it into uneven strata of user access and capacity.\textsuperscript{4}

Most of the forces that drive uneven Internet access have been at work for decades. To begin with, wealth and education often positively correlate with higher broadband use, as the more affluent and/or educated a family is, the more likely it is to have broadband at home and work. This makes intuitive sense when we think of the costs of laptop and
desktop computers and of the greater budgets of schools in wealthier districts. Poorer students have less access to computer science offerings, from classes to afterschool clubs. In addition, higher levels of educational attainment increase one’s likelihood of learning digital skills, as well as one’s chance of working in a field heavily dependent on the networked world.³

Wealth can drive familiarity with computation even more strongly than generational differences, as media scholar Siva Vaidhyanathan argued nearly ten years ago. Living in a poor or working-class economic stratum can lead to reduced access in a variety of ways, from inferior equipment to filtering. Poverty can remove urban residents from the relatively plentiful broadband networks that cities host. And ISPs may already be discriminating in speed offerings based on poverty, according to recent complaints to the Federal Communications Commission (FCC).⁴

Racial inequalities also shape access. Blacks, Latinos, and Native Americans continue to lag whites and Asian-Americans in home broadband speeds and access. At least partially in compensation, the former are more likely to use cell phones for connectivity. This may constitute a digital version of the 20th-century real estate practice of redlining; restricting certain populations from access to desired locations. Race is also tied in to the earlier mentioned economic issues, as blacks and Latinos generally have lower incomes and lower savings than do whites.⁵ As D. Amari Jackson has observed:

The good news? Your daughter’s school has been designated an “Apple Distinguished School” and, as such, she and all of her peers will receive brand new iPads for their individual usage.

The bad news? Once your daughter leaves school, she can’t use it—at least not at home. For you live in a lower-income neighborhood without access to Internet or a fast-enough connection to take advantage of her shiny new toy.⁶

Though wealth is likely a stronger factor, age is another correlate with Internet access: the older an American is, the less likely he/she is to have a speedy connection and the more likely he/she is to use the Internet for less time. It is very easy to fall into traps and myths about digital natives and immigrants, but we can rely on years of Pew Research Center and other surveys showing that—in general—older Americans use less technology than younger Americans (although the gap is gradually closing). This tendency appears in terms of both Internet connection and related devices. As the Pew Research Center reported in May 2017:

Many seniors remain largely disconnected from the digital revolution. One-third of adults ages 65 and older say they never use the Internet, and roughly half (49%) say they do not have home broadband services. Meanwhile, even with their recent gains, the proportion of seniors who say they own smartphones is 42 percentage points lower than those ages 18 to 64.⁷

Yet the strong drivers of class and education can revise a simple age correlation:

Perhaps the steepest and most intractable force currently driving Internet speed and access differences is geography. People living in cities and suburbs tend to enjoy higher broadband speeds and a more competitive ISP environment, while the rural population is more likely to endure slower Internet velocity and a local ISP monopoly. Business reasons are largely behind this divide: cities offer denser, more customer-rich, and easier-to-wire populations; rural areas are relatively underpopulated with less revenue per square mile. Business incentives are vital at this stage of Internet history. Governments are no longer leading energetic expansion efforts as they did with broadband in the 1990s or electricity in the 1930s. An additional complication may stem from the fact that providers are adhering to out-of-date standards
for what constitutes broadband. In 2015 the FCC increased its broadband minimum from 4 Mbps to 25 (download) and from 1 to 3 Mbps (upload), which triggered protests that still rage today. Many businesses, sometimes citing other FCC recommendations, argue for a definition pegged to lower speeds, which allows providers to claim greater broadband deployment success than if they were held to speedier standards. The FCC’s current chair, Ajit Pai, has controversially argued that cell phone access could substitute for wired or other wireless connections—and also wants to define mobile network broadband speed as low as 10 Mbps down and 1 up.\(^{\text{12}}\)

The geographical divide. Urban areas were upgraded from copper lines more quickly than rural areas, which may not have been upgraded at all. Terrain details such as mountains, thick forests, or bodies of water can make deploying wired or wireless solutions more difficult. Many rural areas have cell phone access, but speeds are too low all too often. And satellite connections are just a step above dialup. The impact of this gap is clear. As Clare Malone recently noted, based on Pew surveys: “Those who live in rural areas were about twice as likely not to use the Internet as urban or suburban Americans.”\(^{\text{13}}\) Perhaps this becomes self-reinforcing. Having become inured to lesser services, those living in rural areas demand smaller improvements. That separation from urban and suburban broadband gives rural populations greater challenges in attempting to get online for work, entertainment, government interaction, health care information and records, personal communication, and education. They may also fall behind the rest of the nation economically.\(^{\text{14}}\)

To some extent, the rural-urban divide connects with the way wealth shapes Internet connection. As rural areas fall behind cities and suburbs in terms of total wealth and connectivity, residents experience a double whammy. Rural towns become relatively poorer and less well connected, which renders them less economically competitive, which can reduce their population, cramped or stripped down. Meanwhile, mobile phone Internet access can be severely limited by data plans—a greater problem for the poorest than for the affluent.

