Addressing the Digital Divide in Low-Income Education Through Realigning Networks

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

Imagine a young student in a well-funded school, able to access the world's educational resources with the simple click of a button. Now picture, only a few miles away, another young student in a low-income community, struggling to learn with outdated textbooks and limited access to the internet. In an increasingly digital world, the divide is not just about access to technology but opportunities for education, social mobility, and economic empowerment. At least 42 million Americans lack access to broadband internet, which serves as a critical resource for modern learning and success (Busby, Tanberk, & Cooper, 2001). The digital divide is perpetuated by systemic misalignments between key actors, including governments, educational institutions, and technology providers, compounded with their prioritization of goals and resource allocation. Governments prioritize political agendas or regulatory overreach, educational institutions struggle with inadequate funding and infrastructure, and technology providers are often profit-driven. Meanwhile, low-income communities are left behind, with limited access to the educational tools and resources meant to empower them.

The persistent digital divide raises a critical question: How does this misalignment of interests between human and non-human actors in technology, infrastructure, education, and policy contribute to the persistence of educational inequality in low-income communities? Furthermore, what strategies can realign these networks to promote digital inclusion?

The digital divide persists due to the failure of these actors to work towards common goals of inclusion and accessibility. By realigning these networks through targeted strategies–policy, corporate responsibility, and technological innovation–policymakers and engineers can bridge this gap and promote equitable access to education and technology. In this

paper, I outline how these misalignments have sustained the digital divide and propose strategies to foster more inclusive educational environments.

I organize this paper into four sections. First, I explain the methods used to gather my data, namely policy analysis and literature review. Next, the results section outlines key findings on the systemic inequalities perpetuating the digital divide, including failed policy initiatives and technological and resource barriers. In the analysis section, I apply Actor-Network Theory (ANT) to map the misaligned interests between key actors–governments, educational institutions, and technology providers–and how this has led to the current and ongoing educational imbalances. I also explore Corporate Social Responsibility (CSR) to critique the role of Big Tech within these networks and consider the ethical responsibility of engineers to design more inclusive technologies. Finally, in the discussion section I propose strategies for realigning these networks to foster digital inclusion and outline possible directions for future research.

Methods

To understand the roles of different stakeholders, specifically governments, in addressing the digital divide, I reviewed policies and program initiatives created in direct response to the issue. Through qualitative analysis of past and current government initiatives, I identified the successes and failures of each. Analyzing where they have succeeded and failed helps in developing better solutions for the future. I researched recent initiatives by the Biden-Harris administration as well as past policies such as the Affordable Care Act and Emergency Broadband Benefit. To widen the range of potential policies past the United States and learn from the success of other areas in bridging the digital divide, I also researched successful initiatives of other countries, namely South Korea.

Aside from policy, I applied literature review in my research. More specifically, I have reviewed case studies on the connection between educational technologies and digital literacy as well as the role of technology providers in bridging the digital divide and Corporate Social Responsibility (CSR). I analyze the connections between these topics to identify barriers to the adoption of educational technology as well as technological initiatives and their effectiveness. With CSR, we can gather information on the power of example and the intervention of companies in providing equitable technologies. Do they have the responsibility to do so, or should they remain driven by profit?

Alongside CSR, I apply Actor-Network Theory (ANT) as my primary analytical framework, as it examines how both human and non-human actors interact within networks to shape technological and societal outcomes (Sismondo, 2010). In the context of the digital divide, the key actors include governments, technology providers, policymakers, educators, low-income communities, educational tools, and the designers themselves. Governments aim to expand broadband access and promote digital literacy but often prioritize political agendas. Technology providers or Big Tech companies focus on profitability, neglecting the needs of marginalized communities. Educators, as well as policymakers, work to integrate technology into classrooms but face resource constraints and a lack of promising solutions. Non-human actors, such as infrastructure systems, policies, and digital tools, influence access and usability. Through ANT, I analyze connections between these actors and reveal how significant misalignments perpetuate the divide. I also use this framework to highlight the interplay between actors and thus provide strategies to foster inclusivity.

