Student Achievement Gaps and the Digital Divide

Brenda Quintanilla

University of North Texas

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Abstract

This study uses Meta Analysis to discuss the digital divide and it's impact on disadvantaged students. Although the divide has narrowed in recent years, we still see accessibility gaps throughout our nation. These gaps are predominant among the disadvantaged, specifically in African-American and Hispanic communities. Studies have shown that the lack of accessibility places students in these communities at a disadvantage. These disadvantages include achievement gaps and lower college enrollment.

Keywords: digital divide, achievement gap, technology, underserved, underprivileged,

Introduction

Over the past 20 years technology has become a standard part of education, business, and community. With the integration of technology, comes the awareness that this phenomenon has the potential to bring great benefit to people's lives. Unfortunately, as government and businesses have increased their access to computers and technology, many households and schools have fallen behind. The lack of access to computers and technology has created an inconsistency that could potentially create an even greater gap in today's socioeconomic sectors.

Although the gap in technology access in relation to poverty and minority group status still persists, the gap has narrowed in recent years. There remains, however, a very significant gap in access at home to computers and to the Internet between these groups (DeBell & Chapman, 2003; Kleiner & Farris, 2002). Still, even when income factors are leveled, African Americans and Hispanics are less likely to use computers at home. (Ba et al, 2001) Statistics similar to this one and the reality that there are discrepancies in the equitable use of technology creates a bigger gap in the disparities of our educational system.

According to Mason and Dodds (2005) "for students without a connection at home, schools are the primary source of computer access and often the only place they can go online." Unfortunately, transportation, time restrictions, and school conflicts can prevent students without home connections from using resources like schools and libraries.

Public schools are under great pressure to adhere to curriculum and state mandated exams. Schools are required to show adequate yearly progress (AYP) and make the grade. As our economy has changed, funding for technology has become limited.

Priorities have shifted. Teachers have less time to recreate their lesson plans. However, they are expected to integrate technology into the learning process. Many times teachers are not provided the resources to learn how to effectively integrate technology, or even have enough computers in their classrooms to provide online access. For example; In Chicago, the Bronzeville Scholastic Institute has a computer lab with 24 computers. This lab is shared by nearly 1000 student from the three schools on the campus (Pandolfo, 2012). Across the country technology spending varies greatly. Some districts have access to grants and local donations while others rely on federal funding. This creates schools with one-to-one access and others with out-of-date infrastructure. As public schools integrate technology, students are also expected to use and have the resources needed to keep up with the demands. For some, this expectation is very unrealistic. This study will survey a group of students to measure access to technology and compare the grade point average (GPA) of the students based on their responses. I suspect there will be a correlation between computer access, use, and overall GPA.

Methodology

A random group of 300 students will be surveyed. The students will be divided equally into Blacks, Hispanics, and Whites. Each group will be given the same survey. The survey will question students about access to technology (in and out of school), use of technology, and attitudes toward technology. The survey will ask about ease of homework completion when technology is required. The GPA of each student will also be included.

Participants

100 Hispanic, 100 White, and 100 Black students will randomly be selected from a local public school district in a major metropolitan city.

Material

A survey will be used to question the students. The survey will ask about technology access at home and in the classroom, frequency of computer use, Internet access, ease of completing computer based assignments, and student grade point average (GPA).

Procedure

A survey will be sent home with each student. The students will be asked to complete and return the survey.

Analysis

The survey responses will be correlated. Student GPA will be compared with students who have access and use technology to those who do not have access to technology or who do not use technology.

Literature Review

In 1995 the U.S. Department of Commerce's NTIA division published its first major report on home computer usage (Salpeter, 2006). The Salpeter report was one of a first to account the serious technology gaps between different U.S. households. The report revealed that "white and well-educated households were far more likely to have access to telephones, computers, and telecommunication than Native Americans, Latino, and African American households, or those whose residents had a lower level of education" (Selpeter, 2006). This gap is known as the *digital divide*. The term is often

associated with the division between those who have access to a computer and the Internet, and those who do not.

A report by The Center for Children & Technology states "the digital divide is more than digital. It is a sociological phenomenon reflecting broader contextual factors such as existing social, economic, cultural, and learning inequalities" (Ba et al, 2001, pg.1). Interestingly, over the past 50 years race and income inequalities have taken a different role. Where race was the primary inequality 50 years ago, household income is now the factor that creates the largest gap in equality (Tavernise, 2012).

So how do these discrepancies affect the quality of education for students who are classified in these socioeconomic disparity groups? For one, there is the question of accessibility. Connection does not mean reliability or quality. Digital Subscriber Lines (DSL) has been an option in almost every zip code since 2005. Adults with higher education levels are usually the first adopters (as cited in Salpeter, 2006). Affordability and perception of need sways the disadvantaged from connecting with DSL. The difference between DSL and a phone modem is not disputable. The time lag alone creates a discourse between writing a successful research paper and putting something together based on time and speed of data transfer. Slow access, or no access, will deter computer use.

