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The Inequities of the Digital Divide: is e-learning a solution?

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ABSTRACT This article addresses the continuing digital divide in public education, one that defines itself largely along geographic, socioeconomic, and cultural lines. The article refutes the idea that the digital divide is dwindling due to increasing access to technology within the United States, instead focusing on digital literacy and cultural barriers as perpetuating the divide, causing economic, democratic, and social ramifications for those affected. Finally, e-learning is proposed as a potential solution to narrow the divide based on the ability to receive effective instruction without geographic restraints.

The Inequities of the Digital Divide: is e-learning a solution?

While inequality in American public education has remained constant throughout history, the means by which the system oppresses the underprivileged continually changes. Forced segregation in the early part of the twentieth century has given way to disparity regarding access to relevant resources, particularly those relating to technology. While educators often simplify *Brown* v *Board of Education* to purely racial ends, one must remember why the Court voted unanimously in favor of desegregation. Those justices did not make their decision purely on moral grounds; instead, they saw tangible evidence that African-American schools could not perform as well as their white counterparts, thus making them separate and unequal (Morse, 2004).

Unfortunately, the current digital divide stratifying the United States appears more transparent than segregation, but its impacts are just as serious. While the era and issue have changed, the sentiment of *Brown* remains the same; students should have access to equal educational opportunities regardless of external factors such as geography or income. Ironically, a chasm created by technology may require a technological solution. New advancements in technology, specifically e-learning, have the potential to narrow the digital divide in public education, provided states allot sufficient monetary and political support to start such programs.

The Digital Divide

The many definitions of the digital divide make assessing inequities in technology complex. For the purposes of this article, discussion of the digital divide will center within the United States, which faces technological segregation based on access, digital literacy, and cultural limitations. These social problems extend into public education, where one can see the beginning of a digital divide as far back as 1905 with the advent of school museums that housed forms of educational technology (Reiser, 2001). Unfortunately, policy makers tend to define the divide by a single aspect, usually access, which provides a skewed representation of the problem. As technology and its impact on American life increases, the more serious the implications of the digital divide, regardless of how narrow the gap appears.

Inequity of Access: geography and socioeconomic status

Both urban and rural areas feel effects of the digital divide more than their suburban counterparts, with this geographical stratification tending to correlate with socioeconomic status and ethnicity. Since funding remains the primary barrier to digital equality in urban areas, the digital divide disproportionately affects large numbers of African-American and Latino populations (Huang & Russell, 2006). As of 2004, almost two-thirds of all urban students are African-American or Latino, with most of them attending predominantly segregated schools where minority enrollment is over 90% (Darling-Hammond, 2004).

Rural areas have an additional obstacle when considering digital access. Many rural areas remain out of range for Internet services; even those that can access the Internet are often reduced to using near-obsolete dial-up modems that place them at a considerable technological disadvantage to broadband users (Haythornthwaite, 2007). Fortunately, the cases of complete digital disengagement are rapidly declining. Even Native American reservations in remote locations are slowly gaining Internet access (Monroe, 2002).

Haythorthwaite (2007) defines three types of groups existing in the digital divide, (a) *temporary*, those rapidly closing the digital gap; (b) *ever evolving delays*, those that catch up momentarily but soon fall back again; and (c) *delay and exclusion*, those groups that will never catch up. At present, low socioeconomic groups in urban areas fall into the latter category, with African-Americans and Latinos comprising the largest ethnic groups within that subset. Those raised in better socioeconomic conditions are more likely to have computers in their homes, attend better schools, and have more qualified teachers with better computer skills (Bozionelos, 2004).

