

Technology Inequality in Low Income Minority Youth and Its Developmental Effects

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Introduction

Technology has become an important use in human's day to day lives. As technology becomes a beneficial tool for humans, the accessibility of this tool is not the same for every individual; This brings up the term "digital divide." Multiple factors create the digital divide in society. One example is the availability of digital resources. The cost of technology creates a gap in accessibility for different sets of individuals. Both low socioeconomic and minority groups, when compared to high socioeconomic individuals, do not have the same equal access to technological resources. We can find the lack of access is seen in their homes, schools, and in their communities. Data recorded by the U.S Department of Commerce in the late 1900s show that Black and Hispanic individuals were less likely to own a computer when compared to White individuals (U.S Department of Commerce 1999). In 2019, it is reported that internet use among non-white individuals was less than that of White individuals (Remaley, 2020). This report raises the question of potential outcomes that the digital divide creates. Our project examines the relationship between the accessibility of technology and the developmental effects it may have on minority youth from low-income households.

Literature Review

In a post-pandemic world, we can find many schools and teachers utilizing learning platforms such as Epic!, Google Classroom, and Seesaw to provide a holistic learning experience. While these resources are remarkable for their purpose, they can unintentionally create inequality or a digital divide. The digital divide is the inequality students face on a national scale as education systems transition to utilize digital educational resources inside and outside of the classroom to provide an enhanced learning experience. The term digital divide has many dimensions to it. It comes not only from the lack of access to a computer or internet; but

also from the lack of skill and effectiveness of online education (van de Werfhorst et al., 2022, 2). This digital divide and its outcomes have been an ongoing discussion for the past couple of decades. For example, data from a 2002 Educational Longitudinal Study (ELS) reports a significant relationship between computer use at home and academic achievement in school (Du et al., 2004). This data reveals an outcome of unequal access to technological resources among students. Those who cannot own a computer are limited in their academic success. In addition, non-white students and students from low SES backgrounds in the 2022 ELS data were reported to have a low percentage of computer use compared to White students and students from a high SES background (Du et al., 2004). Due to the differences in economic background, we see an unequal distribution of resources between different groups. As technology becomes more embedded in a student's academic career, we must explore if there are potential developmental outcomes that can result in low SES minority groups when there is a lack of technological resources.

A study found that nationally, approximately 17% of children cannot complete their homework due to limited internet access. The lack of internet access perpetuates the homework gap. Furthermore, these adverse effects hinder students' development and leave them unable to keep up with the curriculum and their peers. Children who entered the digital divide existed before the COVID-19 pandemic; but only worsened as students could not access the resources needed to continue their education from home. According to a New America survey, sixty-five percent of families below the federal poverty line reported that their child could not participate in class, could not complete their schoolwork, or had to participate over the phone due to the lack of access to a computer. Furthermore, data from a survey of more than one thousand lower-income families with students ages 3-13 shows that fifty-six percent have slow internet

connections, thirty-four percent hit their data limits in 2020, 59 percent have a poor-quality computer, and 28 percent have limited number of devices to share (The Education Trust-West, 2021).

Research Question

Based on these findings, we see that low socioeconomic individuals are negatively affected by the digital divide. Past findings have shown that disadvantaged students without proper technology and internet resources cannot perform successfully in school. Academics play a significant role in providing students with critical thinking and technical skills to help them succeed in the workforce. In addition, these educational tools assist in areas of human development such as cognitive, emotional, and language development. Are there developmental effects for low-income minority youth when they cannot access technology?

Research Design

Analysis of developmental effects for low-income minority youth will be conducted by using an open-response questionnaire survey. Survey administrations will be done by email, in-person, or phone interview. Our target participants will be adults. Requirements to participate are that these adults must have a direct association to a low socioeconomic minority youth. The participants must be either a parent, caregivers, teachers or any school faculty that works directly with youth. Participants who have a direct association with a youth can provide the most accurate data on their technical and academic performance. Participants will be recruited via service site location or social media if the service site does not provide services to youth. This survey will be conducted over two weeks to be able to record as much data as possible from different participants.

The survey will be conducted by 3 group members each asking their respective organization members the following questions:

- Describe how access to technology (i.e tablets, phones, computers, etc) has benefited your child or student(s) in their academic career.
- Due to students' familiarity with technology, what are some behaviors you have noticed they took the initiative on their own when using a smart device?
- Have you observed your child or student(s) struggling with utilizing educational technologies? If so, what are some pain points, and how does this affect their academic success?
- Describe the quality of digital resources available to your student(s).
- How can the government assist the digital divide that we face in our society today?
- If the government cannot help, do you think it is the responsibility of big tech companies such as Apple, Samsung, Dell, etc. to make technology more accessible? In what ways can they help assist lower-income families?

