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Research Note

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The Digital Divide: Policies, Programs, and Public Education

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Abstract: Despite efforts to close the digital divide, there is no question that in the U.S. a gap persists. When the term was coined, the digital divide was largely defined and measured in terms of physical access to the Internet. Progress has been made, but certain populations and organizations are still lagging including many of our public schools. Moreover, the conversation has matured, and the digital divide is recognized as a more nuanced phenomenon. Many more individuals have physical access to the Internet and related technologies today but lack the motivation, skill, or guidance necessary to use these technologies productively. Public schools and their students are particularly impacted by this new divide – a problem that most certainly perpetuates economic and societal inequalities. Policies and programs are working to address this new digital divide but have much work to do.

Like electricity a century ago, broadband is a foundation for economic growth, job creation, global competitiveness and a better way of life. It is enabling entire new industries and unlocking vast new possibilities for existing ones. It is changing how we educate children, deliver health care, manage energy, ensure public safety, engage government, and access, organize and disseminate knowledge.ⁱ

-- From the FCC's National Broadband Plan Executive Summary

The term “digital divide” – much like the problem itself – has evolved. At its introduction in the mid 1990s, it meant, simply, the gap between those that do and those that do not have access to the Internet and related technologies. It could be measured in a straightforward manner: for example, by counting the number of households who reported owning a computer and/or those who reported having access to the



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Internet. Advocates of digital access equality understood that it would become table stakes for full participation in society – much like the telephone nearly a century ago. Government policies and private sector programs have been working for more than twenty years to close the access gap, and though much progress has been made, these efforts addressed only the first level problem -- what we might term the digital divide 1.0.

Today the digital divide represents a broader, more nuanced set of inequalities. It is not just physical access that separates the technology-haves and have-nots but a variety of issues including motivation to adopt technology and possession of relevant technology skills. We might call this the digital divide 2.0. The new digital divide must be measured not just by whether a person uses the internet but how often and for what purpose. Researchers and advocates began to describe this new, multi-dimensional digital divide more than a decade ago. Many discussed not only the need for physical access but also the development of motivation and skills -- with the goal being empowerment, not just entertainment. Professor of sociology and communication science Jan van Dijk is one such proponent, and he describes the divide as getting worse, not better.

“The digital divide is deepening where it has stopped widening. In places where people are motivated to gain access and physical access is spreading, differences in skill and usage come forward. The more information and communication technology is immersed in society and pervades everyday life the more it becomes attached to all existing social divisions.”ⁱⁱ

The skill set needed for digital productivity and empowerment has also been referred to as technological or digital literacy. Literacy is in fact a useful term for defining the problem of digital divide 2.0. At its narrowest definition, literacy simply means to read and to write, but it also encompasses education more broadly, and a literate person is assumed to have the ability to understand and communicate ideas and to participate in her or her community. A literate citizenry is the bedrock of a democracy and a prerequisite for the accumulation and advancement of knowledge. As van Dijk suggested, a lack of digital literacy will exacerbate social inequality in a digital society. Individuals who cannot acquire knowledge – whether via analog or digital means – for personal improvement or empowerment will not maintain their socioeconomic status. Therefore, we must not only take stock of our progress on digital access, we must measure and promote digital literacy.

In the United States, policies and programs on the national level have been largely designed to address the former but are gradually evolving to focus on the latter. Current federal government action is rooted in the Communications Act of 1934, which codified the concept of Universal Service, the principal that all Americans should have access to communications services. At its origination, Universal Service covered simply to telephone and telegraph access. The American Telephone & Telegraph Company (AT&T) was granted monopoly status, but in return, it agreed to federal regulations that required it provide service to rural, hard-to-reach, and poor communities. The Telecommunications Act of 1996 updated the 1934 Act and expanded the goal to include advanced telecommunications services and high-speed Internet – “for all consumers at just, reasonable and affordable rates.” The 1996 Act delineates five major goals including to “advance the availability of such services to all consumers, including those in low income, rural, insular, and high cost areas, at rates that are reasonably comparable to those charged in urban areas” and “increase