Results

The efforts to bridge the digital divide are still ongoing. As of Fall 2024, The Biden-Harris Administration was investing $90 billion to connect all Americans to affordable, reliable high-speed Internet by 2030 (National Telecommunications and Information Administration [NTIA], 2024). The United States continues to pursue this issue, despite the failures of past programs such as the recent Affordable Connectivity Program (ACP), which officially ended its efforts in June of 2024. Initially, the Emergency Broadband Benefit (EBB) was implemented by the Federal Communications Commission (FCC) to provide financial aid for internet access to households struggling to afford such services during the COVID-19 pandemic (Federal Communications Commission [FCC], 2023). The program was a temporary response to the digital access challenges seen through the pandemic and was soon replaced by the ACP. The ACP, launched in late 2021, had $14.2 billion in funding and provided many services including discounts of up to $30 a month for internet service for eligible households, up to $75 a month for eligible households on qualifying Tribal lands, and a one-time discount of up to $100 for laptops and other devices under certain conditions. Before the program ended, over 23 million households relied on ACP benefits . Ultimately, lack of additional funding from Congress led to the program's end (Federal Communications Commission [FCC], 2024).

Given the short lifespan of US initiatives, we can look to other countries as examples of how dedicated investments can bring about major changes to the digital divide and boost economic development. South Korea, in the 1950s, was among the poorest countries, with limited infrastructure and an anticipated grim economic future (Seth, 2013). However, during the third industrial revolution, it prioritized advancements in technology and education, significantly increasing its share of public expenditure on education. This long-term investment in education

and infrastructure development led to widespread access to reliable high-speed internet, a rise in graduates specializing in engineering, manufacturing, and construction—surpassing averages in the Organization for Economic Co-operation and Development (OECD)—and economic transformation, positioning South Korea as one of the most digitally connected and technologically advanced countries in the world. The South Korean government also developed successful programs to integrate digital literacy, making it achieve a higher GDP per capita than many European Union countries (IEEE, 2025).

It is also vital to examine the role of technology providers in closing the divide. Aside from taking a stance on Corporate Social Responsibility (CSR) and Big Tech's role in bridging the technological gap, there have been many successful initiatives thus far through the lens of CSR. First, there is the Lenovo and Microsoft EdVision Program, a digital transformation initiative aimed at many regions of South Asia and Southeast Asia. During the COVID-19 pandemic, Lenovo launched a platform in India to support over 300 million students unable to attend classes. Within just two months, the program engaged 13 million people across India, Japan, Indonesia, Singapore, Malaysia, the Philippines, and Thailand. Second, Google's Skills Ignition SG Program, a collaboration with Singapore's government agency to provide digital skills and job training opportunities, has supported over 2,600 job seekers. Third, there is the Alibaba Rural Revitalization Fund, where Alibaba is connecting over 1,000 rural communities in China to broadband internet. The company has invested $15.5 billion in "common prosperity" initiatives to promote equitable development in underdeveloped regions (WE Communications, 2021).

Similar to these efforts, educational institutions seek equitable access to technological learning tools. However, there are some key barriers to lessening this gap, one being internet and

computer access. Many students lack access to essential devices and internet connectivity due to financial constraints, limiting their ability to participate in technology-driven education. To remedy this issue, schools can provide computer labs, loan programs, or structured school days that allocate time for students to access technology. However, one other primary issue is the budget constraints of schools in low-income districts. Some areas struggle with inadequate budgets to provide technology infrastructure, digital learning materials, and device purchases. There are also Wi-Fi and network barriers–schools may face challenges related to insufficient bandwidth, network security, and lack of technical support staff (Dean, 2024).