Service Organizations

Community Tech Network (CTN), a 501(c)3 non-profit organization located in San Francisco California started in 2001 with the name TechSoup (Community Tech Network, 2022). The organization was created to assist the community in learning about rapidly changing technology and the internet. In 2017, CTN expanded its services to the community in Austin Texas (Community Tech Network, 2022). Since then CTN has offered remote and in-person services to older adults and individuals with disabilities. CTN is partnered with multiple agencies ranging from those that provide social services to reaching as many individuals who need technical assistance. CTN believes that digital equity is a right and that individuals who are

underrepresented in the digital divide should have the resources to acquire the technical skills to use the internet and technology (Community Tech Network, 2022). Although this organization does not assist low socioeconomic minority youth, they assist low socioeconomic minority elders and people with disabilities. That being said, a parent will be a participant in this research project. This parent will report data on their child, a recent kindergarten student who identifies as a low socioeconomic minority.

Oppia Foundation is a 503(c) nonprofit organization founded in 2015 in Mountain View, California. Oppia's mobile learning platform can be utilized entirely offline once installed on a mobile device or used in offline mode in the browser. Oppia foundation's vision is to help anyone learn anything they want effectively and enjoyably. The organization is currently focused on improving access to high-quality, affordable education for students who cannot attend school regularly or whose school does not provide them with adequate learning experiences. Oppia has developed its unique learning platform that simulates an interactive tutor who adapts each lesson to an individual learner's needs with specific feedback and hints to help them improve. Furthermore, the platform is designed to allow lessons to be supplemented with subtitles in students' preferred language. Oppia foundation's mission to provide access to high-quality education to youth who may not have adequate access to educational resources aligns with the research topic even though the learning platform does require a device but can be utilized offline. This site does not work directly with youth from low socioeconomic backgrounds; however, I can interview a teacher that works directly with low socioeconomic elementary students who would be able to provide data on this topic.

Computers 4 Kids is a nonprofit organization located in Sacramento, California. The organization was created to help underprivileged students have equal access to technology. This

organization takes computer donations from government entities and companies and helps refurbish them to give back to the community at a much lower and affordable rate. The organization provides computers and technology assistance to the general public, so anyone can purchase a computer or bring in a device for repair, but it mainly focuses on helping out low-income students who need access to technology for school. This service organization is a prime example of how there is a vast digital divide in our society. This organization focuses on and explicitly assists low-income youth so they have an equal opportunity to a fair education and a successful career. At this organization, we will directly interview a customer who utilizes Computers 4 Kids to purchase the necessary technology they need to help assist their students/kids in their academic endeavors.

Findings

A theme among all participants was that more help and resources could be provided to low-income families to help their children succeed academically. Many low-income families cannot afford computers or internet access due to the cost of these items. Some of our participants who were able to provide digital resources spoke about how access to tech resources has benefitted them or their children in learning. “Students have access to a variety of learning resources and [technology] has provided a great source of enrichment” (see Appendix C for the interview). Another participant states “I can use online lessons that I find on the internet to teach her [daughter] the things like the alphabet, colors, animals, and Spanish to prepare her school” (see Appendix B for interview).

Technology resources have become vital tools for completing school assignments and overall academic success. It is essential to notice that without the appropriate technology resources, students can potentially fall behind in school. This ultimately puts underrepresented

students behind compared to other students with access to these resources. Once these students start to fall behind, they are less likely to complete high school, obtain a college degree, and obtain a stable career. All this stems from the lack of appropriate technological resourcing. Without access to technology and the internet, we see the continuation of the digital divide among underrepresented communities and a negative effect on academic success that can result in developmental effects.

In addition, our findings also revealed an evident lack of funding and resources for digital access to low-income SES families by the government and/or tech companies. When we look at the contributions tech companies provide to our communities there is not much support from them regarding providing technology resources to low socioeconomic families. Big tech companies like Apple sell overpriced products to the people that can afford them. Although they tend to decrease the price of older products after a couple of years, it is still something that is not a viable option for most low-income families. When asking a 2nd-grade teacher how big tech companies like Samsung and Apple can help low socioeconomic families, she said “Donation, low-cost devices, educational products” (see Appendix C for interview). From the standpoint of a teacher who works directly with students in low socioeconomic communities, we can see that they need help. Another participant states, “Funding for nonprofits who do outreach for children and low-income families is a must, as it is nearly impossible for someone to not have a computer for school or home use these days” (see Appendix A for interview). Our interviews show that low socioeconomic groups lack funding and accessibility to technology from the government or big tech companies.

