

DIGITAL DYSTOPIA: Overcoming Digital Deprivation in the United States

ABSTRACT

Public libraries serve increasingly critical roles in the knowledge society. Public libraries currently serve integral roles their communities through the provision of free public Internet access. Libraries have become technology centers where critical information services are offered to their communities. This is an analysis of the greater potentiality public libraries possess in bridging the 'digital divide' in the United States. An examination of the ways in which networked services can aid people in disadvantaged communities is provided, as well an exploration of the coordinated efforts of local municipalities and public libraries in the provision of public Internet access. The predominate statistics used were produced by the PEW Internet and American Life Project 2008 study of US Broadband Penetration and the 2007 report "*Public Libraries and the Internet*" for the American Library Association (ALA) by Florida State University which analyzed the impact of Internet-based services by public libraries in their communities.

DIGITAL DEPRIVATION

Recent rapid technological and economic changes have resulted in digital exclusion for large segments of American society. As everyday life transitions towards the pervasive use of the Internet and other networked services, a digital information gap has developed with detrimental consequences for socially excluded groups in the United States. [Dutch and Muddiman, 2000] The definitions of socially excluded groups include minorities, poor, undereducated or digitally illiterate, and/or disabled who have little or no access to online-networked services and who are otherwise the most at-risk and hard-to-reach groups in society. Two common terms, which have evolved from the late 1990s when describing the digital information gap, are the "information haves and information have-nots". [Fourie] These terms have grown to encompass a broader set of ideas now called 'social inclusion' and 'social exclusion'.

Social inclusion refers to all attempts to promote equity among socially excluded groups. [Boushey] Social inclusion simultaneously incorporates multiple dimensions of well-being and exists when all

individuals have the opportunity and resources necessary to participate fully in economic, social, and cultural activities considered the societal norm. [Boushey] Social exclusion is commonly associated with poverty, but actually encompasses much more; it occurs when people or places suffer from a combination of problems such as unemployment, depressed housing markets, discrimination, illiteracy, and poor health or disability. [Fourie] These problems often accumulate to become an exclusion from basic information resources and opportunities. Individuals as well as groups make up the categories of excluded people, and a public library may need to be prepared to address the social exclusion of a few individuals in their community or large segments of individuals in their overall community. [Fourie]

These two concepts are inextricably associated with another concept derived from the term 'digital divide', called 'digital deprivation'. Digital deprivation enhances social exclusion and creates perilous cycles of social alienation. For example, an individual who is poor and unemployed will find it far more difficult to become digitally literate. The unavoidable result will be the denial of access to a series of employment positions, which require IT knowledge. This ultimately reduces the individuals' possibilities of finding a job, and inevitably increases their degree of social exclusion.

DIGITAL DIVIDE 2.0

Digital deprivation in relation to broadband access creates a paradigm of inequality for people who are unable to connect to broadband and networked services and are consequently incapable of acquiring the skills necessary to function in a digital society. Such unequal access to computers, electronic networks, telecommunications services, or information based on demographic or socio-economic factors such as income, race, gender, age, or location has become popularly known as a "digital divide." [Dutch and Muddiman, 2000]

Cheap, ubiquitous high-speed Internet access promises to accelerate economic growth, create new jobs and industries, advance education and lifelong learning, improve health care decision-making, and raise the standard of living. However, cost prohibitive monthly fees and surcharges for broadband remain the principal obstacle to universal broadband connectivity to the Internet. For tens of millions of families broadband is simply too expensive, where the average US family with

high-speed access boasts an annual income of \$72,000. [PEW, 2008] Statistical measurements of broadband penetration indicated stark disparities in race, income and education. [PEW, 2008] Poor infrastructure in rural or central city areas due to geographic limitations is insufficient in explaining all of these disparities, because they persist among racial, income, and educational groups residing in areas of similar population density. [PEW, 2008] The implication being that although including geographic limitations to the digital divide spectrum is relevant it is still primarily contingent upon income and demographics.

U.S. GOVERNMENT--TURNING A BLIND EYE?

