

Leveraging Broadband in Your Community

A Workbook to Help Communities Develop Broadband Plans

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10 Technology Trends

Social Media Is Changing How We Communicate

New technologies and applications are changing the way we communicate. Communities, local governments, businesses, and community organizations need to recognize new communications trends in order to effectively communicate. Here are just a few examples of how social media is changing how we communicate:

- The star of the 2014 University of Nebraska Spring Game was a cat made famous by Twitter user FauxPelini.
- An article in the *Omaha World-Herald* in March 2014 highlighted how University of Nebraska coach Tim Miles was building fan support by posing for selfies with fans.
- Twitter is being used by the National Weather Service, the Weather Channel, local news organizations, and public safety organizations to provide up-to-date information on developing weather-related emergencies.
- Foodies, crafters, brides, mothers planning birthday parties, and home owners planning renovations are using Pinterest to get ideas, sometimes causing stress for those who are unable to live up to Pinterest-generated expectations.
- In December 2013, Beyonce' used Instagram to announce the surprise release of her new album on iTunes, bypassing traditional marketing and distribution models.
- Have a question about how to do something? Youtube has become the source of instructional videos as well as funny cat videos and music videos.
- Photos and videos are an integral part of the online social experience, with 54% of online adults posting original photos or videos to social media sites. (Source: [Pew Internet](#))
- Businesses are increasingly using social media. Social media marketing budgets are projected to double in the next five years. (Source: [Business2Community](#))
- 76% of business to business companies maintain blogs; Business to business companies that blog generate 67% more leads than those that don't. (Source: [Business2Community](#))

How many adults are using social media? Here are some recent statistics from a [2013 Pew Internet survey](#):

- 73% of online adults use social networking sites.
- 71% of online adults use Facebook.
- 17% use Instagram.
- 21% use Pinterest.
- 22% use LinkedIn.
- 18% use Twitter.

A [2014 survey of Nebraska households](#) also reveals high use of social media with 80% of online households indicating that they use social networking.

Broadband Has Gone Mobile

More and more people are using smartphones or other mobile devices to access the Internet. The number of mobile broadband connections now nearly equals the number of fixed broadband connections. At the end of 2012, there were 64 million mobile connections and almost 65 million fixed connections in the United States. (Source: [FCC](#))

A 2014 [Pew Research Internet Project survey](#) found that that 92% of adults have a cell phone and that 55% of adults have a smartphone. Business use of mobile devices is even higher with over 88 percent of Nebraska businesses using some form of web-enabled mobile device. Mobile broadband is not just for checking e-mail and Facebook. Mobile broadband is being used in businesses and agriculture for remote monitoring and for controlling devices.

Online Video Is Huge

Online video viewing continues to grow. Nearly 80% of Nebraska households with Internet access watch videos online according to a [2014 survey](#). In March 2014, 87.8 million Americans watched 46.6 billion online videos. Google sites, including YouTube.com, had 155.6 million unique viewers, ranking first among video sites. (Source: [Comscore](#))

Organizations, businesses and public interest groups are taking advantage of this trend by showcasing content via online video as part of their marketing strategy. Adding videos to landing pages can increase conversions by nearly 90%. (Source: [Business2Community](#))

Not only is watching video online a popular past time, but video creation and sharing is also becoming more popular. Sites like Youtube, Facebook, and Twitter make it easy to share videos. Almost a third (31%) of online adults have uploaded a video to the Internet according to a [2013 Pew Internet survey](#).

Services Are Moving Online, Making Public Access Critical

Governments, businesses, and educational institutions have moved many applications and services online, allowing Internet users to access services 24 hours a day. Many Internet users now expect the convenience of online access to services, and they expect services designed to be accessed via a mobile device.

However, the movement of services from more traditional methods to online, threatens to leave non-users behind. It is now difficult to apply for jobs, apply to colleges, register for classes and apply for benefits without access to the Internet. Unfortunately, those who are often most in need of these services are also the most likely to lack access to the Internet and to need training and assistance. Sites which provide public access to the Internet and basic training play a critical role in bridging the digital divide. A 2014 [survey of Nebraska households](#) found that thirty-two percent of Nebraska households without Internet access use the computer resources at local public use facilities.

Location-based Services Know Where You Are

There are many types of services which utilize data about location. Many of us now have GPS devices in our cars or phones to help us navigate. Newer applications, called location-based services, are leveraging local information generated by mobile devices.

Sites like Foursquare and Facebook use mobile devices, GPS and geolocation capabilities to notify others of their location by 'checking in.' This type of information about customer's habits is useful to businesses who can direct

market by sharing coupons, providing special deals, rewards, and discounts with the people who are signed in. Users may also be able to leave comments or reviews for a certain business or other location, which may be viewed by later visitors.

Geocaching is another popular activity which utilizes GPS devices. Geocaching is a high-tech, outdoor treasure hunting game in which players use GPS devices to locate hidden containers, called geocaches. There are over 1.3 million active geocaches and 5 million geocachers worldwide.

Cloud Computing Is Changing Service Models

Cloud computing is dramatically changing the way information technology services are delivered and supported. In general, cloud computing refers to the use of software applications via the Internet rather than installation of software on a local computer, similar to the delivery system for electricity and other utilities. Online banking, social networking and interactive video services such as Skype, accessible through a web browser, are examples of cloud computing services.

In some respects, cloud computing is similar to mainframe computing, where computing power is centralized and delivered to remote devices. Centralized development and support of software services through the cloud can reduce on-premise requirements and costs for equipment, software development and technical support. Concerns about cloud computing typically involve privacy, security and availability, as well as, the desire of some to maintain complete control over equipment, software and data.

IT Workers Are in High Demand

The availability and development of a skilled IT workforce is a key need in Nebraska. As a response, institutions of higher education in Nebraska are making efforts to increase the number of IT graduates. A total of 1,788 degrees and certificates in the field of IT were awarded in the state of Nebraska in the 2011-2012 academic year, an increase of 110.85% from the previous year according to an [AIM study](#). A majority (88%) of Omaha-area [employers surveyed in 2013](#) considered their recent IT-hires to be excellent (40%) or good (48%). However, many employers still report a shortfall. Just over half of Omaha area businesses surveyed in 2013 (52%) indicated that the local supply of IT talent was excellent (10%) or good (42%). Businesses outside of Omaha and Lincoln may find recruiting IT talent even more challenging.

