

Assessing and Treating Impediments to Internet Access for Economically Challenged Students and those who reside in Unserved and Underserved Areas

Introduction

K-12 education and postsecondary education resources are becoming increasingly digital and more and more web-based. Learning management systems, student information systems, and content management systems all require students, parents, teachers, and administrators to have constant and convenient access to the Internet at ample speeds to download, upload, view, and interact with content, learning activities, grades, formative assessments, and records. Never before in the history of education has it been more necessary for all students to have 24/7 access using an Internet-connected computer or tablet with viewable screen and keyboard.

Equity of Access

Since the advent of the Internet and use of the computer for learning activities, there has always been a digital divide. Originally, it was the discrepancy between no access and dial-up access. It evolved into the gap between dial-up access and always on (cable modem/DSL) access. Today, it is regarded as the chasm between no access and gigabit access. Unfortunately, the fast have become faster, and many of the no access households have remained with no access or grossly underserved access. So, the division between the “haves” and the “have nots” is only growing wider.

Causal Factors

There are many factors or impediments that may contribute to the lack of adoption of broadband access in households with students: Comparatively high monthly cost, multi-year contract requirements, geographically inaccessible locations, customer mobility, personal choice, lack of computer, fear of inappropriate content, and others. Research is showing that cell phone and mobile access is actually contributing to a modest decline in home wired broadband services.

Broadband Adoption Data

Census data from 2013 revealed that 25 million households (21%) have no regular Internet access at all, either at home or elsewhere. Overall, 84% of U.S. households own a computer, and 73% of U.S. households have a computer with a broadband connection to the internet, the bureau reported. The Pew Research Center found that 70% of Americans have broadband access. Among households with incomes below \$20,000, most do not have an internet subscription for a computer, cell phone or other device, though they may have free access at a local library or elsewhere. Among households with incomes of \$20,000 and higher, most households have their own broadband subscriptions. The Nebraska Rural Poll found that 82% of Nebraskans subscribe to a high-speed Internet service at home, other than a cellular data plan. Nine percent (9%) have no Internet access.

Recommendations

RECOMMENDATION 1: Public and private schools that rely heavily on digital curriculum resources, and who expect students to connect to the Internet in order to complete homework assignments, should take steps to assess which students have sufficient wired Internet speeds at home.

RECOMMENDATION 2: Public and private schools should take steps to assist student households that have inadequate Internet access to achieve equity of access.

Interventions to Achieve Equity of Access

Public Wi-Fi Centers. One interim strategy to achieving more accessible Internet for economically challenged students is to open up free Internet access points at public or private locations:

- School buildings
- Library buildings
- Municipal recreation centers
- Churches
- Cultural centers
- Restaurants and coffee shops

Check-out of Portable Wi-Fi Hotspots. Growing in popularity is a cellular-based appliance or antenna known as a hotspot that can be borrowed or purchased and permits one or more laptops or tablets to connect to the Internet using a cellular service or data plan. Increasingly, schools and libraries have begun pilot programs making these devices available for check out via their student library credentials. Most cellular smartphones can double as Wi-Fi hotspots. Portable Wi-Fi hotspots work best in areas that have strong cellular signals.

Entry Level Internet Service. Most Internet Service Providers offer an option for an entry level subscription Internet service known by such terms as Basic, Standard or DSL Lite. With lower bandwidth and a lower monthly cost, it may provide a suitable alternative for households where only one or two computers or smartphones are connected at one time. However, like the higher bandwidth plans, providers will prefer (usually not require) that the customer sign a contract for at least 12-24 months, and also provide access to a checking, savings, or credit card account for automatic withdrawal every month. These last two items (i.e. lengthy contracts and automatic withdrawal) often inhibit participation from mobile families.

Satellite Internet Service. Satellite Internet service is available almost everywhere in the continental United States. With plans ranging from \$40 to \$60 per month, typical transmission speeds are up to 1Mbps upload, and up to 15Mbps download, with a .25-.5 second delay (latency). With most plans, there is a monthly data allowance of 5GB to 10GB, and then once the data allowance is reached, the transmission speed is reduced. Subscribers must have a VSAT (Very Small Aperture Terminal or satellite dish) un-obstructively aimed at a geostationary satellite in the southern sky and a satellite modem in order to receive the service. Satellite Internet may not be appropriate for time-sensitive applications such as online gaming and videoconferencing.