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access to telecommunications and advanced services in schools, libraries and rural health care facilities.^{»iii} To accomplish these aims, the Universal Service Fund (USF) was created. It is supported by charging telecommunications companies a quarterly fee that is often passed on to customers as a separate, billable item. The funds are then provided to entities or programs serving certain populations such as qualifying telephone companies that serve high-cost areas or to low-income customers who receive assistance in paying for monthly telephone charges. Another result of the 1996 Act is the “E-Rate” program, which provides telecommunication services, Internet access, and internal connections to eligible schools and libraries. The E-Rate program has also been a recipient of the USF.

These federal efforts are ongoing but have been adjusted to meet changing needs. The Federal Communications Commission (FCC) has administered the programs under the 1996 Act and evolved its approach and its aims under the direction of Congress and with guidance from the White House. For example, in 2010 the FCC released the National Broadband Plan that reformed certain universal service mechanisms to specifically support deployment of broadband to essential entities (first responders, hospitals, etc.) and to disadvantaged regions and populations.^{iv} Additionally, the FCC is not the only federal regulatory body promoting broadband adoption. The National Telecommunications & Information Administration (NTIA) is an executive branch agency within the U.S. Department of Commerce that is focused on expanding broadband Internet access and adoption in America and ensuring that the Internet remains an engine for continued innovation and economic growth.^v The NTIA administers the \$4 billion Broadband Technology Opportunities Program (BTOP), which provides matching grants for projects that use technology to solve social problems and improve community access to modern telecommunications.

Numerous innovative programs, too many to mention, have been initiated at the state and local levels as well. As only one recent and innovative example, New York City announced the LinkNYC initiative. Up to 10,000 legacy telephone booths will be converted into kiosks offering free Wi-Fi. Each hotspot will serve up to 250 devices with speeds up to 100mpbs, and the program will be funded via advertising shown on the kiosks’ digital displays. The mayor’s office has framed this as a fight against inequality since low-income citizens, particularly minorities, rely disproportionately on cellphone browsing to get online, and wireless data charges can add up.^{vi}

Moreover, corporate entities have brought resources to bear, often in public/private partnerships. For example, in 2011 Comcast announced its Internet Essentials program that offered a combination of discounted broadband service, low-cost computers, and free training programs to teach people how to use the technology. The program is targeted at families eligible for national free lunch programs.^{vii} Comcast and the Internet Essentials program works in partnership with EveryoneOn, a national non-profit entity “working to eliminate the digital divide by making high-speed, low-cost Internet service and computers, and free digital literacy courses accessible to all unconnected Americans.”^{viii} EveryoneOn partners broadly with several leading cable companies including Cox, Bright House Networks, MediaCom, and Suddenlink.

Twenty years of federal, local, corporate, and non-profit efforts have had an effect. Recent measures of technology adoption in the United States demonstrate great progress on closing the digital divide 1.0. In

1990 only 22 percent of households in the United States owned a computer.^{ix} Similarly, in 1995 a Pew Center survey suggested that only 14 percent of adults were using the Internet. But, updated figures demonstrate the decline of the digital access divide. In 2013, the then acting-commissioner of the FCC noted that broadband adoption by households had increased to 70 percent. Moreover, in 2014, the Pew Research Center documented the incredible spread of the Internet, reporting that usage among adults had risen to 87 percent of the population while ownership of cell phones has risen to 90 percent of all adults, and ownership of smartphones has risen to 58 percent.^x