Health Applications Will Be the Next Killer App

Health information technology (health IT), often referred to as eHealth, promises to improve the quality of patient care and consumer safety. Within the next few years, most Nebraskans will benefit from the adoption of health IT. A doctor seeing a patient in the emergency room for chest pains will have access to the patient's medication history, reducing the possibility of an adverse drug interaction. A pediatric cardiologist seeing a high school athlete who passed out at the State Cross Country Meet will have access to tests run by the patient's primary care physician. A doctor prescribing a statin for a patient with high cholesterol levels will have access to the formulary information and will be able to more easily choose a statin which will be covered by the insurer. Nurses will be able to remotely monitor patients with chronic conditions and help patients better manage their care.

Consumer adoption of health technologies is also growing, led by the adoption of applications which monitor fitness like Fit Bit. As more applications are developed and these applications become more interoperable, patients will be able to better manage their care and their fitness.

Tablets and E-Book Readers Are Growing in Popularity

Tablet devices (like the iPad) and e-readers, are becoming increasingly popular. A [2013 Pew Internet study](#) found that 35% of Americans 16 and older had a tablet computer and 24% had an e-book reader. The increase in tablet devices is contributing to the increasing demand for mobile broadband. The iPad or other media tablets may be ideally suited for certain business, education, government and health care applications—for example, allowing doctors to securely connect to a hospital’s electronic health record or to prescribe medications. Although tablets are often considered the toys of tech-savvy early adopters, they may also be a great device for those who have special needs or technophobes. Some educators and parents are finding that children with autism or other conditions can more easily utilize the iPad. It is possible that some technophobes may find an iPad more appealing than a computer.

The rapid adoption of e-book readers signals a shift in how consumers are accessing books and a shift in the traditional publishing industry. Many libraries are adapting to changing consumer preferences by loaning e-books. The rise of the e-book has also opened up opportunities for authors who can now self-publish and sell an e-book on Amazon.com.

Technology Is Facilitating Collaboration

Technology is making unprecedented levels of both collaboration and innovation possible. The term “crowd sourcing” is often used when referring to innovative efforts to leverage mass collaboration. Wikipedia is perhaps the best example of how the efforts of individuals from across the world can be harnessed. More than 91,000 active contributors have developed this free-content encyclopedia which was developed using an openly editable model.

Open-source software is another example of the power of collaborative effort. Open-source software is built and maintained by a network of volunteer programmers. Examples of open source software include the Apache HTTP Servicer, Mozilla Firefox, and the GNU/Linux operating system.

Apple has also leveraged the collective talent of the “crowd.” In 2007 Apple released a software development kit that allowed developers to make applications for the iPhone and iPod Touch and submit applications for inclusion in the Apple App Store. On Jan. 22, 2011, the Apple App store reached the milestone of having the 10 billionth app downloaded. More than 350,000 free and paid apps are available for the iPhone, iPad, and the iPod Touch. Other mobile devices are now also offering apps.

Is Your Community Leveraging Broadband?

1. Are community leaders aware of the importance of information technology and do they work together to address broadband development?
 Yes, community leaders are working together to address broadband development. (2 pts.)
 Some, but not all, community leaders are aware of the importance of information technology. (1 pt.)
 No, community leaders are generally not aware of the importance of broadband technology. (0 pts.)
 Don't Know (0 pts.)
2. Are government, businesses, and educational entities working together to address broadband development?
 Yes, government, businesses, and educational entities are working together. (2 pts.)
 There is some cooperation among government, businesses, and educational entities. (1 pt.)
 No, government, businesses and educational entities don't work together. (0 pts.)
 Don't Know (0 pts.)
3. Are local businesses effectively utilizing broadband?
 Yes, nearly all businesses are effectively using broadband. (2 pts.)
 Some businesses are effectively using broadband. (1 pt.)
 No, most businesses are not effectively using broadband. (0 pts.)
 Don't Know (0 pts.)
4. Are local businesses satisfied with the broadband services currently available?
 Yes, nearly all businesses are satisfied with the broadband services currently available. (2 pts.)
 Some businesses are satisfied with the broadband services currently available. (1 pt.)
 No, most businesses are not satisfied with the broadband services currently available. (0 pts.)
 Don't Know (0 pts.)
5. Are agricultural producers and agribusinesses effectively utilizing broadband?
 Yes, nearly all ag producers and agribusinesses are effectively using broadband. (2 pts.)
 Some ag producers and agribusinesses are effectively using broadband. (1 pt.)
 No, most ag producers and agribusinesses are not effectively using broadband. (0 pts.)
 Don't Know (0 pts.)
6. Do local schools use technology to enhance educational opportunities and communication with families?
This may include distance education using synchronous interactive video or asynchronous web-based courses, using content management systems to support classroom learning, using web-based systems

that let parents check grades or lunch balances, and/or using web-based systems to schedule parent teacher conferences.

Yes, local schools are effectively using technology. (2 pts.)

Local schools are using broadband for some applications, but could be doing more. (1 pt.)

No, local schools are not effectively using broadband. (0 pts.)

Don't Know (0 pts.)

7. Do local hospital and health care providers use technology to improve patient care? This may include using telemedicine for patient consultations with specialists, participating in health information exchange, providing patient access to health information, and utilizing technology to remotely monitor patients.

Yes, hospitals and health care providers are sharing health information electronically and are using telemedicine and remote technology to improve patient care. (2 pts.)

Hospitals and health care providers have implemented electronic health records, but most providers are not sharing health information. Telemedicine may also be in use. (1 pt.)

No, hospitals and health care providers are not using electronic health records or telemedicine. (0 pts.)

Don't Know (0 pts.)

8. Are local governments using technology to communicate with citizens, to provide information, and to provide services?

Yes, local governments are effectively using technology to communicate and provide services. (2 pts.)

There is some use of technology by local governments. (1 pt.)

No, local governments are not effectively using technology to communicate and provide services. (0 pts.)

Don't Know (0 pts.)

9. Does the local library offer access to computers and the Internet and free or affordable training on basic computer and Internet skills?

Yes, the local library offers access to computers and the Internet and provides training. (2 pts.)

The local library provides limited access to computers and the Internet and limited training. (1 pt.)

No, the local library does not provide access to computers and the Internet. (0 pts.)

Don't Know (0 pts.)

10. Is the local library using technology to effectively deliver services and information? This may include offering e-books, online renewals, and access to new technologies like 3D printers. It may also include using social media to publicize library programs.

Yes, the local library is using technology effectively to deliver service and information. (2 pts.)

The local library is using some technology to deliver services. (1 pt.)

No, the local library is not using technology to deliver services and information. (0 pts.)

Don't Know (0 pts.)

11. Do most households subscribe to broadband service? In 2014, 82% of households in Nebraska subscribed to broadband service.

Nearly all households (90% or more) subscribe to broadband service. (2 pts.)