The 1996 Telecommunication Act required the FCC to adopt policies for the advancement of universal service in all U.S. regions, and for access to service for consumers in all income groups "at just, reasonable, and affordable rates." [Jacobsen, 2004] But, despite its statutory mandates to ensure universal telecommunications service at affordable rates, the FCC has rejected universal broadband access as an ideal and has excluded broadband from the "basket of services [that are] eligible for federal universal service support." [Jacobsen, 2004] Critics of the FCC have pointed out that it has failed to carry out its responsibility under the 1996 Act to ensure that "advanced telecommunications services" are provided throughout the United States, including to "low-income" consumers and those in "rural, insular, and high cost areas." [Travis, 2006]

Since 2004, while documenting the exclusion of millions of Americans from the opportunities made available by the Internet, the Bush administration has repeatedly downplayed the importance of the digital divide as a concept and the Commerce Department stopped using the term entirely in its reports on Internet access. [Travis, 2006] Oddly, the Commerce Department has also failed to update the Clinton administration's annual reports on the digital divide called "Falling through the Net." In a glaring display of self-contradictory analysis, the then FCC Chairman Michael Powell called the "digital divide" "a dangerous phrase" that could lead to "government entitlement programs that guaranteed poor people cheaper access to new technology, like . . . Mercedes Benz." Chairman Powell's statement effectively minimized the

divide in access to the Internet by comparing it to the gap in ownership of luxury cars. [Travis, 2006]

For the past four years, the continued lack of commitment by the U.S. government to subsidize universal broadband access to poor and underserved Americans has imposed high social and economic costs. As much as \$1 trillion in economic growth was delayed due to structural and legal limitations on U.S. broadband access. [Travis, 2006] The result has been poor and underserved Americans being unable to participate in the estimated \$1 trillion market for electronic commerce conducted over the Internet. Many people in households without broadband are denied the opportunity to leverage the Internet's wealth of resources, while families without broadband continue to struggle to become "active and informed participant[s] in society". [Travis, 2006] There several critical services public Internet access provides which aid individuals in disadvantaged communities. [Weingarten, 2007] The range of online information services includes:

- **E-Government:** the role of e-government has presented public libraries with opportunities to engage local political leaders in the debate over the growing importance of the public library as community technology centers. [Weingarten, 2007]
- **Emergency Response:** as evidenced by a Florida State University research team studying the response of libraries after Hurricane Katrina in the Gulf Coast, uncovered startling information about librarians and policy-makers, who view public libraries as locations where individuals can go for emergency services. [Weingarten, 2007]
- **E-Learning:** education including distance education, tutoring, after-school education, and home-schooling education
- New employment opportunities for those who develop IT skills
- Access to online banking
- Online shopping
- Online health services
- Online government dissemination of information and simplification of the process of dealing with large bureaucratic governmental institutions [Weingarten, 2007]

BROADBAND TECHNOLOGIES--AT-A-GLANCE

A variety of broadband technologies can deliver broadband service to underserved communities in both large urban areas and sparsely populated rural areas. For instance, Cable Modem service allows consumers to connect to the Internet via the same coaxial cable that provides cable television. Similarly, Digital Subscriber Line, or DSL, is a wire line technology that transmits data over traditional copper telephone lines. The transmission speed is dependent upon the amount of data speed the subscriber is willing to purchase. [Reeve, 2007] Fiber optics is another promising technology that converts data into light and transmits that light through glass fibers. Though this technology holds great potential, it is more cost-prohibitive than either cable modem or DSL. [Reeve, 2007]

Wireless broadband connects consumers to the Internet through radio frequency networks between the consumer's location and the service provider's facility. [Reeve, 2007] Wireless service can be either 'mobile' or 'fixed' at a 'hotspot' location and is a technology commonly used in libraries, airports or coffee shops. Short-range wireless devices typically use wireless fidelity or Wi-Fi with connection speed of up to 54Mbps used in conjunction with a wired broadband technology such as cable or DSL. Wireless technologies, which utilize long-range equipment, such as WiMAX, can provide broadband service in remote and sparsely populated areas.

WiMAX is an emerging technology that provides high-speed mobile data and telecommunication services. WiMAX stands for Worldwide Interoperability for Microwave Access and it operates on IEEE 802.16 standards. [IEEE, 2006] It operates same way as Wi-Fi, but it is more sophisticated and efficient than Wi-Fi. WiMAX provides higher speed connection up to 70 Mbps over an area of up to 30 miles and it is capable of routing data to standard Wi-Fi devices. [Travis, 2006] This wireless technology holds the most promise for rural areas because the expense of installing hardwires to deliver broadband service is impractical and costly. [Jacobsen, 2004]

Another burgeoning area of interest in wireless technology has been the use of Wireless LANs in public libraries. Wireless LANs make it

possible for a desktop, notebook, or PC to access a local area network without a physical connection. Interest in Wireless LANs has grown exponentially since the technology became available in 2001. By mid-2008, over two-thirds of US public libraries had a wireless LAN or a hybrid LANs system [Boss, 2006]. The typical wireless LAN involves the installation of access points in the walls and ceilings of a building. The access points are usually the size of a small book and house a transmitter, receiver, antennae, and a device that bridges the LAN to an organization's wire-based network. [IEEE, 2006] A popular application of wireless LANs in libraries has been the lending of laptops to patrons for their use throughout the building.