Overall, geographic disparity of income in the United States is best explained by first dividing the nation into regions and then further into urban and rural areas. Chakraborty & Bosman (2005), in a study of race, income, and computer ownership, found the largest income disparity in the South, and the least amount of income inequality occurring in the West. However, the results become more complex when broken down by race. When accounting for just white households, the largest disparity of income remains in the South, but the least occurs in the Midwest. Conversely, when dealing with just African-American households, the largest occurs in the Midwest, and the least occurs in the West. Not surprisingly, Chakraborty & Bosman discovered that computer ownership was lowest in areas of greatest income disparity, particularly the South.

A similar study by Kalyanpur & Kirmani (2005) assessing Internet access supported Chakraborty & Bosman (2005) by finding that the South contained the 10 states having below 45% of households with Internet access. Kalyanpur & Kirmani then compared the correlation of both home and school Internet access with low socioeconomic urban areas. In households earning less than $15,000 per year, only 33% had a home computer, with only 14% having Internet access. In comparison, households earning more than $75,000 had a computer ownership rate of 95% and an Internet access rate of 63%. Similarly, only 53% of households in inner cities had computers, with only 24% having Internet access, compared to 61% with computers and 29% having Internet access in rural areas and 73% with computers and 35% having Internet access in suburban areas, regardless of income. Perhaps most troubling, the study found that the more students from a low socioeconomic group in a particular school, the greater ratio of computers per student. Schools where 71% of students receive Title I funding have computer ratios of 16 to 1 compared to 7 to 1 in schools with 11% or less Title I funding. A recent study by Huang & Russell (2006) of schools in Oklahoma City supports these findings by reporting that the schools with the greatest computer access enrolled the lowest number of minority and Title I students, and vice versa.

In addition to being a geographic phenomenon, the digital divide contains racial undertones. Steve Case, founder of America Online, has called the digital divide the 'leading civil rights issue of the twenty first century' (Chakraborty & Bosman, 2005, p. 396). The aforementioned study by Chakraborty & Bosman reported that in all geographic areas African-American households have a larger income disparity than their white counterparts. While the study found computer ownership rising among all populations, ownership among African-Americans does not rise at a rate to combat the digital divide. The authors conclude that the current technological revolution may hurt African-Americans more than it helps, a sentiment shared by others (Kim, 2003; Bozionelos, 2004; Huang & Russell, 2006).

The literature offers much data to support a cultural divide. Kalyanpur & Kirmani (2005) found that even among low socioeconomic groups, white and Asian-Americans are more likely to own computers and have Internet access than African-Americans and Latinos. A study by Eamon (2004) using data from the National Longitudinal Survey of Youth, which surveyed 1029 middle-school students, found that 84% of white students owned a computer compared to nearly 52% for African-Americans and 59% for Latinos, respectively. Huang & Russell (2006) report that only 19% of African-Americans and 16% of Latinos use the Internet at home – well short of the national average of 33%. In a study specifically of Latinos, Hacker & Steiner (2002) found Latino households to be two-fifths as likely as white households to have Internet access.

Various statistics using different variables, such as level of education, can garner similar numbers, each of which places the digital access of African-Americans and Latinos well behind that of whites and Asian-Americans. The more important question to ask is why this phenomenon occurs. Many scholars are content to correlate poverty with race, although additional cultural impediments may exist. For example, Tumposky (2001) believes that African-Americans (and safe to assume Latinos as well) are not as wealthy as whites even when earning the same income. According to Tumposky, using income as a barometer for wealth 'ignores assets and the extent of familial obligations and relationships, [and] is not an accurate measure of disposable income or purchasing power' (p. 121). This would account for part of the racial disparity in computer ownership, especially among lower-income families. Other cultural considerations that may influence lower computer usage along racial lines will be discussed in a later section.

Digital Literacy

The decreasing costs of technology encourage some to dispel the digital divide as a myth when simply referring to access (Warschauer et al, 2004). However, increased access does not necessarily translate into digital equality. Instead, the idea of digital literacy becomes central to the digital divide question. Kalyanpur & Kirmani (2005) define digital literacy as 'a set of habits through which individuals use computer technology for learning, work, socializing, and fun' (p. 9). In other words, digital literacy measures how comfortably one uses various technologies based on previous experiences. Sadly, schools across the United States do not teach the same computer skills, even when access ceases to act as a variable. Discrepancies in technology instruction also tend to follow geographic, socioeconomic, and racial undertones, due to poor instruction and teacher inexperience.

