

The Digital Reality: E-Government and Access to Technology and Internet for American Indian and Alaska Native Populations

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ABSTRACT

Information and communications technologies are powerful resources and tools for tribal governments to engage with their constituents, deliver services, conduct efficient and transparent administration, interact with other governments, and carry out policies. Digital government may in many ways be even more critical for tribes than for many other governments. As sovereign nations, tribal governments are engaged in complex relationships with other governments: local, state and federal governments. They are frequently in geographically isolated locations, with often-dispersed populations. The capacity to bridge distance can convey benefits for service delivery and civic engagement, and can connect communities with resources for health, economic development, and education. In this paper, we review research on Native American technology use and the limitations of available data. Because of the contrast between residents of urban areas and tribal lands, we examine differences in cell phone, computer and Internet use for metropolitan and nonmetropolitan Native populations, by education and income. We propose a research agenda utilizing this data, to support action to remedy disparities and to harness the potential of technology for tribal governments.

Categories and Subject Descriptors

- **Social and professional topics~Race and ethnicity**
- **Social and professional topics~Geographic**

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characteristics • **Social and professional topics~Cultural characteristics** • *Social and professional topics~Broadband access* • **Social and professional topics~Internet governance / domain names**

Keywords

Digital government; Digital divide; American Indian; Tribal government; (In)Equality

1. INTRODUCTION

Information and communications technologies are powerful resources and tools for tribal governments to engage with their constituents, deliver services, conduct efficient and transparent administration, interact with other governments, and carry out policies to promote economic development, education, health care, and more. American Indian nations are sovereign nations with a distinct relationship with the Federal government, which recognizes the government-to-government relationship. Native Nations have the right to govern themselves, define their own citizenship, manage tribal property, and regulate tribal business and such. Because of this, complex relationships with other local, state and federal governments; isolated locations; and, often-dispersed populations; digital government or e-government may in many ways be even more critical for tribes than for many other governments. Yet, the lack of physical infrastructure, lack of technically trained people, and lower levels of information technology use by Native populations are barriers to realizing the potential of digital government.

While there is variation among urban and rural Native Americans¹, there is a general legacy overall of greater exclusion from information and communication technology (ICT), compared to other ethnic groups, and this affects opportunities for tribal self-determination, democratic representation, policy, and

¹ The terms American Indian and Alaskan Native are Census classification categories. In this paper, the terms Native American, American Indian, Native, or Indigenous are used interchangeably to reference the general population. The terms Native Nation or Tribe are used to interchangeably for federally recognized Tribal groups.

governance. In 2004, for example, the U.S. Forest Service released a Draft Environmental Impact Statement (DEIS) regarding recreational development of the San Francisco Peaks on a CD-ROM. However, as noted by a Navajo traditionalist medicine man, Jones Benally, he had no experience with a computer and thought the CD was a mirror (Bennally, 2006, as cited in Mahoney, 2011, p. 66; Helms, 2004). The Forest Service had stumbled upon the reality of technology use in many American Indian communities. While the landscape of telecommunications in the United States has transitioned from wireline telephones to mobile usage (Taylor, Wang, & Dockterman, 2010), and there has been an increasing number of individuals who have broadband Internet connections (Pew Research Center, 2013) many disparities exist for Native populations, especially in tribal communities.

In this paper, we take a step toward better understanding of information technology use in tribal communities by examining metropolitan and nonmetropolitan differences for Native populations. The most recent data made available in federal reports has not differentiated between urban and rural American Indians and Alaskan Natives, although early studies show large disparities based on rural residence. Beyond simple urban and rural differences, however, we also examine the role of education and income across metropolitan and nonmetropolitan areas. Rural Native populations include those who live on tribal lands, and so this may provide further evidence for tribal policymakers regarding e-government and technology use in other policy areas. Tribes have sought to develop their own telecommunications infrastructures and digital inclusion programs.

This data also has relevance for federal policy. Although access to telecommunication technology and service has increased over the years for the U.S. overall, closing the broadband (or high-speed Internet) gap for Indian Country has only recently entered the national discussion. The 2010 National Broadband Plan called for the establishment of the Office of Native Affairs and Policy (ONAP) within the FCC to increase connectivity so that tribal "... communities enjoy the benefits of 21st Century communications infrastructure" (FCC, 2010, p.1). Better data is needed to track progress on this goal.

In this paper, we first review national data on American Indians and Alaskan Natives, followed by a discussion of the potential of information technology to promote improvements in several areas of tribal governance and policy. We discuss the strengths and limitations of national data available in the Current Population Survey (CPS). Using the most recent CPS from 2012, we explore differences in use of cell phones, computers, and home Internet access by metropolitan and nonmetropolitan residence, and by education and income within these geographies. We conclude by discussing implications for policy, and by proposing a research agenda for the future, with further analysis and additional data.

2. NATIONAL DATA ON NATIVE COMPUTER AND INTERNET USE

Digital inclusion has been described as the "ability of individuals and groups to access and use information and communications technologies" (Institute of Museum and Library Services, University of Washington Technology & Social Change Group, International City/County Management Association, 2011). Beyond inclusion, however, is the notion of "digital citizenship," which argues that regular (and frequent) access and effective use of technology is necessary for full participation and

equal opportunity in an online society (Mossberger, Tolbert, & McNeal, 2008). While digital inclusion and digital citizenship require more than connectivity, gaining Internet access is a crucial step, and the availability of data on access and use has been more limited for Native populations in the U.S.