However, while these gains are both meaningful and encouraging, we must recognize that adoption remains disappointingly unequal. The inequalities remain most evident along income and racial lines. Internet adoption among households earning more than \$75,000 per year is 99 percent -- notably higher than that of the general populace. Similarly, adoption is 97 percent for those with a college degree -- implying that those without higher education are accessing the Internet at a much lower rate. Moreover, as recently as 2011, the broadband penetration in low-income areas was determined to be as low as fifteen percent^{xi} versus 70 percent for the population at large. In 2013, acting chairwoman of the FCC Mignon Clyburn noted that households without internet access at home still accounted for roughly 100 million people or one-third of the population. Certain disadvantaged populations have disproportionately low Internet access including 50 percent of rural Americans, 65 percent of the elderly, 58 percent of people living with disabilities, 41 percent of African-Americans, and 51 percent of Latinos.^{xii}

Moreover, figures on access address only the first level issue, digital divide 1.0. Less clear is how well policies and programs are addressing the divide 2.0, meaning digital literacy and the spread of skills required for participation in a digital society. There are signs that the gap is, in fact, widening, and it is evident among a population which is actually highly motivated to use technology: children and young adults. A *New York Times* article called “Wasting Time Is New Divide in Digital Era” suggests that children in poorer families spend more time consuming media on a variety of devices leading to a “time-wasting gap.” It cites a study published in 2010 by the Kaiser Family Foundation which found that while consumption of media has increased for all children, children and teenagers whose parents do not have a college degree spent 90 minutes more per day exposed to media, compared to children from higher socioeconomic families. In fact, the gap has widened over time -- in 1999, the difference was just 16 minutes. The *Times* article quoted parents saying they did not know how to monitor and limit their children’s use technology, and research supports those anecdotes. In effect, the digital divide experienced by parents, trickles down to their children.

Moreover, many of our public schools remain on the wrong side of the divides, both 1.0 and 2.0. Indeed, in 2013, the White House estimated that fewer than 30 percent of America’s schools have the broadband they need to teach using today’s technology, and the average American public school has about the same connectivity as the average American home while serving 200 times as many users. This is particularly problematic for a society that values equality. If we want a digitally literate population, we must certainly begin by educating our youth.

In fairness, there have been programmatic efforts directed specifically to schools. For example, the FCC’s E-rate program was created specifically to ensure that schools and libraries had access to affordable

Internet -- but it has received much criticism since inception. Specifically, a 2012 article by *ProPublica* revealed that AT&T charged some schools up to 325 percent more than others in the same region were charged for essentially the same services, and Verizon charged a New York school district more than twice as much as it charged government and other school customers in that state.^{xiii} Some claim the FCC provided too little guidance and oversight to the telecommunications companies required to provide the low-cost service to schools. To revise the E-rate program and address the digital divide in schools, in 2013 the White House unveiled its “ConnectED” initiative. The program’s goal are three-part: provide high-speed digital access to 99 percent of America’s students by 2017, provide training and digital education tools to teachers, and enlist private company partners to create price-competitive, feature-rich educational devices and software. The White House charged the FCC with developing programs that accomplish this goal, and earmarked \$2 billion in funds to be combined with \$2 billion in commitments from at least nine private-sector companies including AT&T, Apple, Microsoft, and Verizon.^{xiv} The FCC has also publicly discussed building its own “digital literacy corps” using some of the financial support from Connect2Compete, a partnership between it and EveryoneOn. The proposed funding for this program is \$200 million^{xv} – roughly 5 percent of total ConnectED commitments – but it is a step in the right direction.

There have also been multiple well-publicized programs designed to get technology devices into the hands of students. This kind of progress is easy to announce and easy to measure – but surprisingly hard to enact. For example, in 2013, the Los Angeles United School District (LAUSD) rolled out iPads to 47 schools as an initial test, but quickly ran into problems. Distribution of the devices quickly fell behind schedule; the district recalled devices at several schools; students deleted security filters so they could freely browse the Internet; and the educational materials on license were incomplete during the first year.^{xvi} The district made changes to the program that give schools more choice over the types of devices available, but there has been controversy over the bidding process, and the program is currently on hold.^{xvii} Still struggling with providing access, the LAUSD has not even begun to address the question of curriculum and the nature of technology instruction. Unfortunately, this is not an unusual situation in California. In 2012, the San Jose Mercury News estimated that 56 percent of California public high schools did not offer a single course in computer science or programming. It was not a priority because computer science did not count toward the admission requirements in math or science for admission to the University of California. Moreover, California has no computer science certification to insure that teachers have the appropriate content knowledge.^{xviii}