The community is near the state average in households subscribing to broadband service. (1 pt.)

Broadband subscription in the community is less than the state average. (0 pts.)

Don't Know (0 pts.)

12. Is there an adequate IT workforce to meet the demands of local businesses?

Yes, there is an adequate IT workforce. (2 pts.)

Some businesses have a hard time recruiting IT workers. (1 pt.)

A shortage of IT workers is a significant concern. (0 pts.)

Don't Know (0 pts.)

13. Are there opportunities for advanced information technology training through local high schools, colleges and universities, or other institutions?

Yes, there are adequate opportunities for advanced technology training. (2 pts.)

There are some training opportunities, but more are needed. (1 pt.)

There are no opportunities for advanced IT training. (0 pts.)

Don't Know (0 pts.)

14. Are programs which teach coding to youth offered in local schools or by other organizations?

Yes, there are adequate opportunities for youth to learn coding. (2 pts.)

There are some opportunities for youth to learn coding, but more are needed. (1 pt.)

There are no opportunities for youth to learn coding. (0 pts.)

Don't Know (0 pts.)

15. Does your community have a well-designed website which provides information for both prospective and current residents? Is information on a wide range of areas available and up to date, including information on health care, schools, local government, libraries, housing, and economic development?

Yes, the community website provide is a good source of information. (2 pts.)

The community website provides some information, but could be improved. (1 pt.)

The community website provides very little current information. (0 pts.)

Don't Know (0 pts.)

16. Does your community/region support entrepreneurship and innovation through business incubation facilities, meet ups for entrepreneurs, coworking facilities, maker spaces/clubs, or other programs for start-ups?

Yes, several programs support beginning businesses. (2 pts.)

- There are limited programs which supports beginning businesses. (1 pt.)
- There are programs which support beginning businesses. (0 pts.)
- Don't Know (0 pts.)

17. Is adequate broadband service available to all businesses, organizations, and residents?

- Yes, adequate broadband services are available to all businesses, organizations, and residents. (2 pts.)
- Adequate broadband services are available to nearly all businesses, organizations, and residents. (1 pt.)
- No, adequate broadband service is not available. (0 pts.)
- Don't Know (0 pts.)

18. Does your community have **affordable** access to broadband service?

- Yes, affordable broadband services are available. (2 pts.)
- The cost of broadband services is a barrier for some businesses and residences. (1 pt.)
- The cost of broadband services is a significant barrier to adoption. (0 pts.)
- Don't Know (0 pts.)

19. Does your community have adequate mobile broadband service?

- Yes, adequate mobile coverage is available. (2 pts.)
- Adequate mobile coverage is available in most, but not all areas. (1 pt.)
- Mobile coverage is a significant issue. (0 pts.)
- Don't Know (0 pts.)

20. Does your community pay careful attention to quality of life issues? A high quality of life is essential to attract and retain IT workers and businesses.

- Yes, the community has a great quality of life. (2 pts.)
- The community has a fair quality of life. (1 pt.)
- The community needs to address quality of life issues. (0 pts.)
- Don't Know (0 pts.)

Scoring. Give your community one point for each question answered with a "yes":

- 0-20 Stage I
- 21-35 Stage II
- 36-40 Stage III

This assessment has undergone many revisions. Many of the original assessment questions were drawn from "Building eCommunities: Getting Everyone Connected" by Andrew Michael Cohill, available at <http://www.designnine.com/library/docs/ecommunities.pdf>.

Community leadership and support factors to assess:	yes	no
Are community leaders aware of the importance of information technology and do they work together to address the broadband and technology needs of the community?	<input type="checkbox"/>	<input type="checkbox"/>
Are government, businesses, and educational entities working together to address technology-related development?	<input type="checkbox"/>	<input type="checkbox"/>
Has a strategic information technology plan been developed?	<input type="checkbox"/>	<input type="checkbox"/>
Is there widespread support for information technology-related development?	<input type="checkbox"/>	<input type="checkbox"/>
Is there a local champion of information technology development?	<input type="checkbox"/>	<input type="checkbox"/>
Do local leaders utilize new technology applications including video applications and social networking?	<input type="checkbox"/>	<input type="checkbox"/>
Are public/private partnerships used to accelerate information technology development?	<input type="checkbox"/>	<input type="checkbox"/>
Have cooperative arrangements been made for entities to aggregate demand and share costs related to information technology?	<input type="checkbox"/>	<input type="checkbox"/>
Have local sources of funding for IT-related projects been identified?	<input type="checkbox"/>	<input type="checkbox"/>
Does the community have a group of people assigned to seek out and follow up on alternative funding strategies for IT development?	<input type="checkbox"/>	<input type="checkbox"/>
Have grant opportunities from federal, state, and private sources been researched?	<input type="checkbox"/>	<input type="checkbox"/>

Use of Broadband Technology By Existing Businesses	Yes	No
Do almost all small businesses have broadband access?	<input type="checkbox"/>	<input type="checkbox"/>
Are most businesses satisfied with their broadband service?	<input type="checkbox"/>	<input type="checkbox"/>
Do most small businesses have a website?	<input type="checkbox"/>	<input type="checkbox"/>
Are many businesses selling goods and services online?	<input type="checkbox"/>	<input type="checkbox"/>
Are most businesses effectively using broadband technologies?	<input type="checkbox"/>	<input type="checkbox"/>
Is technical assistance/training available to businesses that wish to develop or expand their information technology capabilities?	<input type="checkbox"/>	<input type="checkbox"/>
Are there businesses in the community that offer web design services?	<input type="checkbox"/>	<input type="checkbox"/>
Does a local Internet service provider host websites for local businesses?	<input type="checkbox"/>	<input type="checkbox"/>
Are there technology support services available in the community?	<input type="checkbox"/>	<input type="checkbox"/>
Are there local outlets for shipping products in a timely manner?	<input type="checkbox"/>	<input type="checkbox"/>
Do travel/tourism organizations use the Internet to promote restaurants, lodging and attractions in the area?	<input type="checkbox"/>	<input type="checkbox"/>
Is the community/region using tools to track, benchmark, and understand business needs related to technology and broadband infrastructure?	<input type="checkbox"/>	<input type="checkbox"/>