THE "INFRASTRUCTURE PLATEAU"

A study conducted in 2007 by a team of research librarians at Florida State University entitled, the *Public Libraries and the Internet* surveyed public libraries across the United States based on three library demographics. The demographics used were based on 'metropolitan status' (equating to urban or rural populations), 'poverty level of their service population' (using US census data), and 'the state in which they resided'. [McClure, 2007] The 2007 study sampled 6,979 public libraries, and received 4,027 responses for 57.7 percent response rate. [McClure, 2007]

Data in the study indicated that free public Internet access continues to grow in public libraries. [Bertot, 2007]

Among the key findings:

- 99.7% of public library branches are connected to the Internet;
- 99.1% of public library branches offer public Internet access;
- 54.2% of public library branches offer wireless Internet access, a dramatic increase from 36.7% in 2006;
- 100% of urban library branches are connected to the Internet;
- Public library branches have an average of 10.7 public access workstations, with rural libraries having an average of 7.1 workstations and high poverty libraries — that are usually

associated with large urban public library systems — having 25.4 workstations. [McClure, 2007]

The provision of free Internet access by public libraries in the United States has transformed them into technology centers for communities, patrons, and local governments. This has resulted in a majority of poor and low-income people who solely depend upon its availability.

The findings of the 2007 study indicated a high success rate of public libraries providing Internet access to their communities. However, the study also illuminated a troubling new trend that seemed to be emerging: an 'infrastructure plateau' that will restrict the ability of public libraries to meet the increasing demands of providing Internet access. The concept of an 'infrastructure plateau' was derived from data related to a variety of factors in the 2007 study: physical space, number of workstations, funding, telecommunications infrastructure and speed of connectivity. [McClure, 2007] The variables were measured to the point at which they are static, decreasing, or indicating a future decrease. [McClure, 2007] The overall trend of the study suggested that there was an increased likelihood for public libraries to reach or exceed capacity in their provision of free public Internet access. This was attributed to the high connection speeds required for Web 2.0 technologies that demand large amounts of bandwidth to operate digital media applications.

Questions in the 2007 survey also included a broad range of issues that assessed the ability of public library infrastructure to provide public access Internet and computing services. The answers appeared to indicate that public libraries have reached a plateau along the most basic infrastructure measures of Internet workstations and bandwidth. [McClure, 2007] Statistical analysis from the FSU study also indicated that bandwidth speeds have decreased slightly since 2006, while the average number of computer workstations has remained constant since 2002. The study found that 75 percent of public librarian respondents indicated that their libraries were the only source for free public Internet access for their communities. This implies that while demand for public library computers and connection speeds continues to increase, the quality of Internet services is likely to diminish. [McClure, 2007]

One area where there has been no indication of plateau is wireless Internet access. The number of libraries offering public wireless access increased from 36.7 percent to 54.2 percent in 2007. [McClure, 2007] This seems to indicate libraries are using wireless as an alternative to adding workstations and investing their already limited funds in overhauling their telecommunications infrastructure.

Some libraries have been able to tailor their funding to target the 'Infrastructure Plateau' with limited resources. For example, in the public library district of Alachua County Florida, their libraries allow patrons to "checkout" laptops for a set amount of time. The Alachua County district libraries had limited space and funds, but desperately needed to add more computer workstations to their facilities. Their libraries had a strong IT infrastructure in their facilities, but they were stymied over how to provide additional Internet workstations. [MaintainIT, 2008] Using a grant from the Melinda and Bill Gates Foundation the district purchased laptops with three-year accidental damage coverage warranties. The library district administration then implemented policies and security equipment designed to secure the laptops and reduce maintenance hassles. [MaintainIT, 2008] This was an innovative means of utilizing a wireless LAN to increase the number of available PCs during busy periods without installation of a large amount of data jacks. [MaintainIT, 2008] Their system also offered the flexibility of configuration of the laptops to operate with integrated library system and other networked services. [MaintainIT, 2008]

Other findings of the 2007 FSU report included statistically based criticisms of the Library Services and Technology Act (LTSA), which provides federal grants for technology and planning. [McClure, 2007] Federal funding options provided by the LTSA are insufficient and do not consider the multitude of local infrastructure issues or concerns about long and short term technology. This means that LTSA funding is insufficient for the continued growth and viability of free Internet access currently provided by public libraries. [McClure, 2007] Another funding option for public libraries has been the E-rate, which discounts the cost of telecommunications and infrastructure. The E-rate has funded over \$250 million dollars in technology-related discounts for public libraries; the expenditures of these funds have established libraries as nearly universal providers of Internet access for their communities. [Jaeger, 2006]

BROADBAND ACCESS as a PUBLIC SERVICE?