Dewey and Habits

Dewey (1938) describes the greatest pedagogical fallacy as 'the notion that a person learns only the particular thing he is studying at the time' (p. 48). Students develop skills, opinions, and attitudes based on the content and method of instruction they receive. Dewey would view digital literacy as a skill, regardless of the discipline being taught. Over time, repeated use of skills form into habits for students. A discussion of the nature of habits is pertinent to understanding the significance of digital literacy. Dewey defines habits as a

> Kind of human activity which is influenced by prior activity and in that sense acquired; which contains within itself a certain ordering or systematization of minor elements of action; which is projective, dynamic in quality, ready for overt manifestation; and which is operative in some subdued subordinate form even when not obviously dominating activity. ([1922] 1988, p. 31)

Moreover, Dewey views habits as arts that lead to greater understanding of the unknown. In an analogy comparing young children and adults, Dewey ([1922] 1988) believes the adult fares better when faced with obstacles, 'not because the [adult] has a "mind" which the [child] does not, but because one has already formed habits which the other has still to acquire' (p. 128). When placed into an educational context, Dewey believes educators should foster habits within students that allow students to function as productive members of a democratic society once they leave the classroom. Dewey would view the reliance of society on computers and digital information as

evidence that formation of appropriate technological habits is essential to the modern school curriculum.

If access continues to improve, instilling positive technological habits in students is imperative to both academic and social performance. Dewey (1938) defines the basic characteristic of habits as 'every experience enacted and undergone modifies the one who acts and undergoes, while this modification affects, whether we wish it or not, the quality of subsequent experiences' (p. 35). In other words, understanding the basic skills needed to navigate through a digital world will allow students to adapt even when technology improves and changes. Experience with computers makes students more comfortable with technology and more willing to seek further educational experiences utilizing technology (Haythornthwaite, 2007). Currently, students from more privileged socioeconomic backgrounds are encouraged to develop such habits, making them less anxious regarding technology usage than poorer students (Bozionelos, 2004).

Discrepancy in Usage

Students from low socioeconomic backgrounds use computers in school differently from more affluent students, usually involving rote exercises that do not offer cognitive challenges (Brown et al, 2001). A study by Warschauer et al (2004) compared student use of technology in schools in both high and low socioeconomic areas in California and found that students in poorer schools use computers to make presentations of existing material while wealthier schools encourage students to research, edit papers, and perform statistical analyses. A similar study by Swain & Pearson (2002) analyzed usage based on race and reported that white and Asian-American students use computers for higher cognitive applications 43% of the time, compared to only 14% for African-Americans. While previous studies insinuate that students from low socioeconomic backgrounds would not utilize technology for academic purposes if given access, Eamon (2004) found even though most adolescents use computers for socializing and recreation, African-American and Latino students report more academic usage of home computers than white students. These findings support beliefs that students will constructively use technology if provided with correct habits, both at home and school.

One major impediment to digital literacy is the lack of quality and technologically proficient teachers in poorly funded schools. Ryan (2004) blames the No Child Left Behind (NCLB) legislation of 2001 for this phenomenon by creating situations where standards-based education drives qualified teachers away from the profession due to increased pressure to achieve seemingly unattainable goals. Furthermore, Ryan notes that current teachers flock away from schools in low socioeconomic areas since they tend to pay lower wages, have more perceived student behavior problems, and often perform poorly on standardized tests. This flight of quality teachers into more affluent, suburban areas is pedagogically significant. As Darling-Hammond (2004) states, 'The fact that the least qualified teachers typically end up teaching the least advantaged students is particularly problematic, given recent studies that have found that teacher quality is one of the most important determinants of student achievement' (p. 1056).