Because American Indians are a small percentage of the national population (1.7% or 5.2 million, U.S. Census, 2012), many of the useful and detailed surveys of technology use, like the Pew Internet and American Life surveys, either do not survey American Indians at all, or do not have sufficient numbers to draw any conclusions about patterns of technology use. There are useful studies of tribal experience and institutions such as tribal libraries that portray both challenges and efforts to close the gaps (Jorgensen, Morris, & Feller, 2014). Yet, it is necessary to embed these in a more general context.

The best source of systematic and generalizable national data on indigenous technology use has been the large-sample Current Population Survey (CPS) conducted by the U.S. Bureau of the Census. The CPS has collected employment and unemployment data for the past 50 years, making it the longest ongoing survey conducted by the U.S. Census (DaNavas-Walt & Proctor, 2013). The U.S. Census Bureau began gathering data on computer use through the Current Population Survey (CPS) early as 1984, and Internet use since 1997 (U.S. Census Bureau, 2014). Over the years, the number and types of questions about Internet use have varied, as has the reporting of data on computer and Internet use by Native populations. Additionally, there are some limitations in how Natives are defined by the Census. Still, the national data portray a picture of indigenous populations as lagging behind other disadvantaged groups, including African-Americans and Latinos.

2.1 Early Data

Based on the Current Population Survey, the National Telecommunications and Information Administration (NTIA) reported data as early as 1995 for American Indian, Aleut, and Eskimo households. Such households in rural areas had access to the following in 1995: 75.5 percent had a telephone, 15.3 percent had a personal computer, and of those households with a computer, 28.3 percent had a modem (NTIA, 1995). Although rural American Indian and Alaskan Native (AI/AN) households were less likely to have a computer and modem than rural White, non-Hispanic households, rural AI/ANs who had a computer and modem were **more likely** to engage in online activities such as taking courses (51.7 percent) and accessing government reports (45.4 percent) (NTIA, 1995). This indicates the benefits that rural indigenous households could gain from Internet connectivity. For American Indians and Alaskan Native households in urban and central city areas, their possession of a telephone, computer, and modem were near the proportions of White, non-Hispanic households² (NTIA, 1995).

2.2 Overview from 2012 CPS

Computer and Internet use for AI/AN households, as for all racial groups, has grown considerably since the 1995 data was collected. What has persisted, however, is the relative position of AI/AN households as those who are least likely to use technology

² Concerns were raised if modem possession was a good proxy for Internet access as possession of a modem and thus the ability to have Internet doesn't exactly mean the household has Internet (NTIA, 1998).

at home. For the most recent CPS data, collected in 2012, disparities are narrower for home computer use than for Internet or broadband connectivity at home. While 79% of all households have computers used at home, this is only 68% for American Indians and Alaska Natives. This percentage compares closely with reported home computer use by African-Americans and Hispanics, who are also disadvantaged in comparison with non-Hispanic Whites, in all categories.

However, AI/AN households lag behind African-Americans and Latinos in Internet use and home broadband. This is true even when the data combines urban and rural Native populations, despite the higher level of Internet use by urban AI/AN households. While 75% of the U.S. population, 62% of African-Americans and 64% of Hispanics report using the Internet at home, this is true of only 58% of AI/AN households overall. Similar patterns exist for broadband, or high-speed Internet use at home, which is 72% for the population of the U.S., 61% for African-Americans, 63% for Hispanics, and only 56% for AI/AN households as a whole (NTIA, 2014). Broadband, which has been the focus of federal policy, is particularly important. It is necessary for full access to the Internet – for accessing most websites today, video streaming, uploading and downloading, and performing a variety of tasks online.

Most interesting, however, is that American Indians and Alaska Natives have the highest rates of any racial or ethnic group of use of mobile technologies to access the Internet from home (14% compared to 9% for the population overall (NTIA 2014)). In other words, they are more likely to be “mobile only” Internet users, who lack fixed home connections and rely on cellphones to go online. Dependence on smartphone use is also more common for other disadvantaged racial or ethnic minorities (African Americans and Hispanics) than for non-Hispanic Whites, though at slightly lower rates than for AI/AN households. Overall, the rise of mobile technologies has been the most important trend in Internet use over the past few years (NTIA, 2014), but for most Internet users, smartphones supplement the use of laptops and desktops, which have bigger screens and more functional keyboards for reading and writing-intensive activities online (Horrigan, 2012).

The NTIA data for 2012 does not differentiate between urban and rural populations, as was true in some prior reports. Broad differences between urban and rural AI/AN populations existed in prior years, and residents of tribal communities are most likely to be rural. The overall numbers mask some of the differences in the AI/AN population, and the substantial need in some communities, especially in rural areas or in tribal communities. When looking specifically at **rural AI/AN**³, non-Hispanic households around the time that the National Broadband Plan was adopted, although 52 percent indicated computer usage, **only 31 percent had broadband Internet adoption** (NTIA, 2011). Rural AI/AN households trailed well behind the rural U.S. household’s averages for both computer use (70 percent) and broadband adoption (57 percent) (NTIA, 2011). More specifically in 2011, the FCC noted that **in tribal communities**, nationwide, the telephone penetration rate was only 68 percent and the broadband penetration rate was less than 10 percent (FCC, 2011).