Finally, a more recent development in driving unequal access is due to politics and culture. The abuse of women, people of color, those with marginalized gender and sexual identities, Muslims and other religious minorities, and the disabled has increased dramatically over the past several years. Internet users target these populations with hate speech, doxxing, and other threats. These incidents have grown into organized movements, like Gamergate and the organized harassment conducted by some in the alt-right current.\(^{\text{16}}\) Unlike technological divides, these political or cultural movements make using the Internet more dangerous for large numbers of people, restricting their access, causing emotional distress, and ruining reputations. Various projects and efforts—such as the E-Rate program and One Laptop per Child, mentioned earlier—have attempted to address these digital divides, at least to some extent. Federal and state governments, nongovernmental organizations, foundations, and companies have also contributed resources to narrowing the divide. For example, OneCommunity, led by Lev Gonick, worked hard to expand broadband service in the Cleveland area. In Vermont, one telecommunications company announced lower prices for poorer residents.\(^{\text{17}}\) International projects

Technological limitations heighten the geographical divide. Urban areas were upgraded from copper lines more quickly than rural areas, which may not have been upgraded at all. Terrain details such as mountains, thick forests, or bodies of water can make deploying wired or wireless solutions more difficult. Many rural areas have cell phone access, but speeds are too low all too often. And satellite connections are just a step above dialup. The impact of this gap is clear. As Clare Malone recently noted, based on Pew surveys: “Those who live in rural areas were about twice as likely not to use the Internet as urban or suburban Americans.”\(^{\text{13}}\) Perhaps this becomes self-reinforcing. Having become inured to lesser services, those living in rural areas demand smaller improvements. That separation from urban and suburban broadband gives rural populations greater challenges in attempting to get online for work, entertainment, government interaction, health care information and records, personal communication, and education. They may also fall behind the rest of the nation economically.\(^{\text{14}}\)

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Wealthier Americans will have greater access to the economic might of the online world—from business to training to social connections and information-gathering.
may have uses in the United States as well—projects such as Gunnar Stefanson’s offline Education in a Suitcase or Google’s airborne Wi-Fi Project Loon. Yet the divide persists, in part because, as consumer tech analyst Carolina Milanesi put it: “The pace of tech adoption will maintain the divide.”

Among all programs and players, few sources play a greater role in mitigating these divides than public libraries. Their service mission leads them to provide a mix of hardware, software, connectivity, and training. Consider the wide range of needs from library users (or patrons): some may request the use of 3D printers, while others struggle with understanding how to use a mouse. In a very real sense, public libraries have become not only leading advocates for digital literacy but also unheralded heroes helping people across the digital divides of wealth, education, race, age, geography, politics, and culture.

Digital Divides in Education
The current digital divides have many implications for higher education and technology. To begin with, learners lacking sufficient network access will have a harder time completing their Internet-dependent studies, whether taking LMS-based quizzes, engaging in videoconference conversations with classmates and outside experts, or exploring simulations. One analyst has dubbed this the “homework gap.” The NMC Horizon Report: 2017 Higher Education Edition succinctly observed: “Without high-speed internet access, successful scaling of emerging technologies in education is moot.” Both formal learning and informal learning suffer. To return to Jackson’s account of a child blocked from doing digital work at home: “Given that her scholastic success is intimately tied to this new technology, your daughter is now at a clear disadvantage to her peers in terms of homework, research, engagement and general knowledge. Not good at all.”

Back on campus, current levels of economic inequality drive divergent academic digital strategies. Research by Chris Gilliard and Hugh Culi has determined that wealthier and more prestigious campuses support a very different educational technology environment than do lesser-resourced institutions, especially those focused on poorer students: “The more research-based the institution, the more the policies emphasized IT as an environment with a variety of stakeholders. On the other hand, institutions that emphasized job training and certification saw IT as a tool for transmitting information as determined by the school. These deeply different approaches to digital technologies are a form of redlining that can both discourage and limit working class students from the open-ended inquiry supported at more elite institutions.” Here economics and technology combine to yield very different, and clearly unequal, pedagogies and student experiences. We should also expect a related divide between those institutions capable of reliably supporting high-speed connections and those that cannot do so.