Educational Broadband Service (EBS). EBS, formerly known as the Instructional Television Fixed Service (ITFS), is an educational service that has generally been used for the transmission of instructional material to accredited educational institutions and non-educational institutions such as hospitals, nursing homes, training centers, and rehabilitation centers using high-powered systems. The FCC's recent revamping of the EBS spectrum will now make it possible for EBS licensees to continue their instructional services utilizing low-power broadband systems while also providing students with high-speed internet access with a radius of up to 35 miles. Nebraska education entities had 32 active EBS licenses at the time of this writing. (FCC 47 C.F.R., Part 27)

TV White Space (TVWS) Internet. The use of TV White Space channels, portions of licensed UHF radio spectrum that licensees do not use, provides an opportunity to deliver ubiquitous broadband services. UHF radio frequencies are non-line-of sight (NLOS) and are able to penetrate trees and buildings. By positioning a base station and tower connected to a source of Internet, multiple channels are able to transmit Internet access omni-directionally with a radius of up to 9 miles. Each customer premise interacting with the base station must also have a UHF antenna, customer converter, and Wi-Fi router.

Resources

2014 Digital Divide Index, 2016, as retrieved from <http://ici.msucare.com/sites/ici.msucare.com/files/2014ddi.pdf>, 9/30/2016

Education Commission of the States—Education Trends regarding Municipal Broadband, 2016, as retrieved from http://www.ecs.org/ec-content/uploads/Inhibiting-Connection_State-policy-impacting-expansion-of-municipal-broadband-networks.pdf, 9/14/2016.

Nebraska Broadband Map: <https://broadbandmap.nebraska.gov/>

Nebraska Rural Poll--Broadband and Mobile Internet Services in Nonmetropolitan Nebraska, 2016, as retrieved from <http://ruralpoll.unl.edu/pdf/16broadband.pdf>, 9/19/2016.

NTIA--Digital Nation Data Explorer, as retrieved from <https://ntia.doc.gov/data/digital-nation-data-explorer#sel=internetUser&disp=map>, 11/7/2016

Pew Research Center-Home Broadband Survey, 2015, as retrieved from <http://www.pewinternet.org/2015/12/21/home-broadband-2015/>, 9/14/2016.

U.S. Census Bureau Computer and Internet Use in the United States, 2013, as retrieved from <http://www.census.gov/content/dam/Census/library/publications/2014/acs/acs-28.pdf>, 9/14/2016.

Nebraska Statutes affecting Public Wi-Fi and TV White Space deployments

Neb. Rev. Stat. 86-594. Agency or political subdivision of state; limitation on power (excerpt)

(1) Except as provided in the Educational Service Units Act and sections [79-1319](#), [81-1120.01](#) to [81-1120.28](#), [85-401](#) to [85-418](#), [85-1501](#) to [85-1542](#), and [86-575](#), an agency or political subdivision of the state that is not a public power supplier shall not provide on a retail or wholesale basis any broadband services, Internet services, telecommunications services, or video services.

Neb. Rev. Stat. 86-597. Retail or wholesale service; how construed.

(1) For purposes of sections [86-594](#) and [86-595](#), providing a service on a retail or wholesale basis shall not include an agency or political subdivision of the state, whether or not a public power supplier, deploying or utilizing broadband services, Internet services, telecommunications services, or video services, for its own use either individually or jointly through the Interlocal Cooperation Act, the Joint Public Agency Act, or the Municipal Cooperative Financing Act for the internal use and purpose of the agency, political subdivision, or public power supplier or to carry out the public purposes of the agency, political subdivision, or public power supplier.

(2) Nothing in sections [86-593](#) to [86-598](#) prohibits or restricts the ability of an agency, political subdivision, or public power supplier from deploying or utilizing broadband services, Internet services, telecommunications services, or video services for the internal use and purpose of the agency, political subdivision, or public power supplier, or to carry out the public purposes of the agency, political subdivision, or public power supplier.

This briefing paper was developed by Tom Rolfes, Education I.T. Manager, Nebraska Information Technology Commission, tom.rolfes@nebraska.gov, 402-471-7969. (10/20/2016)