Schools see many of these challenges still, some prominent issues being the "homework gap", rural connectivity challenges, and digital literacy gaps. As mentioned in *Closing the Digital Learning Gap*, approximately

> 15% of U.S. households with school-aged children do not have high-speed internet access at home. The statistics are worse for school-age children in lower-income households earning less than $30,000 a year; about one-third of these households do not have a high-speed internet connection, compared with just six percent of households earning more than $75,000 a year. (Cator, 2019, para. 14)

For Rural connectivity challenges, the FCC's E-Rate program has connected most U.S. schools to broadband internet. However, 2.3 million students still do not have access to adequate connectivity that meets evolving standards (Cator, 2019). With respect to digital literacy concerns, nearly 7% of Americans do not use the internet (Pew Research Center, 2021). This problem affects marginalized groups disproportionately, including seniors, low-income households, and adults with a high school education. With this, comes more issues with access to job opportunities, healthcare, and educational services.

Turner Lee (2020) investigated the digital inclusion challenges at Francis Marion School in Marion, Alabama. For background information, the rural town serves a predominantly African American and economically disadvantaged student population. The area itself had limited access to broadband internet, with only about 39.8% of households maintaining connectivity (Turner Lee, 2020). Feeling largely setback by socio-economic status, Dr. Cathay Trimble, the Francis Marion School principal, led efforts to integrate technology. The school partnered with AT&T to bundle iPads with broadband service, ensuring students and families could have access to the internet. This school was a beneficiary of Obama's 2013 ConnectED initiative. ConnectED was created to accelerate on-site internet access and teacher technology training through partnerships with the private and public sector providing financial support and technological equipment. The new technology boosted student engagement and creativity, with students exploring areas like coding, robotics, and storytelling using advanced tools. Still, despite improved engagement, standardized test scores remain low in Marion, and the school is listed among Alabama's "failing" schools. While the ConnectED initiative has transformed student experiences at the Francis Marion School, its impact is constrained by community limitations. Marion's broader community has limited access to digital infrastructure, the local library is often inaccessible due to transportation barriers, and economic struggles prevent many families from leveraging available technologies, despite increased opportunities within the school itself (Turner Lee, 2020). Though ConnectED has made significant strides in bridging the digital divide in education, such as in Marion, broader systemic investments are needed to enable long-term economic and educational advancement.

Analysis

To understand the misalignments and systemic failures keeping the digital divide going, Actor-Network Theory (ANT) offers a useful lens to explore how all actors–both human and non-human–interact, influence, and enroll one another. ANT puts an emphasis on networks that are dynamic, made of competing interests and goals, and constantly shifting alliances. There is a clear push and pull between actors attempting to direct outcomes in their favor. In this case, each actor has a goal: governments aim to expand broadband, technology providers focus on profit, educators aim for inclusive learning, and low-income communities seek opportunity and equal access. The degree to which these actors enroll others–convince them to become aligned, collaborate, share resources for a common purpose–determines whether true digital equity can be achieved.

The Francis Marion School as a beneficiary to the ConnectED initiative serves as a good example of partial alignment of interests between the government, technology providers–in this instance AT&T and Apple–and educational institutions. These actors temporarily aligned to serve a shared goal, and the effort brought together government funding, private partnerships with big technological companies, and school leadership to improve digital access for local students. However, one critical non-human actor was left under-enrolled: community infrastructure. While the initiative improved internet access and digital resources in the school, limited infrastructure in the broader community stifled sustainable progress. Here, the failure to enroll a vital actor weakened the network and undercut the impact of a promising initiative.

In *Actor-Network Theory for Development*, the authors emphasize that "actors are not 'contained' within networks; rather, networks define them through relations. Their power and influence arise from the strength of these associations" (Faik, Thompson, & Walsham, 2013, p.

14). This idea directly applies to how initiatives like ConnectED lose momentum if ongoing collaboration between necessary actors weakens. If one part of the network is faulty, the effort as a whole can be undermined or fail to see long-lasting impact as intended. As seen with the Francis Marion School in Alabama, without sustained infrastructure investment, true gains in digital inclusion for education were temporary. To fully understand the challenges of bridging the digital divide, it is crucial to examine the conflicting priorities and potential resistance of the key actors within the network—governments, technology providers, educators, and low-income communities—which often prevent sustained collaboration and alignment.