Assessment: Use of Technology in Agriculture	Yes	No
Is fixed broadband service (fixed wireless, DSL, cable or fiber to the premise) available to ag businesses, farms, and residences?	<input type="checkbox"/>	<input type="checkbox"/>
Is mobile broadband service available?	<input type="checkbox"/>	<input type="checkbox"/>
Is there ample broadband speed for future agricultural needs?	<input type="checkbox"/>	<input type="checkbox"/>
Do agricultural service providers maintain active/interactive websites (this includes e-commerce, virtual technicians, instant messaging, and e-help)?	<input type="checkbox"/>	<input type="checkbox"/>
Do the following entities utilize broadband technologies effectively?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Farmers/ranchers	<input type="checkbox"/>	<input type="checkbox"/>
▪ Crop consultants	<input type="checkbox"/>	<input type="checkbox"/>
▪ Livestock consultant	<input type="checkbox"/>	<input type="checkbox"/>
▪ Agribusinesses	<input type="checkbox"/>	<input type="checkbox"/>
▪ Educators (high school, post-secondary, outreach)	<input type="checkbox"/>	<input type="checkbox"/>
Are farmers/ranchers/consultants adopting the use of the following technologies?	<input type="checkbox"/>	<input type="checkbox"/>
▪ RFID (Radio Frequency Identification) for animals or commodities (such as large round or square bales)	<input type="checkbox"/>	<input type="checkbox"/>
▪ Asset tracking using telematics (ex. AgCommand, JD Link)	<input type="checkbox"/>	<input type="checkbox"/>
▪ Precision guidance tools using pervasive automation (RTK- either cellular or radio, GPS)	<input type="checkbox"/>	<input type="checkbox"/>
▪ Crop sensor technology such as soil water blocks/probes, crop condition remote sensing, and aerial imaging	<input type="checkbox"/>	<input type="checkbox"/>
▪ Irrigation scheduling using GPS, cellular/radio uplink, remote sensing logic computers	<input type="checkbox"/>	<input type="checkbox"/>
Are agricultural producers using iPads, mobile PCs, tablet PCs, specific agricultural tablets (AgLeader, FarmWorks, SST)?	<input type="checkbox"/>	<input type="checkbox"/>
Are agricultural producers using grain bin sensing (moisture, air flow, temperature, volume) and remote operation?	<input type="checkbox"/>	<input type="checkbox"/>
Do supporting agricultural companies/producers use or rely on streaming video imaging, conferencing, or consulting to conduct businesses in the area?	<input type="checkbox"/>	<input type="checkbox"/>

Assessment: Use of Broadband Technologies in Education	Yes	No
Does the public school system have a technology plan?	<input type="checkbox"/>	<input type="checkbox"/>
Is technology integrated throughout the K-12 curriculum? The International Society for Technology in Education (ISTE) has prepared suggested national technology standards for students, teachers, and administrators which can serve as a guide (http://cnets.iste.org).	<input type="checkbox"/>	<input type="checkbox"/>
Has the public school system devised a life cycle funding plan for technology incorporating total cost of ownership?	<input type="checkbox"/>	<input type="checkbox"/>
Are teachers continually trained and evaluated on their ability to use information technology as a teaching tool?	<input type="checkbox"/>	<input type="checkbox"/>
Are administrators and support staff continually trained and evaluated on their ability to use information technology as an administrative tool?	<input type="checkbox"/>	<input type="checkbox"/>
Are students required to attain or demonstrate some level of technology proficiency at particular grade levels?	<input type="checkbox"/>	<input type="checkbox"/>
Are opportunities to learn coding available to students either as a class or an afterschool activity?	<input type="checkbox"/>	<input type="checkbox"/>
Are computers, in laboratory or classroom settings, available for daily use by all students?	<input type="checkbox"/>	<input type="checkbox"/>
Is the Internet available throughout each school and used as an integrated teaching and learning tool?	<input type="checkbox"/>	<input type="checkbox"/>
Are school computers networked at high bandwidth within and between schools in the local system?	<input type="checkbox"/>	<input type="checkbox"/>
Are youth involved in technology projects with target groups (i.e., senior citizens, businesses, etc.) within the community?	<input type="checkbox"/>	<input type="checkbox"/>
Do schools have up-to-date web pages with information about programs, current events, student and teacher achievements, and PTA/PTO information?	<input type="checkbox"/>	<input type="checkbox"/>
Do teachers employ a learning management system and digital content repository to increase learning beyond the school day?	<input type="checkbox"/>	<input type="checkbox"/>
Does the public school system utilize a web-enabled student information system to display password-protected attendance and achievement?	<input type="checkbox"/>	<input type="checkbox"/>
Are students, teachers, parents, and administrators using e-mail or text messaging to communicate?	<input type="checkbox"/>	<input type="checkbox"/>
Are two-way interactive distance learning and/or web-based courses used to expand course offerings for students?	<input type="checkbox"/>	<input type="checkbox"/>

Assessment: Use of Broadband Technologies in Health Care	Yes	No
Are local physicians and staff using electronic health records?	<input type="checkbox"/>	<input type="checkbox"/>
Are local hospitals using electronic health records?	<input type="checkbox"/>	<input type="checkbox"/>
Are local long term care facilities using electronic health records?	<input type="checkbox"/>	<input type="checkbox"/>
Are dentists, chiropractors, physical therapists, behavioral health providers, and other health care providers using electronic health records?	<input type="checkbox"/>	<input type="checkbox"/>
Are local physicians and staff participating in health information exchange?	<input type="checkbox"/>	<input type="checkbox"/>
Are local hospitals participating in health information exchange?	<input type="checkbox"/>	<input type="checkbox"/>
Are local long term care facilities participating in health information exchange?	<input type="checkbox"/>	<input type="checkbox"/>
Are dentists, chiropractors, physical therapists, behavioral health providers, and other health care providers participating in health information exchange?	<input type="checkbox"/>	<input type="checkbox"/>
Are physicians and other prescribers e-prescribing?	<input type="checkbox"/>	<input type="checkbox"/>
Do local pharmacies accept e-prescriptions?	<input type="checkbox"/>	<input type="checkbox"/>
Do health care practitioners use interactive video for specialist consultations?	<input type="checkbox"/>	<input type="checkbox"/>
Is interactive video available for emergency room consultation with primary care physicians?	<input type="checkbox"/>	<input type="checkbox"/>
Is teleradiology technology available for rapid reading of X-rays by radiologists?	<input type="checkbox"/>	<input type="checkbox"/>
Is interactive video used for continuing medical education for health care practitioners?	<input type="checkbox"/>	<input type="checkbox"/>
Are home telehealth technologies used for home health care visits to elderly and disabled persons?	<input type="checkbox"/>	<input type="checkbox"/>
Are there resources available in the community to help consumers learn about using electronic health records and other applications?	<input type="checkbox"/>	<input type="checkbox"/>