³ The NTIA 2011 report utilizes the 2010 U.S. Census Bureau Current Population Survey. The survey does not indicate if the rural American Indian and Alaska Native households are located on or off a reservation.

In part, this is a lack of broadband infrastructure, although as we will discuss later, there are other barriers to adoption as well, including affordability. The ONAP, established in 2010 as a recommendation of the National Broadband Plan, sought to address broadband deployment, improved access to mobile wireless communications, and to expand tribal opportunities for radio services. The FCC’s endeavors to address the telecommunication divide in tribal communities was a result of the Telecommunications Act of 1996, which established the Universal Service Fund that provided discounts to income eligible subscribers for telephone services (U.S. Government Accountability Office, 2006a). Eventually the FCC developed a working relationship with tribal governments and this relationship was first formally recognized in 2000 with a “Statement of Policy on Establishing a Government-to-Government Relationship with Indian Tribes” (FCC, 2000).

There is now greater federal attention to the needs of tribal communities, and new mechanisms for representation of their needs. Yet, despite the National Broadband Plan and the establishment of ONAP, there is much more to be done. Federal Communications Commission (FCC) Chairman Tom Wheeler, on a 2014 visit to the Pueblo of Acoma in central New Mexico, commented that less than half of the residents had access to low bandwidth or lower-speed broadband, and barely 10 percent are accessing higher broadband speeds (Wheeler, 2014). What are the implications of these disparities in technology use?

3. E-GOVERNMENT AND POLICY

For tribal governments, Internet applications have many potential benefits for effective public management and policy. In this section, we examine the use of digital government for service delivery, communications with members of the tribe, and communications with other governments. Further, we discuss the use of information technology for policy areas that promote tribal self-governance, such as economic development, education, health, and cultural preservation. Digital government and Internet use may have even greater benefits for indigenous nations than for other governments, because of its ability to bridge distances for geographically isolated locations or dispersed populations. Yet, this requires more than government use of information technology. Even if broadband infrastructure is improved, governments that wish to offer services online or use the Internet to disseminate information to their constituents cannot effectively implement such strategies when a high proportion of the population is offline.

3.1 Digital Government Services and Communication

E-government involves the use of information technology for government services, information, and communication, and it has been associated with a number of benefits for governments and citizens (Tolbert & Mossberger, 2006). E-government has the potential to significantly impact Indian Country for connecting members across geography, to provide services, information, and platforms for participation. Some tribes are already using technology for this purpose. For example, some tribes broadcast tribal council meetings via the Internet and still others over low power television (LPTV). Because some tribal lands are geographically widespread and sparsely populated, Internet use can overcome such barriers for service delivery and governance. Similarly, some tribes are not

located in a particular territory, and members may leave tribal lands in any case.

Externally, tribal governments cannot ignore the use of technology in their interactions with others. The example of the Forest Service points out how common information technology is in government processes more generally. As there is an increase in government services provided online, the opportunities for American Indians to become more involved in these processes is becoming apparent. In recent news a petition was started at the White House's "We The People" petitioning portal related to H.R. 687 the Southeast Arizona Land Exchange and Conservation Act of 2013, which was attached to the National Defense Authorization Act (We The People, 2014; Toensing, 2014). However, knowing which American Indian populations are accessing these e-government opportunities could provide insight into how to increase participation from non-users. At the Tribal level, Tribes may face unique challenges, such as funding, being geographically isolated, and lack of current technological infrastructure, in digitally connecting to conduct government business to meet state and federal requirements (Brescia, & Daily, 2007; Morris, & Meinrath, 2009).

Additionally, digitally connected tribal communities can benefit in important areas of public policy. The federal National Broadband Plan has prioritized technology use in a number of policy areas, including schools and libraries, health care, and economic development. Geographic isolation and poverty suggest that the potential benefits may be even greater for broadband deployment and Internet use in tribal communities. The Internet can also facilitate the building of virtual communities for preserving indigenous languages and cultures – a critical aspect of civic engagement and education for tribes. In all of these cases, technology has the potential to transcend distance and to create broad networks.

3.2 Health

At the tribal level, the FCC's universal service funding of tele-medicine has brought benefits to health care providers in rural areas, and can widen access to health services for tribal residents (GAO, 2006a). Tele-medicine is an innovative use of information and communication technologies that have been utilized in the health field, such as through Indian Health Services, as early as the 1970s (Hays, 2011), to promote health related information for prevention and disease management programs for American Indians and Alaska Natives (Sequist, Cullen, & Acton, 2011). Individuals can benefit more fully from remote monitoring, communication with doctors, health information and other health resources through home Internet connections or other personal access such as smartphones. In one particular study involving Native Americans from Tribes in the Great Plains areas, individuals with disabilities benefitted from programs that utilize information technologies to communicate health-related information (De Mars, 2010). One such method, digital storytelling is a process where individuals create, film, and edit their individual story through electronic technology while utilizing traditional oral storytelling practices (Iseke, & Moore, 2011; Palacios, 2012). Digital storytelling has been advocated as a method to increase communication on health knowledge and prevention, such as for diabetes (Azure, 2012), suicide (Wexler, Gubrium, Griffin, & Difulvio, 2013), and cancer (Cueva, et al., 2013). However, access to health information online and to specialists in distant medical centers are ways in which connectivity could also benefit individuals in tribal communities,

especially given high rates of diseases such as tuberculosis, alcoholism and diabetes among AI/AN individuals (NCAI, 2012).