Conclusions

The findings in our report examined the effects of the inaccessibility of technology and

the internet among low-income minority youth. From our findings, we acknowledge that the digital divide among these groups remains prevalent today. Our data from interviewing members of these communities support our research question of how a lack of access to technology affects the development of low-income minority youth. Based on our findings and prior research, we see that digital accessibility is vital in order for these individuals to succeed academically. From our interviews with parents, students, and teachers we have seen precisely how important it is to have the necessary resources to succeed in school. Insufficient technology resources in schools and homes prevent students from having the proper tools to accomplish their school work and continue their academic learning.

In addition, our findings also highlighted the importance of funding and cost. The cost of today's technology is an additional barrier that individuals from low socioeconomic backgrounds face in the current digital world. Tech companies are not making their products cost-friendly for low-socioeconomic families, and the government is doing nothing to regulate these prices or provide funding for low-income communities. We saw a constant theme across the board from parents and teachers that there is a desperate need for funding from either the government or major tech companies. The government and big tech companies can help bridge the gap between the social classes and minority races by providing the necessary support to low socioeconomic groups. Being in a low social class and minority race inevitably puts these families at a disadvantage. Without help from the government and big tech companies, we will not be able to bridge this gap.

Recommendations

For future research purposes, we would recommend surveying a wider audience. In order to collect stronger data we can conduct surveys from students ranging from K-12 in low, middle

and high class communities. We can focus on students and how likely they plan to go to college and what communities they live in and correlate our findings with how technology accessibility plays a role in a student's success.

In addition to future research, we also propose cross-sectional studies that report on minority groups from different socioeconomic backgrounds in order to provide information on how access to technology affects different areas of human development. The inaccessibility of technology and the internet among different socioeconomic groups is an outcome of their economic status. Analyzing different socioeconomic groups can provide more information on income's role in the digital divide. In terms of advocacy, we believe that tech companies should make their devices more affordable and provide products to underrepresented students as donations or at low cost with the option to finance the device over an extended period.

Furthermore, we recommend that the government bolster the availability of computers at libraries and public spaces where students may be able to access computers to complete their school work. Additionally, the government should create computer loaner programs that would allow these low-income students to borrow devices to complete their work as needed. A step further in this direction would be to create workspaces for students to complete with school work or further their education after school or during the weekends. These spaces would require a joint venture between big tech companies and the government to ensure that they are well funded and have the resources necessary to scaffold the growth of all students. Youth from low-income communities will then have the proper tools to succeed in school and thus potentially pursue higher education and higher-paying jobs. The funding from the government and tech companies can substantially help increase the accessibility of technology for low socioeconomic communities and provide equality of technological resources.

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Appendix A

Computers 4 Kids - Customer/Volunteer interview

This interview was conducted in person at the service site. The interviewee was Raymond, a young college student who comes from a low income background. Raymond is currently a volunteer at the site. This individual was ideal due to his close work with the organization and his previous experience utilizing the resources that this site provides.

Question: Describe how access to technology (i.e tablets, phones, computers, etc) has benefited your child or student(s) in their academic career.

Answer: Thanks to computers that I received from Computers 4 Kids I was able to complete my school homework even faster than I normally would be able to on paper, accessing the internet is also a great way to double check my work and make sure that I truly understand the concepts presented to me in my coursework.

Question: Due to students' familiarity with technology, what are some behaviors you have noticed they took the initiative on their own when using a smart device?

Answer: They learn to type so much faster than children my age were able to, they learn touch typing from a very young age.

Question: Have you observed your child or student(s) struggling with utilizing educational technologies? If so, what are some pain points, and how does this affect their academic success?

Answer: Usually the things I notice children struggling with when it comes to technology is safe internet browsing, making sure to keep the computer virus free. Safe is more than just an anti virus, it's about knowing how to properly read the things that you receive in emails and to understand the basics of internet safety.

Question: Describe the quality of digital resources available to your student(s).

Answer: They have been very good, the price is very good (260 for a macbook pro)

Question: How can the government assist the digital divide that we face in our society today?