Assessment: Use of Broadband Technologies in Local Government and Community Services	Yes	No
Do city and county governments collaborate on telecommunications and information networking infrastructure?	<input type="checkbox"/>	<input type="checkbox"/>
Do local governments use mobile wireless data networks to enhance efficiency?	<input type="checkbox"/>	<input type="checkbox"/>
Do local governments regularly include budgeted funding for technology upgrades?	<input type="checkbox"/>	<input type="checkbox"/>
Do local governments regularly include budgeted funding for technology training for elected officials and employees?	<input type="checkbox"/>	<input type="checkbox"/>
Does the city government have a website?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Are meeting agendas and minutes available online?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Are budget documents available online?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Are property tax appraisals available online?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Are ordinances available online?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Are land use and zoning maps available online?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Is information for new or prospective residents available online?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Are permits, forms, and applications available online?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Can citizens perform online information searches?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Can citizens perform online transactions such as paying utility bills or traffic violations?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Is a version of the website customized for mobile devices?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Are video and social networking applications used to provide information to the public?	<input type="checkbox"/>	<input type="checkbox"/>
Does the county government have a website?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Are meeting agendas and minutes available online?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Are budget documents available online?	<input type="checkbox"/>	<input type="checkbox"/>

▪ Are property tax appraisals available online?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Are ordinances available online?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Are land use and zoning maps available online?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Is information for new or prospective residents available online?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Are permits, forms, and applications available online?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Can citizens perform online information searches?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Can citizens complete online transactions?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Is a version of the website customized for mobile devices?	<input type="checkbox"/>	<input type="checkbox"/>
▪ Are video and social networking applications used to provide information to the public?	<input type="checkbox"/>	<input type="checkbox"/>
Do local governments use the Internet to post bids and buy goods or services?	<input type="checkbox"/>	<input type="checkbox"/>
Do local officials play a role in state-level information networking policy formation?	<input type="checkbox"/>	<input type="checkbox"/>
Have existing local ordinances been reviewed and modified to remove anti-technology bias?	<input type="checkbox"/>	<input type="checkbox"/>
Do human service organizations have a centralized computer database of community resources?	<input type="checkbox"/>	<input type="checkbox"/>
Do human service organizations communicate with the public and each other electronically?	<input type="checkbox"/>	<input type="checkbox"/>
Does the community have a website for the community with links to other local home pages?	<input type="checkbox"/>	<input type="checkbox"/>
Do community websites have information of specific interest to newcomers and visitors?	<input type="checkbox"/>	<input type="checkbox"/>
Is there a community-maintained website for posting of community events and discussion of local issues?	<input type="checkbox"/>	<input type="checkbox"/>
Do the city and county governments cooperate in a computerized geographic information system?	<input type="checkbox"/>	<input type="checkbox"/>
Has there been an assessment of the overlapping data and/or mapping needs of local agencies such as the County Assessor, County Register of Deeds, city/county emergency response, city/county planning and zoning authorities, city/county public safety agencies, natural resources districts, local utilities and public works departments, economic development entities, and County Engineer/Highway Superintendent?	<input type="checkbox"/>	<input type="checkbox"/>
Has there been an effort to determine what digital maps, geospatial data or	<input type="checkbox"/>	<input type="checkbox"/>

technical assistance is available through state government agencies?		
Do city and county governments have a plan to use social media to provide information in the event of an emergency?	<input type="checkbox"/>	<input type="checkbox"/>

Assessment: Use of Broadband Technologies in Public Libraries	Yes	No
Does the library use social media (i.e., blogs, Facebook, Twitter) to communicate with patrons?	<input type="checkbox"/>	<input type="checkbox"/>
Can patrons search the library catalog and request renewals or inter-library loans from the library's website?	<input type="checkbox"/>	<input type="checkbox"/>
Can patrons borrow electronic books?	<input type="checkbox"/>	<input type="checkbox"/>
Does the public library provide public access to computers and the Internet?	<input type="checkbox"/>	<input type="checkbox"/>
Does the public library have a sufficient number of computers to meet patron demand?	<input type="checkbox"/>	<input type="checkbox"/>
Does the public library offer basic computer and Internet training?	<input type="checkbox"/>	<input type="checkbox"/>
Does the public library provide a password-protected, wireless access hot spot for use by patrons?	<input type="checkbox"/>	<input type="checkbox"/>
Does the library have sufficient bandwidth?	<input type="checkbox"/>	<input type="checkbox"/>
Has the public library considered other municipal aggregation options to achieve a higher bandwidth connection (e.g. school district, city, county, etc...)?	<input type="checkbox"/>	<input type="checkbox"/>

Assessment: Broadband Adoption, Public Access, and Digital Literacy	Yes	No
Do at least 80% of homes subscribe to broadband service?	<input type="checkbox"/>	<input type="checkbox"/>
Do most adults in the community/region have the technology skills necessary to utilize broadband applications?	<input type="checkbox"/>	<input type="checkbox"/>
Is there a place in the library, schools, or a community technology center which provides public access to computers and broadband?	<input type="checkbox"/>	<input type="checkbox"/>
Are the public access facilities conveniently available for use within the community/region?	<input type="checkbox"/>	<input type="checkbox"/>
Are there free wireless access locations in the community at the library, coffee shops, restaurants or other locations?	<input type="checkbox"/>	<input type="checkbox"/>
Is assistance in using the Internet available at the public library or other locations?	<input type="checkbox"/>	<input type="checkbox"/>
Does the public library offer free or low-cost training in the use of computer applications and the Internet?	<input type="checkbox"/>	<input type="checkbox"/>
Are adult education classes on common computer applications (using the Internet, word processing, spreadsheets, etc.) offered in the community through a community college or other organization?	<input type="checkbox"/>	<input type="checkbox"/>
Do students graduate from high school with basic computer skills on the most common computer applications (using the Internet, word processing, spreadsheets, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>
Are there organizations (i.e., tribal colleges, multicultural centers, or senior centers) that work with underserved populations who can help in increasing adoption?	<input type="checkbox"/>	<input type="checkbox"/>
Does the community have a group of people assigned to seek out and follow up on grant opportunities and/or alternative funding strategies for reaching underserved populations?	<input type="checkbox"/>	<input type="checkbox"/>