We’ve been speaking of higher education, but digital divides afflict primary and secondary schooling as well, of course. Given that public K-12 is funded largely at a very local level, divides based on class, race, and geography are already shaping different digital experiences for schools depending on their immediate social and economic environment. It is possible that those divides have deepened over the past generation and might deepen further based on feedback loops. Already this leads to major differences regarding which students graduate from high school and attend and graduate from college.

Will would-be postsecondary students arrive on campus with starkly different digital backgrounds? Will those differences include a gap in pedagogical expectations, along with unequal digital skills? If so, colleges and universities will have to take the digital divide into account when determining how to educate their students in everything from digital literacy to office productivity apps. To the extent that a given institution supports students who are poor or working class, black or Latino, or rural, the institution will have to direct more resources for their support. Given also that the majority of undergraduates are women, we must ask how higher education is ready to help them in the face of online abuse.

Digital Divides and the Future
Faced with such deeply laid and powerfully determined divisions, how should higher education respond? What is the role of educational technology in this unfolding situation?
To some extent, higher education is already pursuing a demand-side strategy. Colleges and universities are serious broadband customers, from research to entertainment to civic engagement. They educate students to be thoughtful and thorough users of the digital world (although higher education can always do more!). The cumulative impact of this technological buildup helps grow demand for services, which could elicit further market, governmental, or nonprofit responses.

Local solutions are available. For some areas, academic and public libraries offer viable routes for getting online with sufficient hardware, software, and speed. Perhaps interinstitutional partnerships could strengthen these connections. State governments, businesses, and nonprofits could expand their capacities, especially if they experiment with the unused TV white space spectrum. Along similar lines, higher education could urge or support local efforts to build out broadband, through initiatives such as co-ops or small businesses. This could be an opportunity for students to become business or social entrepreneurs, potentially incubated by their campuses. Students may be inspired by educational broadband projects like Wi-Fi-enabled school buses.

Perhaps technology-specific solutions are available. If campuses are serious about equity, could they reshape their digital offerings (content, services) for different access levels? That is, a mobile-first design approach might better suit students who primarily use cell phones when they lack access to laptops and desktops. Alternatively, a less-bandwidth-demanding media strategy, one centered on text rather...
than video, would be more accessible to audiences with slower bandwidth. Higher education institutions might reconsider mobile strategies, keeping in mind the underappreciated likelihood that not every student has a fully featured smartphone. Or they could make curricular materials accessible offline, through local or portable storage, from USB drives to the Education in a Suitcase model noted above.28

Beyond technology and local partnerships, it may be time to consider political options. The federal government has offered various forms of digital divide mitigation over the past generation but has suffered from congressional budget battles—including fights from before the current administration. Perhaps educators should lobby legislators for the preservation or extension of programs such as the FCC’s Connect America Fund (CAF) or Lifeline initiatives. IT leaders might urge the FCC, in particular, to not decide that cell phone access is as good as home broadband. Similarly, college and university leaders could urge state governments to more fully fund local efforts, such as New York’s current effort to connect upstate. They could also agitate for urban Wi-Fi clouds. Most ambitiously, higher education could collectively call for a broadband version of the New Deal’s rural electrification program.29

Digital divides are a painful dimension of the U.S. higher education technology experience. This article may elicit action on the part of readers: undertaking further research, or holding new conversations, or taking programmatic steps. But readers need to bear in mind that this portrait is one based on recent history and the present. The future may
not be this challenging; it may be even more difficult. It is possible, even likely, that the digital divides we are grappling with today will widen still further as social cleavages based on class, gender, race, and other categories intensify. Educational structures and outcomes could mitigate these divides to a degree—or could worsen them.

Academic and IT leaders have the ability—indeed, the obligation—to think carefully about the future. Strategic plans are predicated on this type of extended vision, as are college and university commitments to supporting generations of students for lifelong learning. If new and deeper digital divides loom ahead, threatening to split apart not only students but also communities, can higher education leaders in good conscience resist taking action now?

The alternative is to acquiesce to an increasingly Balkanized Internet, in an increasingly divided nation, with increasingly accepted inequalities. Is that a future we can accept? Is that a world we can help build through our actions and policies? Or is it a future that higher education academic and IT leaders, with all of their creativity and commitment to students, can and should oppose?

Notes

1. For reasons of space, I will confine the discussion in this article to the United States.
10. Ibid.

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