Human Actors

First, the political ideologies and regulatory overreach of government have stalled bipartisan efforts to address digital concerns. In 2021, Congress passed the bipartisan Infrastructure Investment and Jobs Act (IIJA), allocating $42 billion to close the digital divide. However, the National Telecommunications and Information Administration (NTIA) imposed additional restrictions on broadband deployment: these include preferential treatment for government-run networks, complex regulations, and union-friendly policies (U.S. Chamber of Commerce, 2023). These decisions made it harder to enroll private actors such as telecom companies, who were expected to assist in broadband deployment. Additionally, overregulation at the state and local level has shifted the program's focus away from achieving digital inclusion and toward political agendas, further hindering progress. Similarly with the Affordable Connectivity Program (ACP), there was limited success in helping low-income communities long-term. Mixed interests within government, or complete lack of interest from key representatives, can cause programs to be entirely ineffective or end much too early. In terms of

ANT, the government actor failed to maintain its alliances, and the network weakened at the cost of low-income communities.

Technology providers are not much better, however, when they are tasked with bridging the digital divide. Many of these companies find that implementing socially responsible practices requires difficult trade-offs between short-term financial goals and long-term socio-economic impact. As one article notes, “implementing sustainable practices can be difficult and costly. Companies need to balance short-term costs with long-term benefits. Managing the difficulties requires careful planning and a commitment to overcoming challenges” (ThouCentric, 2024). This difficulty is evident in initiatives like Google's "Rolling Study Halls". Google’s initiative was put into place as an effort to combat the aforementioned “homework gap” for students with limited internet access. It equips school buses with Wi-Fi connectivity so that students in marginalized communities can study and do homework in their daily commutes (Google’s "Rolling Study Halls," 2018). While this program provides essential access to educational opportunities, it also serves corporate interests by fostering brand loyalty and new brand revenue streams. Even with a pull from communities and governments on tech providers to act ethically, internal pressures and financial burdens cause resistance to deeper enrollment. Without clear regulations to ensure fairness and accountability, these initiatives risk becoming token efforts, designed primarily to improve a company's public image–a motive of profit. In order to truly see changes in corporate involvement, the government must enact change or provide incentives to bridge the gap.

For educational institutions and low-income communities, there are often resource constraints involved, regardless of their motives for improvement and implementing educational inclusion. In the US, 17% of students are unable to complete homework due to limited internet

access. Additionally, 50% of low-income families and 42% of families of color do not have the technology required for online education (American University, 2020). For marginalized communities, it is nearly impossible to make changes to these statistics without external involvement or funding. Furthermore, educational institutions often operate within strict budgets and have to prioritize urgent needs, such as providing basic supplies or maintaining staff, over long-term investments in technology and digital access. With the enrollment of corporations, such as with Google's "Rolling Study Halls", some burdens may be reduced. However, the scope of such solutions are limited with programs primarily serving corporate interest. Additionally, these initiatives may not fully address systemic resource disparities without government funding or policy support. ANT reminds us that these actors do not simply lack resources but are situated in weakened positions within networks that fail to prioritize inclusion.

Non-Human Actors

As for non-human actors, at the forefront is infrastructure. With the ConnectED initiative, The Marion school principal shared that "the library is a main resource for the students, if they can get there. Common transportation barriers or an unavailable parent or guardian stymie continuous traffic to the local institution" (Turner Lee, 2020). Here, the students were given the necessary resources to pursue a better education, but did not have the means to access them. Though educational institutions, the government, and Big Tech were aligned in this initiative, without the proper enrollment of infrastructure, it failed to see long-lasting results. The infrastructure resisted the intended direction of the network and limited its read. Proper infrastructure in low-income communities is central to sustainable digital inclusion but often underfunded or inaccessible.