Assessment: Broadband Service and Infrastructure	Yes	No
Are the heaviest users of broadband services (schools, businesses, health systems, etc.) satisfied with broadband services available in the community?	<input type="checkbox"/>	<input type="checkbox"/>
Are small businesses and residents satisfied with broadband services available in the community?	<input type="checkbox"/>	<input type="checkbox"/>
Is adequate mobile broadband service available throughout the community?	<input type="checkbox"/>	<input type="checkbox"/>
Is adequate mobile broadband service available throughout the region?	<input type="checkbox"/>	<input type="checkbox"/>
Is there competition to provide broadband services in the community?	<input type="checkbox"/>	<input type="checkbox"/>
Is the current broadband infrastructure adequate to meet the growing needs of the communities heaviest broadband users?	<input type="checkbox"/>	<input type="checkbox"/>
Is there fiber to the community's main business areas?	<input type="checkbox"/>	<input type="checkbox"/>
Is there a fiber backbone that can be reached from many places in the community?	<input type="checkbox"/>	<input type="checkbox"/>
Is fiber available throughout the entire community?	<input type="checkbox"/>	<input type="checkbox"/>
Do community leaders talk periodically with private infrastructure providers about plans and needs in serving the local community?	<input type="checkbox"/>	<input type="checkbox"/>
Has the community identified the 15-20 biggest users of advanced telecommunications services?	<input type="checkbox"/>	<input type="checkbox"/>
Has the community inventoried its aggregated demand for telecommunications services?	<input type="checkbox"/>	<input type="checkbox"/>
Has the community inventoried its telecommunications infrastructure assets?	<input type="checkbox"/>	<input type="checkbox"/>
Has the community projected the need for broadband services and infrastructure for the next 3 to 5 years?	<input type="checkbox"/>	<input type="checkbox"/>
Do local governments use their purchasing power to support telecommunications services upgrades in the community?	<input type="checkbox"/>	<input type="checkbox"/>
Do representatives of local government, schools, and health systems meet periodically to discuss their plans for technology infrastructure improvements and ways to coordinate efforts and share costs?	<input type="checkbox"/>	<input type="checkbox"/>
Has the community made site visits to "leading edge" communities in the deployment of broadband services and infrastructure?	<input type="checkbox"/>	<input type="checkbox"/>
Are all new subdivisions required to set aside proper telecom right of way?* ¹	<input type="checkbox"/>	<input type="checkbox"/>

¹ Checklist items marked with * were drawn from "Telecommunications as Essential Public Infrastructure" by Andrew Cohill available at http://www.designnine.com/library/docs/telecom_as_infrastructure.pdf.

Are developers required to install telecom duct and turn it over to the community?*	<input type="checkbox"/>	<input type="checkbox"/>
Are all new buildings required to have structured wiring meeting Cat5e/Cat 6 standards?*	<input type="checkbox"/>	<input type="checkbox"/>
Does the community install duct and/or fiber just before repaving streets?*	<input type="checkbox"/>	<input type="checkbox"/>
Are light poles with built in mounting brackets for wireless access points being installed when replacing streetlights or putting in new streetlights? The poles can be leased to private sector companies.*	<input type="checkbox"/>	<input type="checkbox"/>
Do reasonable rights-of-way fees for all telecommunications providers and a simplified application process encourage competition?*	<input type="checkbox"/>	<input type="checkbox"/>
Has the community invested in telecommunications infrastructure such as duct, fiber, or access points which can be leased to providers?*	<input type="checkbox"/>	<input type="checkbox"/>

Programs and Resources: Digital Literacy and Adoption

Programs for Seniors

The Osher Lifelong Learning Institute at the University of Nebraska–Lincoln (OLLI at UNL) (<http://olli.unl.edu>) is one of 115 in the U.S. OLLI offers classes and other learning opportunities specifically for lifelong learners ages 50-plus.

AgeWell Computer Education Center (<http://discoverskills.com>) at the Landing in Williamsburg Village in Lincoln has partnered with DiscoverSkills to provide a complete Computer Education Center (CEC) equipped with the latest computer technology and professional educators that specialize in senior learning.

The AARP Information Center offers three-day, nine-hour computer classes for \$15 at the Kids Can Community Center in Omaha. The sessions cover a variety of topics, including navigating Microsoft Windows 7, word processing and using the Internet. The classes have a limit of 8 students and 4 instructors.

Some programs for seniors may be offered at libraries or senior centers. The Adams County Senior Center in Hastings has had students from Hastings College give classes. The Ravenna Public Library used its laptops to host a computer training class at the computer center. The Verdigre Public Library has offered beginning computer classes to senior citizens, providing individualized training.

Community colleges in Nebraska offer a range of computer and Internet courses, including some programs specifically designed for senior citizens. Southeast Community College offers a 24-hour class introducing personal computers to senior citizens. Metropolitan Community College offers non-credit courses on Facebook especially for senior citizens.

Programs for Low-Income Consumers

CenturyLink Internet Basics (www.centurylink.com/internetbasics) provides 1.5 MBPS service for \$9.95 (plus tax and fees) for 12 months, a netbook for \$150 (plus tax and shipping and handling), and free basic Internet training to qualified low-income consumers.

Programs at Public Libraries

In 2010 the **Nebraska Library Commission** received a \$2.4 million BTOP grant with 1.25 million in matching funds provided by the Bill & Melinda Gates Foundation. The Library Broadband Builds Nebraska Communities BTOP grant significantly improved the capacity of libraries in Nebraska to provide public access to computers and broadband.

- A total of 129 libraries received 168 broadband upgrades, including 34 upgrades to fiber and two to faster fiber. The average Internet speed of all 147 participating libraries moved from 3.8 mbps at the start of the project to 19.7 mbps on Sept. 30, 2013.
- As of the end of the grant in September 2013, 8 participating libraries had broadband speeds of 100 mbps or greater, 13 had speeds between 35 and 99 mbps, 36 had speeds between 11 and 30 mbps, 46 had speeds between 5.6 and 10 mbps, and 44 had speeds between 1.5 and 5.5 mbps.

Some examples of the programming being offered in Nebraska's public libraries are listed below:

Bennett Martin Public Library in Lincoln (<http://www.lincolnlibraries.org>) has offered the use of its new training room to Lincoln Literacy to teach computer classes to refugees and immigrants. According to Clayton Naff Lincoln Literacy's executive director, "Most good jobs require online applications, and parents need to go online to access their children's grades at school, plus there is the whole world of news, social media, and information available on the computer." Women from Africa, Asia, the Middle East, Eastern Europe and Latin American signed up for the 7-week computer class. The participant's children enjoyed storytime and literacy lessons from library staff. Everyone received library cards. The classes were a great way to introduce new immigrants and refugees to library services. It was a great partnership and an excellent use of our new computer area. Plans are to continue the classes year round.