Therefore, schools in low socioeconomic areas, with poor technological resources, often have the added disadvantage of settling for teachers unwilling to use technology in their classrooms, an attitude subsequently passed to their students (Bozionelos, 2004). Of the teachers in economically disadvantaged schools who do attempt to use technology, usage is mostly confined to classroom management or drill-and-repeat practices (Brown et al, 2001). Huang & Russell (2006), in a study of teachers in schools in low socioeconomic areas in Oklahoma City, found that 84% of teachers use classroom computers less than one hour per day on average. Also, 76% allow students to play video games during time on the computer. Ironically, Kalyanpur & Kirmani (2005) observed teachers of low socioeconomic students use computers more than other groups, but largely for remedial exercises. These accounts are problematic since many students rely on school for computer access and on their teachers to model appropriate technological behavior. Remedial use will not provide students with habits they need to handle advanced technological issues in the future.

Cultural Implications

Finally, there are cultural implications that may contribute to the digital divide, regardless of access. For example, 15 years ago many in education were concerned that females could not exist in a primarily male-based technological world (Kalyanpur & Kirmani, 2005). Still today, companies pitch video games and other social technology toward males, and males continue to dominate in technological fields such as computer science (Ching et al, 2005; Kalyanpur & Kirmani, 2005). Even in secondary education, teachers often perpetuate this stereotype by allowing males to have increased technology access compared to their female peers (Bravo et al, 2003). Such actions result in many female students having adverse attitudes toward technology, accounting for low enrollments in technological disciplines (Smith et al, 2005).

Language also acts as a technological barrier. Approximately 32% of material on the Internet is in a language other than English, with non-English websites usually appealing to stereotypes in order to achieve marketability (Kalyanpur & Kirmani, 2005). The mass immigration of Latinos in California and Texas, in particular, makes this phenomenon especially disturbing (Warschauer et al, 2004). Considering that the battle over bilingual textbooks still wages in state legislatures, widespread use of bilingual computer resources appears a hope of the distant future. As a result, Warschauer (1998) claims technological advancements will benefit language minority students the least among student populations in the United States.

Assessing cultural beliefs that discourage technology use remains the most subjective aspect of the digital divide. Tumposky (2001) claims that African-Americans do not feel comfortable with mainstream institutions, in particular methods of schooling, which are viewed as white fixtures that perpetuate majority dominance. Technology, therefore, is seen as a tool of the majority and avoided. Similarly, Native American tribal councils have historically shunned technological advancements as being assimilatory. Recently, however, technology has begun to filter into reservations and gain acceptance as a way to perpetuate Native American culture instead of detracting from it (Monroe, 2002).

Regardless of the truth of these, or any other, cultural diversions from technology, they remain significant in understanding the complexities of the digital divide. Technological access only contributes a small percentage of the equation. Digital literacy and cultural implications involve more subjective interpretations, but that does not diminish their importance. Similarly, while the immediate effects of an educational digital divide may present themselves in the form of weakened instruction, equally important, but hidden, implications occur outside of school.

Implications of the Digital Divide

While the stratification of any social opportunity hurts society both economically and culturally, what are the true implications of the digital divide among those who suffer from its existence? Obviously, students who have limited access to technology will fail to receive the instructional benefits of that technology. However, translucent economic, social, and democratic implications also exist within our present society.

Dewey (1916) views democracy as more than a system of government, but instead, 'a mode of associated living' (p. 87). If, as Dewey believes, schools train students to perpetuate democracy, then any form of educational inequality will lead to a society where certain groups always lag behind and become the responsibility of the more affluent. Therefore, all members of any democratic society need to not only understand the educational implications of the digital divide, but also the resulting social, economic, and democratic ramifications in order to find potential solutions.