3.3 Economic Development

While economic development and Native-owned businesses are growing in recent decades, the poverty rate for AI/AN households is still 25%, or nearly double that for the population overall (NCAI, 2012). The Internet is an important tool for employment and economic development. In 2011, nationwide, 34 percent of Internet users conducted online job searches, and to the extent that tribal residents lack Internet access, they are excluded from many job opportunities (NTIA, 2013). Technological skills are beneficial to the tribal labor force (Brescia, & Daily, 2007), as more jobs in the economy rely on computer skills and familiarity with the Internet. There is also an increasing need for tribal workers to have the technical capabilities to continue the development of telecommunications plans and improvements for their nations. For rural communities distance learning opportunities offered in Tribal colleges and universities offer a sustainable method of supplying technically able workers to develop and improve Tribal telecommunications (GAO, 2006a). Having the ability to connect to the World Wide Web also has potential for individual AI/ANs to engage in E-commerce (Bregendahl, & Flora, 2002) but also for Tribal businesses to enter new markets and to promote tourism (Bregendahl, & Flora, 2002; Samuel, Ribisl, & Williams, 2012).

3.4 Education and Libraries

Nationally, K-12 schools have become increasingly connected to the Internet, so that the racial digital divide between Black and White students in computer usage in schools has been closing (The JBHE Foundation, Inc., 2004-2005). For 8th-grade AI/AN students, they are the least likely of racial groups to use computers at home (78 percent compared to 95 percent of White students) (National Center for Education Statistics, 2008). Students can benefit from access to the Internet with research and homework assistance, and online tutoring. Tribal libraries have become a point of access for individuals to get online, however, compared to public libraries nationwide, fewer tribal libraries can offer electronic resources for homework, licensed electronic databases, e-books, and online instructional courses/tutorials (ATALM, 2014). For rural tribal communities, distance education or online colleges have become common (Ayasia, 2013) and this has become one method for rebuilding culture and education (Sanchez, Stuckey, & Morris, 1998). In addition, tribal colleges and universities can be positioned to create opportunities for students to engage in information sciences such as computer science or to provide computer training and support (Brescia, & Daily, 2007).

3.5 Cultural and Language Preservation

Public libraries have evolved over time from simply housing books to increasingly taking on additional responsibilities for the communities they serve (Jaeger, Bertot, & Gorham, 2013). Federal policies have positioned public libraries to be involved in information technology (Children's Internet Protection Act, E-Rate Funding Program, E-Government Act, and the FCC's 2010 Broadband Plan) (Jaeger, Bertot, & Gorham, 2013). Tribal libraries have essentially become the main conduits of information and "culture keepers" in the communities they serve (Dunn, 2004; Jorgensen, Morris, & Feller, 2014). A unique benefit of information technologies to American Indian people and Tribes is how technology can assist in cultural and language preservation.

Tribal libraries have undertaken the task to digitally collect and maintain archives of stories, songs, and language (Crimmins, 2012; Jorgensen, Morris, & Feller, 2014).

With 78 percent of American Indians living outside AI/AN areas (U.S. Census, 2012), connectivity also transcends commonly cited reasons to include culture and language preservation for Native American individuals both on reservations and off (NCAI, 2013). Native Nations and individual developers have created innovative products to facilitate linguistic and cultural learning through Internet websites like *NavajoWOTD.com* which has both text and audio clips of Navajo words and short descriptions of the origin or use of the word (Shorty, 2012); video gaming such as *Never Alone (Kisima Ingitchuna)*, developed with representatives from the Iñupiat Native Alaskan community, which connects culture, storytelling, puzzle-solving and is available on major video game consoles (Byrd, 2014); and mobile device applications and computer software for language learners such as *Rosetta Stone-Navajo*, *Objibway Language and People* app, and *Native Language App* (Zah, 2010; Indian Country Today Media Network, 2012; Dadigan, 2013).

Both American Indian Tribes and Native American individuals are using digital technologies in cultural language preservation. There is much published on Native American language revitalization, yet there are few academic articles and only a handful of newspaper articles regarding technology and Native American languages. Academically, particular attention has been paid to technology and indigenous language revitalization with regard to the Ojibwe language demonstrating the use of technology for communications, material production, documentation and archival efforts (Hermes & King, 2013); the discussion of technology driven multimedia language software project for language revitalization (Hermes, Bang, & Marin 2012); the Hawaiian language (Warshauer, 1998; Galla, 2009); and, increasingly the Chickasaw Nation via newspaper articles (Richmond, 201; Russon, 2014). Additionally, a recent dissertation examines the Chickasaw Language Revitalization Program (Ozbolt, 2014; Davis, 2013) and another other discusses uses of technology and in particular mobile apps for language learning (Begay, 2013).