Answer: Funding for nonprofits who do outreach for children and low income families is a must, as it's nearly impossible for someone to not have a computer for school or home use these days.

Question: If the government cannot help, do you think it is the responsibility of big tech companies such as Apple, Samsung, Dell, etc. to make technology more accessible? In what ways can they help assist lower-income families?

Answer: They could go about donating refurbished or older devices to people in need or helping fund nonprofits that do. Another thing they could do to help would be to offer easier repairs for those companies.

Appendix B

Parent Interview

This interview was done in person. The participant for this interview was a parent who reported on behalf of their daughter.. The parent and daughter both identify as a low SES minority individuals of Mexican descent. The daughter is a 4 year old beginning preschool.

Question: Describe how access to technology (i.e tablets, phones, computers, etc) has benefited your child or student(s) in their academic career.

Answer: I am able to use online lessons that I find on the internet to teach her [daughter] the things like the alphabet, colors, animals, and Spanish to prepare her school.

Question: Due to students' familiarity with technology, what are some behaviors you have noticed they took the initiative on their own when using a smart device?

Answer: She [daughter] is able to unlock our devices and get on Youtube or any of the game applications already downloaded to our devices.

Question: Have you observed your child or student(s) struggling with utilizing educational technologies? If so, what are some pain points, and how does this affect their academic success?

Answer: She [daughter] gets distracted easily and if there is no supervision when they are using their devices they will not do their homework or watch educational videos.

Question: Describe the quality of digital resources available to your student(s).

Answer: They [daughter] have access to the internet and smart devices such as my phone and tablet.

Question: How can the government assist the digital divide that we face in our society today?

Answer: The government can provide better support to schools in low income areas. They can provide schools with laptops or tablets that students can use at school and take home to use for their homework.

Question: If the government cannot help, do you think it is the responsibility of big tech companies such as Apple, Samsung, Dell, etc. to make technology more accessible? In what ways can they help assist lower-income families?

Answer: These companies can assist low income families by making their phones and computers more affordable.

Appendix C

2nd Grade Teacher Interview

This interview was conducted in person with a 2nd grade teacher who teaches at a Title I school in the Franklin Unified School District. I chose this interviewee for two reasons: firstly she has taught at both high SES school districts and low SES school districts and secondly she has taught through the pandemic.

Question: Describe how access to technology (i.e tablets, phones, computers, etc) has benefited your child or student(s) in their academic career.

- Students have access to a variety of learning resources and has provided great source of enrichment.
- District provided devices allowed for remote learning for students thus allowing them to learn over the pandemic.
- Online reading platforms like Epic! Allowed students to read.

Question: Due to students' familiarity with technology, what are some behaviors you have noticed they took the initiative on their own when using a smart device?

- Students who are familiar with technology tend to be more comfortable navigating technology, although these students may also exhibit know-it-all behaviors and may not engage with learning platforms as much or become disinterested in activities.

Question: Have you observed your child or student(s) struggling with utilizing educational technologies? If so, what are some pain points, and how does this affect their academic success?

- Students struggle in various ways ranging from signing on to physically using the device.
- Reading abilities plays a huge role in utilizing educational technology.
- Pain points:

- Navigation
- Readability
- Multiple steps
- Content taking too long to load
- Effects on Academic Success:
 - Doesn't finish homework
 - Falls behind in class or does not completely grasp concepts.
 - Waterfall effect - sets them up for failure for the next module or school year

Question: Describe the quality of digital resources available to your student(s).

- Students in this school district have iPads available for use only in class whereas previous school district had devices available to take home and use throughout their learning career.
- Digital platforms: Epic!, Clever...
- Lower quality compared to previous school district she taught at.

Question: How can the government assist the digital divide that we face in our society today?

- Increase funding to schools, provide 1-1 quality devices that work well
- Provide access to digital learning resources to low SES schools/Title 1 schools
- Provide free reliable internet access to students/ low SES families.

Question: If the government cannot help, do you think it is the responsibility of big tech companies such as Apple, Samsung, Dell, etc. to make technology more accessible? In what ways can they help assist lower-income families?

- Has a quote when government fails its people, its up to corporations to help the people.

- High value companies have the means to donate devices to schools although doesn't see it happen too much
 - Children and taking care of devices don't work well together meaning that district provided devices need to be replaced more often.
 - Companies need to make more durable products for educational purposes
- Donation, low-cost devices, educational products.