Educational Implications of the Digital Divide

Technology undoubtedly aids in the operational tasks required of schools, such as recording grades, attendance, and scheduling (Page, 1998), but do the educational benefits of technology justify the concern over the digital divide? Studies in various disciplines show that technology creates at least minimal, and sometimes substantial, improvement in cognitive development if used correctly. The rote exercises utilized in many schools in low socioeconomic areas do not take

advantage of technological potential. In their study of Oklahoma City schools, Huang & Russell (2006) observed that schools with more computer access to have much higher reading and math scores. While the lower socioeconomic schools with less computer access had comparable science and writing scores, reading and math are the main areas evaluated by NCLB, increasing the likelihood of failing marks from the state. Page (2002) corroborates these findings in a study of elementary schools in Louisiana where students subjected to classroom technology scored much higher in math. The results of both studies are particularly disturbing since low test scores often result in student grade retention, especially in this NCLB era. Therefore, students in schools that receive the least amount of resources are punished academically, socially, and emotionally for having antiquated instruction (Darling-Hammond, 2004).

Studies have shown that technology lends itself very well to the social studies curriculum, particularly regarding students with disabilities (Coombs, 2005; Boon et al, 2006). Also, Internet access can democratize the availability of primary sources and allow visits to virtual museums or other educational opportunities that otherwise would remain unexplored (Doolittle & Hicks, 2003; Bolick, 2006). A study by Tally & Goldenberg (2005) found that 87% of students felt they had learned more by using technology in their history class and 72% said they held favorable attitudes toward history as a result.

Educators continually search for ways to make instruction exciting and interesting for students. Technology creates endless possibilities to enhance instruction to the point that students may become enamored with learning. Page (2002) also observed that the use of technology in classrooms seemed to help raise the self-esteem of low socioeconomic students by creating environments that foster student participation. Therefore, technology may prove invaluable in low socioeconomic, urban areas where students often exhibit disconcerting attitudes toward education in favor of issues of perceived importance such as working, gang membership, and social posterity. Accruing interest in education may act as the first step in healing social ills dominating urban areas.

Economic, Democratic, and Social Implications of the Digital Divide

The Internet has changed the nature of capitalism within the United States by neutralizing constraints of time and space and by reducing the cost of acquiring information (Kim, 2003). This economic revolution also has geographic effects. No longer are inner cities necessarily hubs of productivity; the efficiency provided by the Internet allows businesses to retreat to suburbs and overseas where costs of production are lower. As a result, large percentages of blue collar jobs have fled as well. Therefore, the poor and uneducated in urban areas need to either relocate or learn new skills that will make them attractive for employment. Due to the digital divide there remains a technological mismatch between the urban poor and companies still making their home in inner cities (Servon & Nelson, 2001).

Kim (2003) found a more striking economic consequence of being technologically illiterate, noticing that those who do not have Internet access make 2.3% less in hourly wages than people who regularly use the Internet. Even more telling, Kim found that those who utilize the Internet as a method of seeking information experience a 4.2% increase of hourly wages and work an average of three hours less per week than those who do not. Moreover, only 4% of high school dropouts regularly use the Internet, a statistic that exemplifies the need to engage and retain students in those formative years. Kim concludes by stating, 'using computers is not only a valuable job skill for processing and generating information, but also an important source of acquiring information, which provides a higher chance of maximizing one's utility' (p. 228). An information society can only promote equality if all members have comparable access to the same information.

Access to information also impacts democratic participation and decision making (Glenn & Kaviani, 2006; Vanfossen, 2006). Dewey (1916) sees public education as the center for perpetuation of democracy for no other reason than 'a government resting upon popular suffrage cannot be successful unless those who elect and who obey their governors are educated' (p. 87). Dewey would view the educational digital divide as a failure of our democratic system since he argues that a society experiencing stratification must ensure that educational opportunities are 'accessible to all on equable and easy terms' (p. 88). More importantly, Dewey would see the divide as impeding the future participation of certain citizens within society. Since many low socioeconomic students do

not receive digital training in their educational experience, they are unable to participate in an ever-changing democracy that increasingly utilizes online resources. Dewey believes that schools in a fluid society have the responsibility to educate students 'to personal initiative and adaptability' (p. 88). As technology becomes more influential to civic life, schools should place a higher emphasis on technological applications within the curriculum (Crowe, 2006).