In order to realize the potential of technology in these areas, tribal members must have access to high-speed networks and the ability to use them. While the data on how digitally included the American Indian Tribal communities are is underdeveloped, there have been advances by groups, such as Native Public Media and the Association of Tribal Archives, Libraries, and Museums (ATALM), who have conducted independent research on digital inclusion of tribes. Native Americans are using technology at higher rates than national norms, if mobile and public access use are taken into account; despite the fact that broadband access is not always available on tribal lands. In fact, like other minority groups, tribal populations are mobile adopters, again demonstrating motivation to use technology. However, individuals often must travel in order to obtain access or connectivity (Morris, & Meinrath, 2009; Jorgensen, Morris, & Feller, 2014). **The national AI/AN data, which combines urban, rural, and tribal residents, does not reflect the digital reality for tribal communities. Because residents of tribal communities are not identifiable in this data, disaggregating metropolitan and nonmetropolitan AI/AN households gets us closest to that reality.**

4. METROPOLITAN AND NONMETROPOLITAN AI/AN TECHNOLOGY USE, 2012 CPS

Currently, the U.S. Census gathers data from over 53,000 households and over 100,000 individuals throughout the nation, representing about 122 million households once the estimates are weighted and factored by head of household (NTIA, 2014). This yields a larger sample of American Indians and Alaskan Natives than other national surveys, although it is important to acknowledge some of the survey's limits, such as self-reported identity.

As early as 1860, American Indians were included in the Census as a separate race group. In the 2000 Census, changes were made to the survey allowing individuals to self-identify as multiple races (U.S. Census, 2012). The response change resulted in variability, from the 2000 to 2010 Census, in who self-identified as American Indian and such implications should be considered when examining racial disparities, especially when relevant across time periods (Liebler, Bhaskar, & Rastogi, 2014). The lack of consistent data specific to AI/AN households decreases the ability to fully understand trends. Excluding this population from national reports, due to small sample sizes, or combining the AI/AN population with other racial/ethnic categories (NTIA, 1998; NTIA, 2000; NTIA, 2002; NTIA, 2004; NTIA, 2002; NTIA, 2013; Jorgensen, Morris, & Feller, 2014) makes it challenging for Tribal governments to advocate for their citizens and for policy makers to stay informed. Adding to the challenges for Tribal governments is that aggregate and boundary-less data are not applicable to specific Tribes. In addition, changes in the Census Bureau's classification of American Indians and Alaskan Natives from 1994 to 2010 add to the barriers of making direct comparisons across the years.

There are other problems with using the CPS data to track trends over time. Often the number of questions has been limited, with little data collected between 2003 and 2009. After the development of the National Broadband Plan (Federal Communications Commission 2010), the Bureau of the Census began to collect more detailed data on broadband adoption, mobile technology use, barriers to adoption, and activities online. This enriched CPS provides recent national data on American Indians and Alaskan Natives as well, from surveys collected in 2012.

The CPS gathers data from a sample of the overall population, and not the whole population. Therefore, the data must be weighted to resemble a larger population. This causes discrepancy in the data to where a sample error measurement must be factored into the data. Thus, the data presented in this report may not fully describe actual conditions, but rather act as an estimate of where the AI/AN community stands in the digital world. Still, these large sample surveys provide the best estimates available, and provide an overview of connectivity and Internet use.

To compare the difference in information and communication technology use in metropolitan and nonmetropolitan areas, we use the Current Population Survey (CPS) Computer and Internet Use supplement, which was administered in October 2012. The Computer and Internet Use supplement asks respondents and households about their cell phone use, the availability of a computer at home, Internet usage (current use, prior use but not current, and never used), reasons why there is no Internet use, and activities conducted online and

by which technology. Here we focus on types of access and barriers to Internet use at home. Data was extracted from the Census Bureau's extraction tool DataFerrett.

The extracted subsample is described as being American Indian or Alaska Native only (AIAN), non-Hispanic, and 25 years and over. Respondent age is top-coded at 85 years of age. The final sample consists of 722 respondents. The CPS's definition of metropolitan and nonmetropolitan residence was used to compare ICT users. ICT usage questions are reflective of branching and skip logic and as such, if a respondent was not eligible for a certain question due to their answer to a previous question, they were not included in the analysis of that specific question.

Differences in ICT usage between metropolitan and nonmetropolitan areas was broken down by four categories of educational attainment (less than a high school diploma; high school graduate but no college; some college or associate degree; or bachelor's degree or higher), and five categories of household family income (less than \$25,000; \$25,000-\$49,999; \$50,000-\$74,999; \$75,000-\$99,999; or \$100,000 or more). Applicable weights as recommended by the CPS⁴ were used to weight for the basic CPS person, households, or primary respondent questions.

4.1 Results

Overall, approximately 86 percent of American Indians and Alaska Natives in metropolitan and nonmetropolitan areas are cell phone users. However, while there may not be differences in mobile adoption between metropolitan and nonmetropolitan areas, there is a clear distinction in the householder's computer and Internet use in metropolitan areas compared to nonmetropolitan areas. Nonmetropolitan American Indian and Alaska Native householders (61 percent) are less likely than their metropolitan counterparts (75.9 percent) to own a computer and are less likely to use the Internet (50.7 percent compared to 71.1 percent).