Fairlie stated that the 2001 census data showed a technology gap that was "larger for children than for adult." He indicated that it was "especially troubling given the potential importance of access to technology on educational and future labor market outcomes" (Selpeter, 2006). According to the 2004 Pew's Parents and Teens survey, 87 percent of all youth between the age of 12 and 17 used the Internet. The increased use

by teenagers is encouraging because it shows that technology access has increased for children. The increase is most likely due to programs like No Child Left behind and computer adoption programs by public schools (Chapman, Masters, and Padulla, 2010). Community Technology Centers (CTCs) have also become a resource in many communities and provide great value for outside usage. Several studies have shown that these programs are successful in providing technology access to underserved individuals and their communities. In fact, Community Technology Centers provide the underprivileged with free or low-cost access to the technology enjoyed by most other Americans.

For increased home accessibility to be successful, parent involvement and computer monitoring is vital. Single parent households are becoming more dominant in low-income communities. These parents are stretched for time and resources. Unfortunately, they are less likely to monitor computer use and, consequently, there is less guidance to promote the computer as an educational tool. In turn, many of these students use the computer as a leisure resource, or time waster, rather than for schoolwork. Lei and Zhou (2012) collected survey data from 1,576 middle school students in China. The reports indicated that "home internet access and parental support were significantly positively associated with technology self-efficacy, interest in technology, perceived importance of the Internet, and perceived impact of the internet on learning".

The gap in home access is exacerbated by the fact that even when they do have access, low-income students benefit less academically from home computer access than do high-income students (Attewell & Battle, 1999). One example is an analysis of

NAEP Mathematics performance of grade 4 and 8 students (Wenglinsky, 1998), which reported that low- income students were significantly more likely to be taught lower-level skills on the computer than more affluent students. Furthermore, at the grade 8 level, the use of computers to teach lower-level cognitive skills (drill-and-practice activities) was negatively related to academic achievement, whereas the use of computers to teach higher-level cognitive skills through simulations and applications was positively related to achievement (Cummins, Brown, and Sayers, 1999). In addition, a 2003 study by the U.S. Department of Education showed that "more high-income children with home computers use them for word processing than low-income children: 41% if those with incomes under $20,000 word process, compared to 59% of those with incomes of $75,000 or more". In 1998, "80 percent of families making more than $100,000 have computers. By contrast, of those families making less than $30,000 a year, only 25 percent have computers" (Benton Foundation, 1998, p. 3).

According to John Baily, the director of the Office Educational Technology for the Department of Education, "the achievement gap and the digital divide are similar because they effect the same group of students, a majority of whom are minorities in low-income families. Anytime you use technology to close the achievement gap, you will close the digital divide," he says (Vail, 2003. Pg. 24). Laura Bestler-Wilcox (2008) researched several studies to look at the correlation of the digital divide and college access. She found that according to Vengas (2007), low-income students who faced issues with college access paralleled those K-12 students who were unable to have significant Internet access. She also summarized that "while colleges and universities continued to increase online resources and processes available to potential incoming

students, these practices impeded college admission for students faced with digital access barriers." (Bestler-Wilcox, 2008)

Ba et al (2001) states that "to date, the digital divide debate has turned on the concept of access, that is, providing access to those who have no computer or telephone and thus cannot enter the Internet realm at school or home. The concept of "access" encompasses the acquisition of hardware and software as well as complex uses of software for design and production. Between these two extremes, which represent both physical and expressive access, lie other dimensions of access: quality and affordable hardware and software, tools with rich educational content and/or fun activities, and technical and educational support".

This access dilemma now includes digital textbooks. In early 2012 Apple announced its iBooks 2 initiatives. This is Apple's move into the digital textbook market. iBooks 2 is a partnership with McGraw-Hill, Pearson, and Houghton/Mifflin/Harcourt to digitize textbooks for use on iPad. The claim is that print textbooks are expensive to produce, heavy to carry, and out of date for today's tech savvy students. In theory this is wonderful. The only problem is that to view and interact with these textbooks you must have an iPad. In fact, the textbooks are digitized through Apple's proprietary software called iBook Author. The proprietary nature of this agreement locks users into using only Apple products to view the books. For this adoption process to work students would need to either purchase an iPad or schools would need funding to provide them. The chances that low-income students would have the same equity to participate in these types of adoptions are low. As stated by Gillian Shaw in her Digital Life blog "some

students can afford the technology, those who can't shouldn't be barred from using it. At a time when there are kids going to school without enough to eat or socks to wear in the coldest weather, the prospect of an iPad in every student's hands seems remote indeed" (Digital Life, 2012).

Discussion

Over the last 10 years there has been plenty of data collected to show that students are using computers. This data has also shown that certain types of student populations have greater access to technology than others. Cummins, Brown and Sayers state that "technology *can* play a highly significant role in promoting literacy among all students and particularly among low-income and minority students. Technological tools such as the Internet and World Wide Web can also contribute in important ways to the development of a socially committed and intellectually critical citizenry". As we continue to close the gap and the divide in our nation, technology resources are becoming more readily available to those who need them. Libraries, community technology centers, before and after school access, and cell phones help to close the gaps as we look for better solutions.