Interestingly, several studies have proposed that use of the Internet within the social studies curriculum can drastically improve students' feelings of agency and encourage them to actively participate in society. Students can use the Internet as a method of inquiry, which allows them to seek multiple perspectives on issues and become more informed citizens. Such instruction can encourage students to engage in social action, giving them a feeling of civic responsibility that goes beyond the passive act of voting (Hicks et al, 2002; Doolittle & Hicks, 2003; Waring, 2006). These studies imply that increased access and adequate technological training will help create young adults who value democratic ideals.

The economic and democratic effects of the digital divide both contain social ramifications. Simply gaining access to technology can elevate one's place and worth in society, especially within groups where technology is not commonplace. A case study by Mehra et al (2004), studying a Community Networking Initiative in Champaign, Illinois that gave computer access to local low-income families, shows the effect technology can have on individuals. Within the span of one year the participants and their family members developed basic computer literacy and, more importantly, saw a rise in their social status due to being local gatekeepers of information. Two related case studies by the same authors regarding traditionally disenfranchised groups, African-American women and gay/lesbian/bisexual college students, showed the power of the Internet to group like-minded individuals. In both cases the groups utilized technology to mobilize, share ideas, plan events, and discuss issues of importance, all while maintaining a level of privacy each group desired.

The hazards of the digital divide are overshadowed only by the possibilities generated by the potential for greater technological equality. Mehra et al (2004) show the effects of introducing technology on a micro scale; policy makers now must find ways to increase access and literacy among the larger population. While no concrete solutions exist, a combination of ideas along with advancements in technology may slowly narrow the digital divide.

Solutions

Since the problems associated with the digital divide are complex, educators must utilize a myriad of potential solutions to make headway in lessening technological inequality. States, local communities, and individual school systems must concurrently combat the previously discussed elements of the divide. While student access to technology remains important, simply stocking classrooms with computers does not answer questions of digital literacy or socioeconomic inequality. Therefore, more creative solutions must be utilized; in particular the use of state-funded e-learning to supplement instances of failing public schools.

Addressing Access and Digital Literacy

Obviously, access remains the foremost priority to ending the digital divide because without access all other discussions become moot. Since the costs of computers and the Internet are dropping, the problem will continue to fade. However, in the short term, school and community programs can address the problem by creating access. Schools have the option to move to wireless Internet services and invest in laptops (Morse, 2004). While stopping short of giving each student their own computer, schools can provide enough laptops that multiple classes can use laptops simultaneously. This allows for more mobile technology in schools rather than forcing students to share one central area for computer use.

Of course, computers cost money, a scarce commodity in many urban schools. Districts can secure funding by using elements of the system that have traditionally segregated educational opportunities. Federal standards, such as NCLB, inadvertently reinforce inequality through stringent consequences to failed expectations (Darling-Hammond, 2004; Ryan, 2004), but if districts

can convince state legislatures that inadequate technology serves as the predominant reason why students fail to meet federal standards, they may be able to petition states for grants or money allocated for technological improvements (Brown et al, 2001; Swain & Pearson, 2002) with legal action available as a last resort (Blaylock & Newman, 2005).

Other simpler and considerably cheaper solutions exist involving the cooperation of school districts and neighboring communities. Schools could partner local libraries to facilitate student computer access or even act as technology centers themselves after school hours (Brown et al, 2001). Servon & Nelson (2001) advocate the use of community technology centers that provide a place for those lacking computer access to use the Internet for information and recreational purposes. Currently, two-thirds of all technology centers are located in urban areas, most of them providing programs that improve digital literacy as well as delivering content, such as General Educational Development (GED) programs. The authors also found that these centers become a much-needed positive social outlet in many urban areas.