Nonmetropolitan cell phone users did not drastically differ from metropolitan cell users in their level of educational attainment; however the disparity is visually apparent for computer and Internet users. The gaps in educational attainment for computer users in both metropolitan and nonmetropolitan areas have a similar trend in that householders with less education are less likely to be computer users and as the level of education attained increases householders are more likely to use computers. Yet, there are large disparities between geographic areas.

FIGURE 1 HERE

In metropolitan areas, 45.9 percent of householders with less than a high school diploma used a computer compared to 92.7 percent of householders with a bachelor's degree or higher. In nonmetropolitan areas, 36.8 percent of nonmetropolitan householders with less than a high school diploma used a computer compared to 88.1 percent of householders with a

⁴ "The Internet Use supplement is a fully allocated supplement. There is no supplement non-response weight included for use with supplement data. The basic CPS person (PWSSWGT) and household (HWHHWGT) weights may be used to tally the supplement. ... "There is, however, a weight associated with the primary respondent questions. This weight, (PWPRMWGT) in location (1187-1196), should be used with the primary respondent questions, which include PENET1, PENET1A(1-10), PENET12(1-13). This weight must be used when tallying these supplement questions"" (U.S. Census, 2012 October, p. 3-4).

bachelor's degree or higher. However, the disparity between metropolitan and nonmetropolitan areas based on educational attainment is more dramatically observed in Internet users. Among nonmetropolitan householders who used the Internet, 25.4 percent who had less than a high school diploma used the Internet, compared to 47.7 percent who had a high school diploma, and 61.1 percent who had attained some college. The percentage of nonmetropolitan householders who had a bachelor's degree or higher (81.3 percent) who use the Internet is slightly more than their metropolitan counterparts (79.3 percent).

FIGURE 2 HERE

AI/AN households with a family income less than \$25,000 that live in nonmetropolitan areas are almost equally likely to use a cell phone (79.8 percent) as households of the same income level that live in metropolitan areas (77.6 percent). Although mobile adoption is almost equal for AI/AN persons with a household family income less than \$25,000 in metropolitan and nonmetropolitan areas, those nonmetropolitan households still lag behind in computer and Internet use. For lowest-income households in nonmetropolitan areas, 39.8 percent use a computer and an even smaller percentage, 30.3 percent use the Internet. Internet use for all income groups is somewhat lower in nonmetropolitan areas, but the difference is small for households with incomes over \$100,000 – about 89% in nonmetro areas versus 92% for metropolitan AI/AN householders.

Table 1 summarizes these differences. There are substantial gaps between metropolitan and nonmetropolitan populations, with the largest relative differences apparent for low-income and less-educated AI/AN householders. Internet use displays larger disparities than computer use, and cell phone use (though not necessarily smartphone use) is similar across places. For Internet use, there is a nearly 20-percentage point difference between metropolitan and nonmetropolitan high school graduates, and a 16-percentage point difference between metropolitan and nonmetropolitan householders with annual incomes of \$25,000 or less. Clearly, affordability is an issue as well as the availability of Internet connections for rural AI/AN populations, as high-income householders either live in different locations or are able to afford more expensive technologies such as satellite access. Low-income and less-educated Natives in nonmetropolitan areas are doubly disadvantaged.

TABLE 1 HERE

5. TRIBAL LEVEL POLICY AND DIGITAL GOVERNMENT

What the national data point out is that AI/AN communities access broadband Internet less than Non-Hispanic White households, and at only 56%, are in fact the least likely racial or ethnic group to have home broadband access. AI/AN householders are also most likely to be "mobile-only" Internet users who use smartphones to access the Internet, but lack home broadband connections. This represents 14% of AI/AN households.

While knowing these trends indicates that AI/AN households are less connected overall, there are important differences across metropolitan and nonmetropolitan populations. For rural AI/AN households, the challenges for Internet are even greater than for indigenous populations as a whole. This is particularly true for those who are low-income and less educated in nonmetropolitan areas. For householders with less than a high school education, only about a quarter of the population uses the

Internet at home; for those with incomes less than \$25,000, less than one-third are home Internet users. In contrast, cell phone use is similar across metropolitan and nonmetropolitan areas. But, not all of these cell phone users report using the Internet on their phones.

These findings have implications for tribal e-government and tribal policy, given that indigenous communities tend to be in rural areas. Yet, nonmetropolitan Internet use is likely much higher than tribal Internet use. Examining technological capabilities at the tribal level has been called an important area for future research (Brescia, & Daily, 2007) especially as some Tribes are moving forward in the development of their own information and communication technology infrastructures (Morris, & Meinrath, 2009). The American Community Survey, which is also conducted by the U.S. Bureau of the Census, began collecting data on computer and Internet use in 2013, and this data will draw a clearer picture of Internet use for larger tribes. While the questions are limited to access rather than barriers to use or activities online, it will be possible to compare the CPS, with its richer information, to the ACS. This will also portray differences across the largest tribal communities.

Given the larger number of questions that can be asked in this smaller sample, it is important to continue the Internet supplements in the CPS. There is more analysis that can be done with existing CPS data as well. Further analysis of barriers to Internet access and activities online by geography will yield better information about digital inclusion or digital citizenship than examining access data alone, as we have done here. Age may also be an important variable, especially with the growth of mobile access, and this is an issue that should be explored further in both the CPS and the ACS. The AI/AN population is much younger than the U.S. population (NCAI, 2012), and trends among youth represent an important source of change. Including metropolitan status in a multivariate analysis will also disentangle the relative strength of overlapping influences, such as the relationship between poverty and rural residence, for example. And, qualitative studies in tribal communities can provide additional, in-depth evidence of technology needs, uses and motivations, supplementing the national survey data. Tribal research can overcome the limits of self-reported identity in the census data.