The most controversial proposed solution to disparities in broadband access has been for municipal governments, i.e. cities and counties, to offer broadband access as a public service. Over 600 municipalities offered such service as of 2005, a small but rapidly growing percentage of the over 18,000 municipalities in the United States. [Jacobsen, 2004] However, the U.S. government and states largely prohibit or restrict cities and counties from ensuring universal broadband access through complex anti-competition laws. [Jacobsen, 2004] Municipal broadband projects, and particularly the provision by cities and counties of offering free or low-cost wireless broadband networks partially subsidized by tax revenues, holds great potential to bridge the digital divide. [Travis, 2006]

Public libraries could become the 'municipal agents' whereby states could promote cities and counties to provide free and low-cost Wi-Fi broadband to their citizens by investing the telecommunications infrastructure of their community public libraries. Congress and the states could promote legislation that permitted cities and counties to offer free and low-cost Wi-Fi broadband to their citizens through the targeted funding of public libraries. In this manner, many public libraries could utilize their pre-existing wired infrastructure to develop and deploy large-scale Wi-Fi networks, which would provide blanket coverage to large urban areas and small rural areas. Thereby, effectively circumventing the current miasma of telecommunication legislation and in turn providing local communities the access to broadband-networked services.

Municipal broadband has saved many small communities from being relegated to the wrong side of the suburban-rural digital divide. Broadband Internet service was "frequently limited or lacking in rural areas" for years after it was first unveiled in urban areas. For this reason, small cities and towns in more rural parts of America have taken the initiative in providing fiber optic-based broadband to their residents. [Cox, 2005] In this manner, public libraries are in a position to continue to provide an 'infrastructure of inclusion'. By becoming the primary facility that houses the wired and wireless broadband equipment, which services large segments of their communities and being 'agents of municipalities' public libraries can influence policies which support their role in the provision of local public access computing. Cities and

municipalities have the potential to bolster the pre-existing wired infrastructure within their local public libraries to develop large-scale WiMAX networks that could transmit extensive broadband coverage to their urban and/or rural citizens free or at minimal cost per user. [Travis, 2006]

Other barriers for public libraries that need to increase their bandwidth include the total cost of more bandwidth excluding connectivity, uncertainty in future funding and difficulties with complex E-rate applications. [Bolt, 2008] Fortunately, in 2006 the U.S. Senate enacted telecommunications legislation entitled the *'Advanced Telecommunications and Opportunity Reform Act'*, which could accelerate this potentiality. The bill extends the rights of state municipalities to provide ICT access through broadband technologies in their local communities. More specifically, the bill preempts state laws that prevent municipalities from providing telecommunications services (e.g. setting up large scale Wi-Fi networks to serve urban and rural areas). [Travis, 2006] To be able to address adequately the 'digital divide spectrum'; cities and municipalities must create policies that effectively ascertains broadband penetration; coordinates federal, state, and local agencies, educates the public on broadband issues, and promotes partnerships with private industry and government. [Cox, 2005]

Wi-Fi WAVE OF THE FUTURE?

The next major wave of wireless innovation is Wi-Fi technologies. [Jacobsen] Wi-Fi is an open standard for the wireless networking of personal computers at true broadband speeds of up to ten Mbps. [Travis, 2006] Wi-Fi access points utilize unregulated spectrum to blanket areas of dozens to hundreds of feet in diameter with broadband Internet signals. When these access points are staggered throughout an area in Wi-Fi "mesh" networks, they operate at a surprisingly low cost-per-user. [Cox, 2005] A Wi-Fi network requires only a computer with a Wi-Fi card and an access point to rebroadcast an Internet signal. [Cox, 2005] Since 2004, city officials across the United States have increasingly endorsed the idea of providing universal broadband access to their citizens. There are grassroots level interests in the deployment of

wireless fidelity (“Wi-Fi”) mesh networks to cast high-speed Internet signals across entire metropolitan areas. [Cox, 2005] Philadelphia is planning to provide Wi-Fi broadband access for a mere \$10 to \$20 a month throughout 135 square miles of the city. New York City has solicited bids on a project to build “the largest municipal wireless network ever established,” which would blanket Manhattan with broadband Internet access beamed to computers, portable digital devices, and emergency response personnel, even in vehicles moving at high speeds. San Francisco has pledged to its citizens that “every San Franciscan [will have]... access to free wireless internet service.” [Travis, 2006] Major metropolitan cities from Florida to Washington have proposed to equalize high-speed Internet service through publicly funded Wi-Fi “clouds” transmitting high-speed Internet signals across many miles. [Travis, 2006]