Conclusion

"The digital divide is more than a gap to technology access. In the twenty-first century, knowledge and information and a highly skilled labor force are increasingly important determinants to growth in the global economy" (education.StateUniversity.com). Additionally, Charles Murray, a scholar at the American Enterprise Institute, states that the growing gap between the better educated and the less educated has formed a kind of cultural divide that has its roots in natural

social forces, like the tendency of educated people to marry other educated people, as well as in the social policies of the 1960s, like welfare and other government programs, which he contended provided incentives for staying single (Taverinse, 2012). Students who do not have access to technology, or do not live in households where the use of technology is perceived as beneficial, will fall into this cultural divide. There will be an increased gap between the rich and the poor, the educated and uneducated.

Our society is evolving more quickly than ever. Those who can keep up with this evolution have a greater chance of success than those who do not. Individuals with a bachelor degree out earn individuals with a High School Diploma. Resource equality can help narrow that gap. Closing the digital divide, however, will take more than just putting a computer in every household. We must provide technology resources and training to our teachers, communities, parents, and students. If we can actively combine the two, both the digital divide and the achievement gap will continue to narrow.

Resources:

Ba, H., Culp, K. M., Green, L., Henriquez, A., & Honey, M. (2001). *Effective Technology Use in Low-Income Communities: Research Review for the American Connects Consortium*. The American Connnects Consortium, Center for Children & Technology. http://cct.edc.org/admin/publications/report/acc_rr01.pdf

Benton Foundation (1999). *Native Networking: Telecommunications and Information Technology in Indian Country*. Washington, DC: Benton Foundation Communications Policy and Practice Program.

Bestler-Wilcox, L. (2008, June 24). *Is there a Correlation between the Digtial Divide and College Access*. Retrieved July 06, 2012. http://www.laurabestler.org/is-there-a-correlation-between-the-digital-divide-and-college-access/

Chapman, L. , Masters, J., Pedulla, J. (2010) *Do Digital Divisions Still Persist in our Schools? Access to Technology and Technical Skills of Teachers in High Needs Schools*. Journal of Education for Teaching , vol. 36, no. 2, pp. 239-249.

Chih-Yuan Sun, J. (n.d). *The Digital Divide and Its Impace on Academic Performance*. University of South California, Rossier School of Education & Davis School of Gerontology. http://net.educause.edu/ir/library/pdf/WRC08034.pdf

Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2008). *Scaling the Digital Divide: Home Computer Technology and Student Achievement*. Duke University. http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.172.8466

Cummins, Brown, & Sayers. (n.d.). Teaching for Success in Changing Times.

Hoffman, D. L., & Novak, T. P. (1999). The Growing Digital Divide: Implications for an Open Research Agenda. http://www.chihtu.org/bb/etc545/lesson6/Cummins_-_Technology_PDF.pdf

Lei, J., & Zhou, J. (2012). *Digital Divide: How Do Home Internet Access and Parental Support Affect Student Outcomes?* www.mdpi.com/journal/education.

Mason, & Dodds. (2005). Bridge the Digital Divide for Educational Equality.

Pandolfo, N. (2012). *As some schools plunge into technology, poor schools are left behind*. Chicago: The Hechinger Report. http://articles.chicagotribune.com/2012-01-25/news/ct-x-digital-divide-0125-20120125_1_computers-consortium-for-school-networking-poor-schools

Education.stateuniversity.com. *The International Gap in Technology - The Digital Divide in Education, Education and Technology in the Balance*. Retrieved July 6, 2012, from http://education.stateuniversity.com/pages/2124/International-Gap-in-Technology.html.

Salpeter, J. (2006, March). Inside the Divide. *Technology & Learning , 26* (8), p. 22 - 27. http://www.techlearning.com/article/43386

Shaw, G. (2012, January). Apple's new textbooks: Advancing education or widening the digital divide? *Digital Life*. Retrieved July 20, 2012. http://blogs.vancouversun.com/2012/01/20/apples-new-textbooks-advancing-education-or-widening-the-digital-divide/

Tavernise, S. (2012, February). Education Gap Grows Between Rich and Poor, Studies

Say. *The New York Times* . The New York Times. http://www.nytimes.com/2012/02/10/education/education-gap-grows-between-rich-and-poor-studies-show.html?pagewanted=all

U.S. Department of Education (2003). *Computer and Internet Use*. http://wiki.ties.k12.mn.us/file/view/ComputerInternetUse.pdf

Vail, K. (2003). *Next Generation Divide*. American School Board Journal. edweb.fdu.edu/anyfile/RodriguezN/Digital**Divide**.pdf

Venegas, K. M. The Internet and College Access: Challenges for Low-Income Students. *American Academic , 3* (1), 141-154. http://www.aft.org/pdfs/highered/academic/january07/Venegas.pdf