In fact, 25 of 50 states do not allow computer science courses to count toward high school math and science graduation requirements. A 2013 survey by the Computer Science Teachers Association revealed several challenges including a lack of support or interest from school staff (cited by 40 percent of teachers), a lack of student interest or enrollment (cited by 35 percent), rapidly changing technology (30.5 percent) and a lack of curriculum resources (23.5 percent). Despite these headwinds, here again, progress has been made. At the start of 2013, just nine states had a policy that allowed computer science to count toward graduation, but lobbying efforts by the Association and Microsoft brought that number up to the current twenty-five.^{xix}

Despite that progress, the state of technology instruction in California’s secondary schools suggests we

have only just begun to solve the digital literacy gap. A study conducted by researchers from the University of Florida provides further evidence of the divide. They gave the nearly 6,000 Florida students an “information and communication technology (ICT) literacy” test, and the results showed “a digital divide between low and high SES [socio economic status], white and non-white, and female and male students on all measures of the [test]. Specifically, high-SES, white, and female students outperformed their counterparts.”

Unfortunately, these findings are not surprising. Many have written that technology has the potential to both cure and exacerbate societal ills. In 2003, Professor Mark Warschauer wrote an article in *Scientific American* with the subtitle “Handing out computers and Internet access is the wrong way to raise technological literacy” and warned that it could actually worsen inequalities by failing to address how the computers were used.^{xx} Other research has suggested that low income schools were more likely to offer computer activities that simply reinforced existing pedagogical practices like drills or memorization while higher income schools invested in software that promoted creativity. These approaches might serve to exacerbate the learning disparities.^{xxi}

Of course, not every school district is struggling, and there are digital success stories. For example, Chicago Public Schools are in the process of rolling out a K-12 computer science program. In the next three years, every high school in the city will offer a foundational computer science course, and in the next five years, at least half will offer an Advanced Placement computer science course.^{xxii} When introducing ConnectED, President Obama praised Mooresville, NC, a small district that rolled out a laptop program for students in the fourth grade and above beginning in 2009. The district has reported a climbing graduation rate, from 73 percent to 90 percent since 2007, and an increase in academic performance, with students proficient at their grade level increasing from 73 percent to 89 percent. However, Mooresville's superintendent has said improvements were not a result of the laptops, but rather thanks to the instructional changes they enabled.^{xxiii} In other words, Mooresville's success did not result simply from access but from broader educational efforts including methods and curriculum. And, there are innovative programs that allow students to be part of the solution. For example, the Net Literacy Corporation is a non-profit begun in 2004 by a middle school student who volunteered to teach computer and Internet skills to senior citizens. It operates in several states and includes multiples program that utilize student volunteers to build computer labs and teach skills like Internet safety and online financial literacy.^{xxiv}

This sampling of policies and programs from a broad set of organizations indicates what is in place and represent some part of what is needed. But, given that the problems and challenges of the digital divide were identified ten and twenty years ago, these efforts also feel much delayed. In fact, progress on closing digital divide 2.0 seems much harder to achieve than that of divide 1.0. Perhaps this, too, was to be expected for it is certainly more difficult to define and measure digital literacy than it is to tally and track digital access. But, we can also see that the stakes are higher in the era of 2.0 because giving our citizens, and particularly our students, the tools of technology without the requisite guidance can have the opposite effect of what is hoped for. That being the case, it seems time to double our efforts across all channels before the digital divide becomes a breach we cannot repair.

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