PRIVATE INVESTMENT and CORPORATE COOPERATION

The Bill and Melinda Gates Foundation administer grants to aid libraries across the U.S. in ensuring quality technology services for their underserved communities. For the past ten years, the Gates foundation has disbursed funding for public libraries to provide free public Internet access and computing services. Although relying upon other private markets to initiate equitable access to Internet technology across racial and socioeconomic lines is unlikely, there have been other promising initiatives implemented by some of America’s top technological corporations. Google and EarthLink have pledged to debut free advertiser-sponsored citywide Wi-Fi broadband in San Francisco and Philadelphia. [Nobel, 2006] The plan includes providing broadband equipment to forty city-supported broadband projects in the near future. [Travis, 2006] The implication here is that that cooperative effort in policy development for public libraries can involve corporate interests who could financially alleviate the infrastructure and technology support gaps left by the LTSA.

CITIES---CALLED-TO-ACTION

In the largest cities in the United States, the potentiality of Wi-Fi to bridge racial and socioeconomic digital deprivations is making itself felt most strongly. Over 200 cities were planning or constructing municipal broadband networks as of early 2005, and nearly 200 cities are currently deliberating about whether and how to implement citywide wireless broadband access. [Nobel, 2006] Cities may spend up to \$700 million through 2008 in setting up Wi-Fi and wire-based high-speed networks. [Travis, 2006]

Cities and counties are currently leading the next wave in Internet infrastructure deployment through the establishment of fast, cheap, ubiquitous Internet service on a wireless platform. Wealthier suburbs and mid-sized cities have also launched municipal Wi-Fi networks. The entertainment hub of Burbank, CA has launched one of the “first municipal broadband wireless hotspot[s]” in the L.A area [Burbank, 2005]. They offer a free network covering a thirty-four-block area for over 29,000 entertainment-related employees. [Burbank, 2005] Tempe, Arizona is another city on its way to becoming one of the first mid-sized cities to provide Wi-Fi broadband to all 150,000 of their residents. [Grebb, 2005]

FOR FURTHER RESEARCH: RLCs working within the system

In 2007, the ALA’s Office for Information Technology Policy (OITP) undertook a study funded by the Bill and Melinda Gates Foundation to research the impact of Regional Library Cooperatives (RLCs) in the provision of high-speed broadband in small- and medium-sized public libraries. Regional Library Cooperatives allow state agencies and local libraries to pool their resources to manage technology infrastructure more efficiently as well as provides them with assistance with applying for complex E-Rate funding. [OITP, 2007] The study identified RLCs as one of the key players in enhancing high-speed broadband and network services for small- and medium-sized public libraries through their roles as technology, administrators and political advocates. RLCs also provide the administrative expertise to facilitate the aggregation of resources between local libraries, which enables them to secure funding and provide robust broadband services to their communities. [OITP, 2007] This area needs further research in the ways in which RLCs work within the current

system of public libraries and their provision of providing free broadband Internet access in the United States.

CONCLUSION

Most scholarly discussions involving the current state of the 'US digital divide' rely upon the measurement of the percentage of Americans online from home as an instrumental metaphor for determining national online accessibility. Although an accurate measurement of online participation from individual household usage statistics are important, it gives a narrow interpretation overall online usage by Americans and does not offer any solutions to the problem. Public libraries have taken advantage of numerous financial opportunities to position themselves in the expansion of Internet access and networked based services in their local communities. Public libraries can further these goals through their participation as municipal agents of their local communities. However, the role of the public library evolves from their ability to establish effective linkages with community stakeholders involved with local government and funding organizations.

Broadband and Wi-Fi networks operated by cities and counties is financially viable option and is likely to encourage greater private broadband investment. Although, there is no comprehensive national broadband policy 'panacea' that exists which will completely bridge the digital divide. A basic understanding of the broad spectrum of factors related to the digital divide is critical when local municipalities commit to the development of locally tailored broadband deployment strategy.

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