Another key actor, digital tools, is vital in bridging the gap for low-income students. Digital tools should be designed and implemented in a way that fosters engagement and appeals to the end-users. In another quote from the principal of the Marin school, Dr. Timber said "when we first got the iPads without the broadband package, kids would still be sitting on the ground or on the stoop, doing their homework or studying" (Turner Lee, 2020). The students were initially given access to tools that were not designed or equipped to meet their needs. When designing technologies, it is important to focus on digital equity and keep in mind all types of users. Without the proper infrastructure to access the internet at the local library, students were also unable to do their work at home; only part of the solution had been provided. With some negotiating, Dr. Timber was able to achieve Wi-Fi for students during the school year through AT&T, though this was set as a temporary solution. This serves as an example for how poorly aligned technological tools can fail to address long-term educational needs. In terms of ANT, the digital tools also resisted alignment, as they were not equipped to function within the conditions of the community and thus pulled the network away from achieving digital inclusion.

Corporate Social Responsibility

In using Actor-Network Theory to propose realigned interests, it is helpful to delve into Big Tech's Corporate Social Responsibility (CSR). In *Big Tech's power, political corporate social responsibility and regulation*, the authors highlight the "Big Five"–Google, Apple, Meta, Facebook, Amazon and Microsoft–and give CSR three definitions: (1) classical liberal CSR, (2) deliberative democratic CSR, and (3) high liberal CSR. Classical liberal CSR sees businesses as economic entities focused solely on maximizing shareholder value, with a strict separation between business and politics. Deliberative democratic CSR argues that in a globalized world,

businesses must engage politically to fill governance gaps, using stakeholder dialogues and democratic deliberations to co-create public goods. High liberal CSR integrates elements of both approaches, advocating for stronger institutional boundaries between business and politics to protect privacy, equality, and justice. The three interpretations of CSR differ mainly in how they view the relationship between business, politics, and society. The first argues for more company-driven intervention, the second argues for more community intervention, while the third argues for more government intervention and heavier regulation. Regardless of the interpretation chosen, CSR advocates for corporate intervention in socio-economic issues. These interpretations help ANT explore ways to realign the interests of key actors to promote digital inclusion and equitable access to technology.

A combination of the possible strategies–dividing social responsibility between all actors in the network–would be the best solution to bridging the digital divide. As mentioned before, borrowing on examples from South Asia, Google's Skills Ignition SG Program showcased a highly liberal CSR approach by contributing to economic and social equity in partnership with local governments. The Alibaba Rural Revitalization Fund exemplifies the same approach, illustrating how stronger institutional boundaries between business and politics help companies make a more meaningful impact. Lenovo and Microsoft's EdVision Program was the most successful and wide-reaching of the three, engaging millions of students across multiple countries. This initiative illustrates deliberative democratic CSR, with hints of the other two, where companies work collaboratively with governments and communities to deliver public goods. Technology companies have a responsibility to intervene in the digital economy, but success is best seen through a collaborative effort with governments, low-income communities,

and schools (WE Communications, 2021). CSR must be designed as a tool for strategic enrollment–aligning all actors to work toward a common goal.

The Responsibility of Engineers

Lastly, from this paper so far, it may seem like I am arguing that bridging the digital divide primarily falls in the hands of governments, policymakers, or corporate leadership, not engineers or lower-tier workers, as issues like infrastructure development and funding fall outside the scope of engineering expertise. However, it is imperative that engineers design technologies that are accessible to marginalized and low-income communities. This means considering affordability, offline functionality, and usability for those with limited digital literacy. Just like with the Marion school example, technology was provided but infrastructure and accessibility barriers still limited long-term success (Turner Lee, 2020). Engineers have an ethical responsibility to ensure their technologies do not exacerbate existing inequalities. Just like with the responsibility of leadership and Big Tech, everyone has a responsibility for serving the public good. Engineers can emphasize the role of non-human actors–infrastructure and digital tools–and ensure their designs are adaptable to existing systems in underserved areas. In the network, they act as translators, as they have the ability to transform the goal of "digital equity" into concrete learning tools.