Norfolk Public Library (<http://www.ci.norfolk.ne.us/library>) offers various beginner computer classes once a month in order to support the lifelong learning efforts of our patrons and encourage the development of digital literacy skills. The classes are repeated for several months in a row to meet community demand for them. An instructor from Northeast Community College's Adult Education department leads the 3-hour class. This benefits the library staff and patrons because the class is led by a professional educator and expert in computer instruction. The library tries very hard not to make this class, which is free for participants, a competitor to what the college traditionally offers on their campus. Participants of the class are introduced not just to the digital literacy skills presented, but to what kind of experience they would have if they took the class on the college campus. If they enjoyed the beginner class at the library, they may want to further their learning by taking the next level of class at the college. So, the college is providing the library with quality instruction for patrons at a reasonable cost, and the library is providing the college with the opportunity to market their other classes to an audience that might not otherwise pursue those types of classes.

Lied Scottsbluff Public Library (<http://www.scottsbluff.org/departments/library>) offers free technology classes. The twenty grant laptops now available provide registered participants the opportunity to learn technology skills in a hands-on environment. The ability to provide the needed equipment for the library's "Technology Tuesday" classes puts every participant on a level playing field, which allows the facilitator more time to provide hands-on instruction on things like the Internet, email, Facebook, online shopping, photo sharing and numerous other topics related to technology literacy.

The Nebraska Library Commission (<http://nlc.nebraska.gov/grants/finra/index.aspx>) is partnering with the University of Nebraska-Lincoln Extension to bring financial education programs

and services to 23 libraries in mostly rural locations across the state. The program will combine face-to-face educational sessions with online learning. The program is funded by a \$100,000 grant from the Financial Industry Regulatory Authority (FINRA) Investor Education Foundation and the American Library Association (ALA). In addition to improving financial literacy skills, this type of programming may also provide an opportunity for some participants to improve their technology literacy skills.

Libraries as Maker Spaces—Libraries in Nebraska are beginning to provide access to 3D printers and other resources which facilitate collaboration and creativity. At least three public libraries have or are in the process of getting 3D printers: Bellevue Public Library, LaVista Public Library, and Chadron Public Library. The Nebraska Library Commission produced a Tech Talk on Libraries as Maker Spaces. At least three public libraries have or are in the process of getting 3D printers. It is available at <http://www.youtube.com/watch?v=hxzJErZJLR0>.

Other Non-Traditional Programming

Bella Minds (<http://www.bellaminds.com>) is a crowd-funded technology training program for digitally literate rural women who want to improve their technology skills. The pilot program was held in Alliance, Nebraska from February 22nd through March 1st, 2014 and was followed by a nine week program revolving around individual work and virtual collaboration. The nine-week program is designed to enable participants to:

- Build a Website
- Communicate and Collaborate Online
- Understand the Logic of Code
- Research and Study New Skills
- Feel at Home in a Tech Savvy World

Community College Programs

Community colleges in Nebraska offer a range of computer and technology courses, including some programs specifically designed for senior citizens.

Programs and Resources: IT Workforce Development

University Programs

Peter Kiewit Institute (<http://pki.nebraska.edu>) in Omaha is designed to help meet the needs of the nation's technology and engineering firms by providing a top-flight education to students interested in pursuing careers in information science, technology and engineering. The Peter Kiewit Institute is home to the University of Nebraska-Lincoln's College of Engineering and the University of Nebraska at Omaha's College of Information Science and Technology.

Jeffrey S. Raikes School of Computer Science and Management at the University of Nebraska-Lincoln (<http://raikes.unl.edu>) offers courses in partnership with the Department of Computer Science and Engineering, the Colleges of Business Administration, Engineering, Journalism and Mass Communications, and Architecture to teach students the foundations of computer science, management, and software engineering. Graduates of the Raikes School have gone on to start companies like Hudl, Boutique Window, Allied Strategy, and Med XT.

Code Schools/Nontraditional Technology Training/Leadership Development

Omaha Code School (<http://omahacodeschool.com>) started its first class in February 2014. The 12 week program turns beginners into hireable web developers. A second class will run from July 28-Oct. 17, 2014.

Interface School (<https://interfaceschool.com>) is a flexible 12-week crash course on coding and business basics, offering its first session on March 3, 2014 in Omaha. Summer classes will be held in Lincoln and Omaha. The full Web Development Track is available in Lincoln while workshops are being held in Omaha covering digital project management, web development, mobile development, and more.

Bella Minds (<http://www.bellaminds.com>) is a crowd-funded technology training program for digitally literate rural women who want to improve their technology skills. The pilot program was held in Alliance, Nebraska from February 22nd through March 1st, 2014 and was followed by a nine week program revolving around individual work and virtual collaboration. The nine-week program is designed to enable participants to:

- Build a Website
- Communicate and Collaborate Online
- Understand the Logic of Code
- Research and Study New Skills
- Feel at Home in a Tech Savvy World

AIM IT Leadership Academy (<http://aimforbrilliance.org/it-leadership-academy>) is offered in Omaha and Lincoln to facilitate the development of effective leadership and management skills for IT professionals and improve their ability to meet the challenges of the ever-changing IT workplace.

Job Information

NEworks (neworks.nebraska.gov) is a statewide online database with thousands of job listings extracted from nearly every employer in Nebraska and thousands of resumes for employers searching for suitable candidates. Current data available on NEworks includes a strategic mix of job openings, career exploration, employer information, education, and labor market research information. Local job buttons will filter jobs from economic development and/or chamber websites. The Department of Labor worked with local libraries to educate their staff on NEworks. A NEworks app can be download from the Google and Apple app stores.

CareerLink (<http://careerlink.com>) links jobseekers with employers. Developed by the AIM Institute in 1995, CareerLink was one of the first employment websites and originally focused on IT jobs in the Omaha area. CareerLink's scope has expanded to include other career fields. AIM has partnered with other communities and regions, including Scottsbluff and Gering (<http://www.wehavejobs.net>) to create local job sites.

Career/Workforce Development—Youth/Young Adults

Intern Nebraska (www.internne.com) connects full-time students at Nebraska postsecondary educational institutions and Nebraska residents attending postsecondary educational institutions in other states with businesses and non-profit organizations looking for interns. All internships must pay at least minimum wage. As of the spring 2014, 415 students have been placed with approximately 40% of the interns placed outside of the Omaha and Lincoln metropolitan areas. Approximately 50% of the interns are offered full-time positions. Grants of up to 50% of the internship up to \$5,000 per internship are available for businesses creating new internships. Additional grant funding is available for hiring interns who are Federal Pell Grant recipients. Intern Nebraska is a program of the Nebraska Department of Economic Development.

Intern Omaha (<https://www.omahachamber.org/talent-and-workforce/intern-omaha.cfm>) program provides events, Omaha swag and information on what's hot in Omaha to students who are interning in Greater Omaha for the summer.