Future research could also compare indigenous use of the Internet to trends in other groups. Compared to home broadband adopters, smartphone-only Internet users engage in fewer economic and political activities online (for jobs, health, education, civic engagement, etc.). But, some studies have shown that African Americans and Latinos in urban neighborhoods are statistically more likely than Non-Hispanic Whites to enjoy an increase in activities online with smartphone use (Mossberger, Tolbert, and Anderson, 2014). Despite their limitations, smartphones are used for greater benefit by these disadvantaged urban groups. This may well be the case for AI/AN households as well.

With tribal governments expanding broadband access, these findings raise some important considerations for effective implementation. Internet cost is an important issue nationwide and for Tribes, "which are among the most economically distressed groups in the United States" (GAO, 2006b). This point, made nearly a decade ago, holds true today. Affordability is a key consideration, or infrastructure projects will not go far in promoting widespread access and use.

Smartphones are bringing new users online, and there is an opportunity to use mobile applications for services and

communications with tribal members. As mobile-only users are less experienced and do less online (Mossberger, Tolbert, & Franko, 2012), there is also a need to develop skills and expertise by supporting these less-connected users with public access and assistance. In general, new and less-experienced users in tribal communities require help to become comfortable with the Internet, gaining basic skills, and understanding Internet safety (Brescia, & Daily, 2007). Tribal libraries are important actors in this regard, and can reach both adults and youth.

Although tribal libraries are seen as technology hubs, not all offer training on technology skills (Jorgensen, Morris, & Feller, 2014). For those libraries that do provide training, they offer more classes on general computing (88 percent) and Internet browsing skills (81 percent) rather than specific online or technical activities such as accessing government information (59 percent), safe online practices (38 percent), and investment activities (6 percent) (Jorgensen, Morris, & Feller, 2014). There is a need to help new users become aware of what they can do online, and to acquire the skills needed for digital citizenship.

There are other needs as well. The majority of tribal libraries provide access to the Internet, but the quality of connectivity and limitations on library hours vary across tribal libraries (Jorgensen, Morris, & Feller, 2014). Quality of access has been identified as one issue (Kwon, & Zweizig, 2006). Distance and availability of access is often a concern; one strategy has been to consider how to make connecting to the Internet more convenient (Burke, 2007). The Hopi Tribe, for example, has implemented a mobile public library, which includes satellite Internet connection (Jorgensen, Morris, & Feller, 2014).

In general, further exploration is needed for tribal and geographic differences in this population, and for those who identify as AI/AN alone compared to those with a multi-racial status. Better data by place and by tribe is needed to measure the extent to which recent initiatives through the federal Broadband Technology Opportunities Program and tribal investments made a difference. Tribal governments and federal and state policymakers require data for addressing digital needs, advancing tribal e-government, and measuring the effectiveness of initiatives.