Once schools and communities address access, they must provide training to ensure that community members can engage in societal and democratic functions online. Technology centers offer one method of improving digital literacy, but most training must take place within the public schools. If poor schools continue to utilize computers differently from their affluent counterparts, then access becomes irrelevant. Since teachers are responsible for ensuring proper technological development of their students, schools must provide teachers with proper training (Brown et al, 2001; Swain & Pearson, 2002). Districts and individual schools need to offer in-service training to existing teachers, and administrators must hold teachers accountable by having them present lessons in which they utilize technology effectively (Swain & Pearson, 2002).

Finally, districts need to create welcoming environments to attract qualified teachers to their schools. Since many teachers entering the profession often avoid urban schools due to their reputations, poor test scores, and low salaries, schools must be proactive in finding teachers that meet high standards (Ryan, 2004). Many urban districts cannot afford to let teachers come to them; they must actively search for qualified teachers willing to accept the challenge of teaching in urban areas.

The Potential of E-learning

Assuming problems of access continue to decline, Blaylock & Newman (2005) propose e-learning as a partial solution to the limitations of the digital divide. While many may dismiss e-learning as simply a passing fad, there is reason to believe that e-learning differs from failed implementations of educational technology in the recent past (Reiser, 2001). While instructors still create and assess the curriculum, many e-learning courses operate without direct teacher instruction. This creates an important distinction between e-learning and previous examples of educational technology; e-learning does not supplement instruction, but instead, acts as the agent for instruction. Since the basic draw of e-learning is that students of certain geographic and socioeconomic locations can access distant educational opportunities without ever leaving their home community, e-learning may offer the best chance to revolutionize public education and partially stifle the effects of the digital divide.

E-learning is a fairly new phenomenon in secondary public education, with most school districts attempting to develop their own courses or seeking aid from vendors (Conceicao & Drummond, 2005). Davis & Roblyer (2005) report that one-third of public school districts in the United States have students enrolled in some form of online distance education. Other avenues also exist for e-learning, such as the Virtual High School sponsored by the Concord Consortium where schools volunteer to participate and create their own online courses for students. Also, over 30 states have secondary e-learning programs, some of which are free to in-state students. Some state programs conjoin with state universities while others, as in the case of the Florida Virtual High School, are funded by state legislatures (Schrum, 2004). While these programs still face access problems associated with the digital divide, they offer the best chance for students to succeed despite geographical and socioeconomic limitations (Blaylock & Newman, 2005).

Blaylock & Newman (2005) studied the Illinois Virtual High School in depth and reported on 16 high school courses and 10 Advanced Placement (AP) exam review courses available to students

throughout the state. While the overall demographics of students in the Illinois Virtual High School were 88% white from moderate-to-affluent schools, the AP exam courses provided a stark contrast. Of the 2700 students taking the AP courses, 2000 of them came from poor areas of Chicago and received free tuition. The Chicago students were 78.6% urban, 60% African-American, and 28% Latino.

When discussing e-learning options one must consider cost of enrollment. Free tuition allowed the Chicago students in the aforementioned example to participate in AP exam courses, whereas the normal monetary constraints of online courses would have negated that opportunity. The question then becomes, can states afford to make e-learning options free or dramatically reduced for students in low socioeconomic schools? Already some states provide virtual high schools free to in-state students or offer grants to low-income schools, so the potential exists nationwide (Schrum, 2004).