Discussion

From the analysis through Actor-Network Theory, it is clear that all actors–governments, educational institutions, technology providers, infrastructure, and more–in the network need to have aligned interests in order to achieve sustainable progress in closing the digital divide.

Misaligned priorities have hindered many initiatives aimed at improving digital access and educational inclusion. Government programs, such as the Affordable Connectivity Program, are stalled by political agendas, overregulation, and insufficient funding for long-term results. Technology providers face pressure to prioritize short-term profitability over sustained social impact. Schools and marginalized populations encounter barriers such as lack of sufficient infrastructure, budget constraints, and digital literacy challenges. This problem of partial-enrollment is evident in the Marion school example, where they benefited from digital tools under ConnectED but faced limited community broadband access and transportation barriers. The digital divide reflects deeper structural inequalities that require the realignment of actor priorities.

Long-term collaboration between actors is essential to address these inequalities. Relating to government and policy, there should be increased focus on sustained infrastructure investments (e.g., expanded broadband access) as well as funding policies that emphasize equity and accessibility. Subsequently, this can motivate technology providers to invest in Corporate Social Responsibility (CSR) initiatives with more strategic collaborations, borrowing from successful examples seen in Asia: Google's Skills Ignition SG Program, Lenovo and Microsoft's EdVision Program, and Alibaba's Rural Revitalization Fund. Educational institutions and low-income communities should seek out partnerships with such technology providers to expand digital learning opportunities. This can include providing offline tools, computer labs, and increased internet access. Lastly, engineers have the ethical duty to ensure technologies are adaptable to different infrastructure and designed for all types of learners. These designs should emphasize digital equity and offline functionality, compatibility with limited infrastructure in

marginalized communities, and affordability and usability for populations with digital literacy concerns.

While it may seem that the problem of bridging the digital divide should fall on policymakers or corporate leadership, it can not be solved by any actor acting in isolation; it is about actors recruiting, aligning, and strengthening their relationships with one another. Everyone has a role to play in promoting digital equity and accessibility. While governments and corporations play critical roles in motivating lower-level actors to make change, engineers also hold influence over the enrollment of non-human actors–digital tools and infrastructure–that determine technology accessibility. As with Marion, Alabama, while schools became abundant with resources earmarked and targeted to educational gains, surrounding communities still lacked the digital infrastructure to support the increased technology training within schools (Turner Lee, 2020). Even with government funding and Big Tech support, if infrastructure and digital tool designs are not aligned, sustained progress cannot be achieved. All actors, human and non-human, need to be aligned for true progress in bridging the digital divide.

As for future directions, I could investigate long-term impacts of digital inclusion strategies on educational outcomes. This would likely include research on how expanded broadband access through government or private partnerships has affected academic performance in marginalized areas. With this, exploring the digital inclusion strategies that have led to sustained improvements in academic performance across different communities would provide key insights into proposing the most effective and applicable solutions. I could also dive into how cultural and linguistic factors shape the adoption and effectiveness of educational technologies. With my paper, I have focused on the relationship between low-income communities and digital access concerns, whereas there are other factors such as language

barriers that can influence this problem in terms of digital literacy. Often, low-income communities and educational language barriers are intertwined issues. Lastly, I would hope to assess the scalability of CSR initiatives and collaborative models on various socio-economic and geographic contexts. This would lead to research of whether similar collaborations (government and nonprofits) can be replicated in other regions with scalable impacts.

Ultimately, bridging the digital divide requires unified efforts across sectors. Only through sustained collaboration, strategic investments, and the alignment of both human and non-human actors can we achieve true digital inclusion for all students, regardless of their socioeconomic background. Without coordinated efforts, the digital divide will continue to hinder both social mobility and economic opportunities for millions of students.