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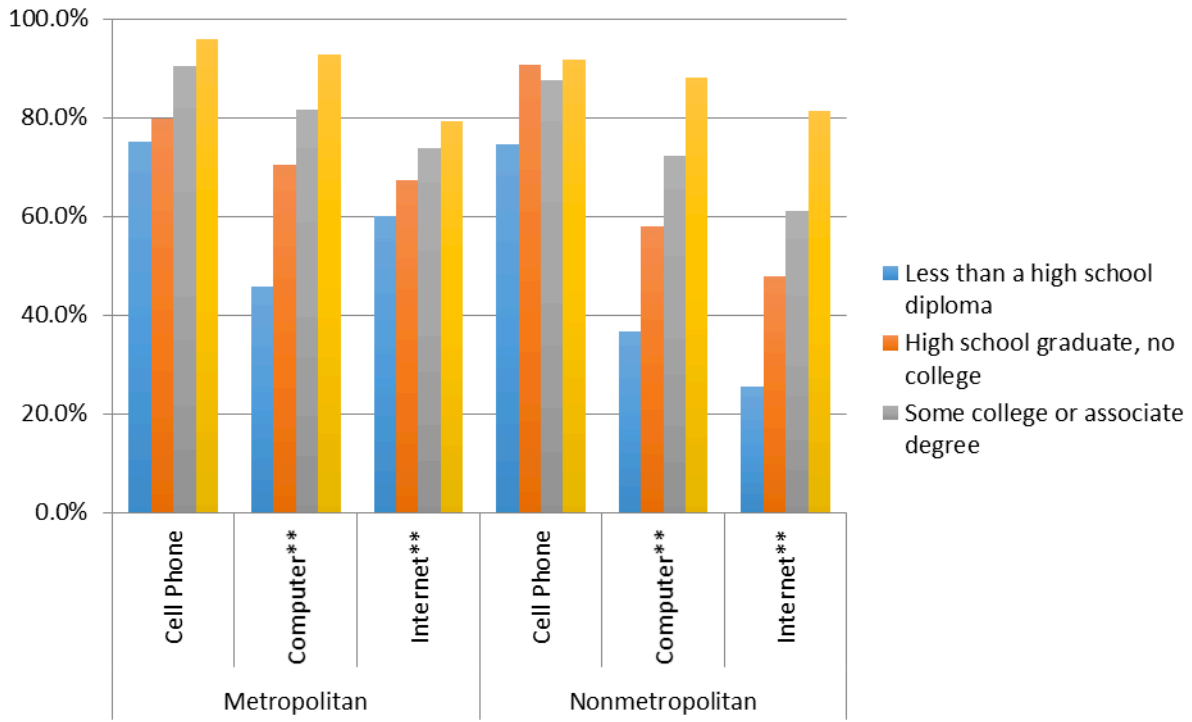
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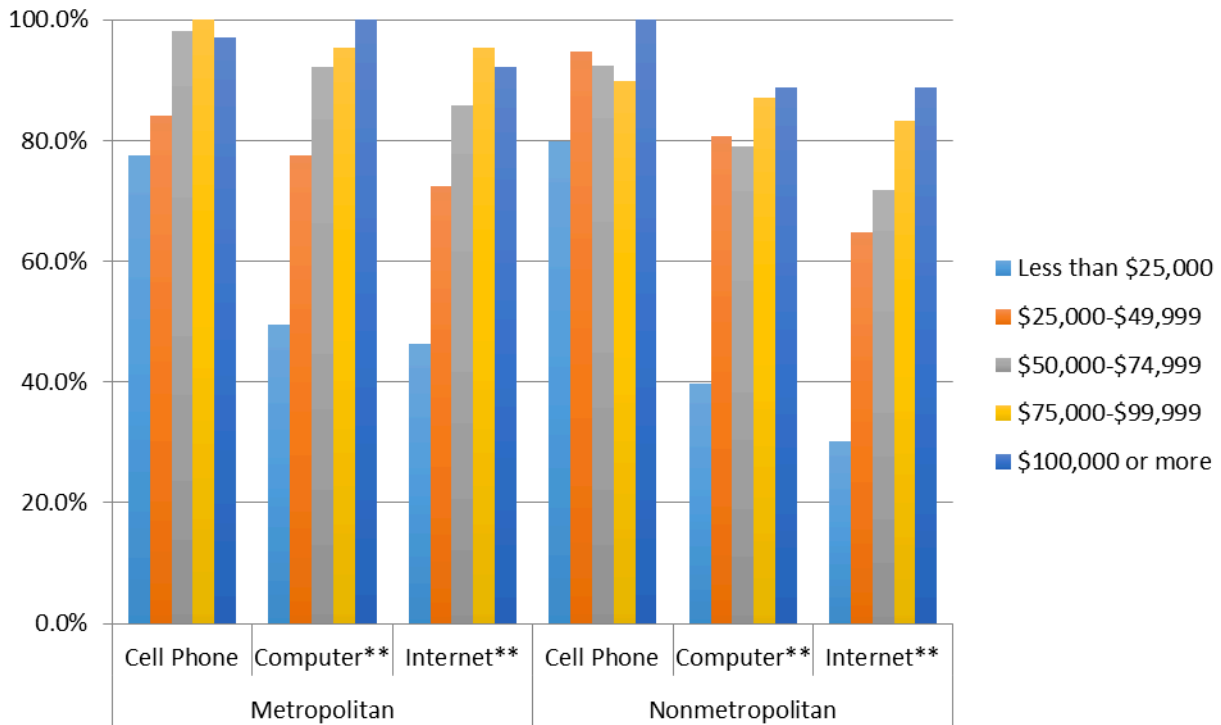
7. FIGURES

Figure 1: Cell phone, computer, and Internet Use among metro and nonmetro areas by educational attainment



**Attributes of the householder

Figure 2: Cell phone, computer, and Internet Use among metro and nonmetro areas by income level



**Attributes of the householder

Table 1: Cell phone, computer, and Internet Use among metro and nonmetro areas by educational attainment, and income level

		Metropolitan			Nonmetropolitan		
		Cell Phone	Computer**	Internet**	Cell Phone	Computer**	Internet**
Whole Sample		86.2%	75.9%	71.1%	86.8%	61.0%	50.7%
Educational Attainment	Less than a high school diploma	75.2%	45.9%	60.0%	74.5%	36.8%	25.4%
	High school graduate, no college	79.7%	70.3%	67.4%	90.8%	58.0%	47.7%
	Some college or associate degree	90.4%	81.6%	73.7%	87.4%	72.3%	61.1%
	Bachelor's degree or higher	95.9%	92.7%	79.3%	91.7%	88.1%	81.3%

Household							
Family	Less than						
Income	\$25,000	77.6%	49.4%	46.4%	79.8%	39.8%	30.3%
	\$25,000-						
	\$49,999	84.1%	77.5%	72.4%	94.8%	80.7%	64.9%
	\$50,000-						
	\$74,999	98.1%	92.2%	85.8%	92.3%	79.1%	71.8%
	\$75,000-						
	\$99,999	100.0%	95.3%	95.3%	89.8%	87.0%	83.3%
	\$100,000 or						
	more	97.0%	100.0%	92.1%	100.0%	88.9%	88.9%
<hr/>							
Total		836,971	592,810	555,698	454,076	288,934	239,842

****Attributes of the householder**