Since e-learning is a relatively new educational phenomenon, many districts have not reached a verdict on whether virtual options teach students as effectively as traditional classroom settings. In particular, skeptics view e-learning as impersonal and cite the high percentage of e-learning dropouts as evidence of the inferiority of online education (Rovai, 2002; Jun, 2005). Indeed, many e-learning proponents cede that districts should never push online instruction on students without first providing them with a face-to-face option (Roblyer, 1999). However, if traditional forms of instruction are proven inadequate, is it not the responsibility of the state to provide a viable alternative? If districts fail to meet basic standards with traditional instruction, a virtual program run by qualified teachers may serve as comparable, if not superior.

While educators have legitimate concerns over the lack of social interactions within e-learning applications, the literature gives considerable evidence to the ability to foster communities online, particularly when one defines communities as 'activities people do together, rather than where or through what means they do them' (Haythornthwaite et al, 2004, p. 36). In a series of studies Rovai (2001; 2002; Rovai & Wighting, 2005) chronicled the development of e-learning communities and discovered that online participants will naturally form active and caring communities over the span of an individual course. Further, Rovai & Wighting found that students who identify with an online community are less likely to feel alienated and subsequently drop out. Similarly, Tu & McIsaac (2002) observed that students actively involved in online communities have elevated perceptions of social presence, which leads to greater amounts of shared information among students and improved class participation.

This ability to foster online communities rests largely in the hands of the teachers that design individual courses; therefore additional instruction for teachers is necessary for e-learning to thrive on a national level. Simply forcing technologically savvy teachers to teach online does not provide adequate instruction. Instead, schools need to provide teachers with training from experienced online instructors on how to combine technology and pedagogy (De Simone, 2006). For continued success, teacher training institutes must include effective e-learning instruction strategies within their existing curriculum. A handful of universities already include such instruction, with more programs spreading across the nation (Davis & Roblyer, 2005).

The logistical aspects of creating a virtual high school lend themselves to saving money in the long term. Once server space is established, the only regular fees are teacher salary, training, technical support, and annual maintenance. States could balance these costs with students from affluent school districts willing to pay to take online courses for convenience or early graduation. There are also certain procedural concerns that skeptics would assail, such as the reliability of student assessment. If teachers cannot monitor student performance then they cannot ensure the legitimacy of student work. While no method of assessing academic integrity is foolproof, a strong shift toward authentic assessments would help limit instances of student dishonesty. Along those lines, several scholars recommend the use of student portfolios for e-learning assessment (Rovai, 2000; Mason et al, 2004; Bassoppo-Moyo, 2006).

One obvious concern is if students from poor schools increasingly turn to virtual high schools for instruction, traditional schools may become irrelevant. However, national and state standards would ensure that schools continue to improve, and once they meet certain standards their students would no longer be eligible for free virtual tuition, which would force many to return to traditional instruction. Furthermore, traditional schools could never become relics since many subjects, such as physical education and drama, are hard to replicate online, without even

considering the social aspects of high school such as athletics and clubs. Students would still attend regular school, either part-time or full-time, and take virtual courses outside of school hours to supplement their traditional curriculum.

In many ways e-learning could serve as a temporary remedy until individual schools meet standards and lessen inequities. By no means are virtual high schools perfect solutions, but they do offer avenues for students currently entrenched in inferior schools impaired by the digital divide and other forms of inequality. While states have more considerations than the ones presented here, future use of virtual high schools may change the scope of American public education. No longer should the geography or socioeconomic conditions of where a student resides control the quality of education they receive.

Conclusion

Advancements in technological innovations continue to perpetuate a digital divide within the United States. Nowhere is the digital divide more evident or disturbing than in our public schools, largely in low socioeconomic urban and rural areas. Consequently, the digital divide becomes a racial and social issue with economic and democratic implications. States, school districts, and communities need to explore imaginative solutions to increase access and improve digital literacy. E-learning is presented as a possible solution to temporarily give low-income students quality education provided by the state free of charge. While limitations of e-learning exist, it has the potential to decrease the digital divide with minimal costs and operational constraints. Sadly, while complete elimination of the digital divide remains fantasy, the United States needs to make reducing technological inequality a realistic priority.

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