References

Affordable Connectivity Program Consumer FAQ. (n.d.). Federal Communications Commission. Retrieved June 3, 2024, from https://www.fcc.gov/affordable-connectivity-program-consumer-faq

Busby, J., Tanberk, J., & Cooper, T. (2021, May 5). BroadbandNow estimates availability for all 50 states; confirms that more than 42 million Americans do not have access to broadband. *BroadbandNow*. https://broadbandnow.com/research/fcc-broadband-overreporting

Cator, K. (2019, January 9). *Closing the Digital Learning Gap*. Digital Promise. https://digitalpromise.org/closing-the-digital-learning-gap

Dean, M. (2024, June 7). *What are Some Barriers to Technology Integration in Education?* EDTECH. https://www.hmhco.com/blog/barriers-of-ict-in-education?srsltid=AfmBOoo8T9TctONEvLID3-9LTxdmT2KlbGiANPykPeqkPDq1-dsjuAbk

Emergency Broadband Benefit. (2023, December 18). Federal Communications Commission. Retrieved April 13, 2025, from https://www.fcc.gov/broadbandbenefit

Faik, I., Thompson, M., & Walsham, G. (2013). Facing the Dilemmas of Development: Understanding Development Action through Actor-Network Theory. In *Actor-Network Theory for Development* (p. 29). Centre for Development Informatics Institute for Development Policy and Management, SED. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://hummedia.manchester.ac.uk/institutes/cdi/resources/cdi_ant4d/ANT4DWorkingPaper2FaikEtAl.pdf

Institute of Electrical and Electronics Engineers. (n.d.). *Digital Divide in Developing Countries: Why We Need to Close the Gap*. Connecting the UNCONNECTED. https://ctu.ieee.org/blog/2023/01/23/digital-divide-in-developing-countries-why-we-need-to-close-the-gap/

Lee, N. T. (2020, March 2). *Bridging digital divides between schools and communities*. Brookings Institution. Retrieved April 13, 2025, from https://www.brookings.edu/articles/bridging-digital-divides-between-schools-and-communities/

Li, A. (2018, April 2). *Google's 'Rolling Study Halls' equip buses w/ Wi-Fi & Chromebooks, expands to thousands of rural students*. 9To5Google. https://9to5google.com/2018/04/02/google-rolling-study-hall-expansion/

Lindman, J., Makinen, J., & Kasanen, E. (2022, June 30). *Big Tech's power, political corporate social responsibility and regulation*. Sage Journal. https://journals.sagepub.com/doi/full/10.1177/02683962221113596

National Telecommunications and Information Administration. (2024, September 10). *NTIA Fact Sheet: Bridging the Digital Divide*. NTIA. https://www.ntia.gov/press-release/2024/ntia-fact-sheet-bridging-digital-divide

Perrin, A., & Atske, S. (2021, April 2). *7% of Americans don't use the internet. Who are they?* Pew Research Center. https://www.pewresearch.org/short-reads/2021/04/02/7-of-americans-dont-use-the-internet-who-are-they/

Seth, M. J. (2013, Winter). *An Unpromising Recovery: South Korea's Post-Korean War Economic Development: 1953-1961*. Association for Asian Studies.

https://www.asianstudies.org/publications/eaa/archives/an-unpromising-recovery-south-koreas-post-korean-war-economic-development-1953-1961/

Sismondo, S. (2010). *An introduction to science and technology studies (2nd ed.)*. Wiley-Blackwell.

ThouCentric. (2024, August 12). *Sustainability And CSR In Tech-Driven Enterprises*. ThouCentric. https://thoucentric.com/blog/sustainability-and-csr-in-tech-driven-enterprises-thoucentric/

Understanding the Digital Divide in Education | AU. (2020, December 15). American University School of Education Online. Retrieved April 13, 2025, from https://soeonline.american.edu/blog/digital-divide-in-education

U.S. Chamber of Commerce. (2023, April 17). *How Big Government Mandates Hinder Closing the Digital Divide*. U.S. Chamber of Commerce. https://www.uschamber.com/technology/broadband/how-big-government-mandates-hinder-closing-the-digital-divide

WE Communications. (2021, September 16). *Power of example: Tech's role in closing the digital divide.* We. Communications | PR and Integrated Marketing Communications. https://www.we-worldwide.com