Nebraskacareertours.com (<http://nebraskacareertours.com>) provides information on jobs in several industries including IT. Virtual industry tours of HUDL and Yahoo are available. Other videos show what it is like to work in the industry. The site is a collaborative effort of the Nebraska Department of Education, Nebraska Department of Labor, and Nebraska Department of Economic Development.

Career academies in high schools will provide opportunities for high school students to learn more about careers, including IT. Rule 47 was adopted by the Nebraska Department of Education on November 19, 2013 and provides regulations for career academy programs established by school districts.

1st Job Lincoln (<http://lincolnhhr.org/blog/1st-job-lincoln-project>) will be starting its second year in Lincoln. The program is a partnership of Lincoln Human Resource Management Association, the AIM Institute, and Lincoln Public Schools' IT focus program to provide IT-based internships for high school students. Through the pilot program, 15 high schoolers in the summer of 2013 experienced their first professional job. The program included workforce readiness preparation.

Learn to Code—Youth/Young Adults

Code Crush (<http://codecrush.unomaha.edu/>) is a four-day five-night immersion experience for 8th and 9th grade girls to show them the world of IT. The event was hosted by the UNO College of Information Science and Technology in the spring of 2014 with support from Google and Women Investing in Nebraska.

CoderDojos (<http://aimforbrilliance.org/coderdojo>) are a global movement of open source coding sessions led by volunteer mentors from education and industry. Kids learn how to creatively code at their own pace in a fun, relaxed environment. CoderDojos are free to attend. AIM has hosted Coder Dojo's in Omaha, Lincoln, and Kearney.



A mentor works with young people at the April 26 Coder Dojo in Lincoln.

Girls Who Code (<http://girlswhocode.com/>) aims to provide computer science education and exposure to 1 million young women by 2020. The organization partners with school networks, community-based organizations, libraries, technology companies to bring Girls Who Code Clubs to communities all across the country.

Made with Code (<https://www.madewithcode.com/>) is an initiative led by Google to engage girls in coding. Partners include Girls Inc., Girl Scouts of the USA, National Center for Women and Information Technology, MIT Media Lab, TechCrunch, and Seventeen. Made with Code includes:

- Blockly-based coding projects like designing a bracelet 3D printed by Shapeways, learning to create animated GIFs or building beats for a music track.
- Video profiles of girls and women who explain how they're using code to do what they love -- in fashion, music, dance, animation, cancer research and more.
- A resource directory for parents and girls to find more information about new local events, camps, classes and clubs.

- Collaborations with organizations like Girl Scouts of the USA and Girls, Inc. to introduce Made with Code to girls in their networks, encouraging them to complete their first coding experience.

Sew Electric (<http://sewelectric.org/>) offers a collection of do it yourself projects that combine fabric, electronics, and programming.

SMART Girls Club (http://www.ywcalincoln.org/programs_services/smart_girls_club/) engages girls in science, technology, engineering and math. The YWCA in Lincoln sponsors several clubs at Lincoln elementary and middle schools.

Code Day Omaha (<http://coday.org/omaha>) is a 24-hour coding event for students. The 2014 Code Day Omaha is hosted at the Omaha Code School. The world-wide event is coordinated by StudentRND (<https://studentrnd.org>).

Code Academy (<http://www.codecademy.com>) provides free, interactive lessons on coding.

Khan Academy (<https://www.khanacademy.org/computing/cs>) (Requires registration) provides a video introducing programming and tutorials on drawing using JavaScript.

Scratch (<http://scratch.mit.edu>) is a free, online resource developed by the Lifelong Kindergarten Group at the MIT Media Lab which enables children to program interactive stories, games and animations.

4-H Science, Engineering, and Technology (<http://4h.unl.edu/4hcurriculum/set>) includes projects, college major information, and career information on aerospace, computers, electricity, GEAR-TECH-21, geospatial, physics, robotics, small engines, welding, and woodworking.

Programs and Resources: Innovation and Entrepreneurship

University Programs

Peter Kiewit Institute (<http://pki.nebraska.edu>) in Omaha is designed to help meet the needs of the nation's technology and engineering firms by providing a top-flight education to students interested in pursuing careers in information science, technology and engineering. The Peter Kiewit Institute is home to the University of Nebraska-Lincoln's College of Engineering and the University of Nebraska at Omaha's College of Information Science and Technology.

Jeffrey S. Raikes School of Computer Science and Management at the University of Nebraska-Lincoln (<http://raikes.unl.edu>) offers courses in partnership with the Department of Computer Science and Engineering, the Colleges of Business Administration, Engineering, Journalism and Mass Communications, and Architecture to teach students the foundations of computer science, management, and software engineering. Graduates of the Raikes School have gone on to start companies like Hudl, Boutique Window, Allied Strategy, and Med XT.

Accelerators/Contests

NMotion (<http://nmotion.co>) is a mentor-driven, education-focused, startup accelerator based in Lincoln, Nebraska. NMotion focuses on high-growth software and technology-based businesses in targeted industries of sports, agriculture, marketing technologies, education, and finance/insurance. The program includes an intense 14-week program designed to help selected start-ups move forward. Each start-up selected to participate receives \$15,000 in seed funding from NMotion's associated investor pool (Nebraska Angels and Invest Nebraska). Other benefits include free co-working space, research, legal support and marketing services. The program also provides access to a network of key experts, advisors, mentors, presenters and funders.

The Nebraska Innovation Campus (<http://innovate.unl.edu/>) includes a business accelerator and maker space. The Innovation Campus's accelerator will focus on engineering, agriculture, hardware, product/industrial design, energy, health and food. Start-ups accepted into the NIC Business Accelerator will have access to mentorship, a financial investment up to \$20,000, office space, workshops, maker space, and an Investor Day in which participants have the opportunity to give an 8 minute pitch to a room full of mentors and investors.

Straight Shot (<http://straightshot.co/>) aims to rapidly develop technology startups through a 90-day curriculum that culminates with a Demo Day, where the companies pitch their ideas to the community and a panel of investors. Straight Shot startups receive an initial \$20,000 investment, in addition to training, mentoring, and networking opportunities.

JumpStart Challenge (<http://www.jumpstartchallenge.com>) is a Lincoln-based software and application design contest.

Code One (<http://www.codeoneomaha.com/>) is a 48-hour hackathon hosted by First National Bank of Omaha. Developers, designers, and other talented 3-person competed for a \$10,000 first prize. The first Code One hackathon was held in September 2013.

Conferences

Big Omaha (<http://www.siliconprairienews.com>) is an innovation and entrepreneurship conference held annually since 2009 to bring entrepreneurs, innovators and creatives together. The conference is produced by Silicon Prairie News.

Infotec (<http://infotec.org>) is Nebraska's largest business technology conference and is produced by the AIM Institute. Annual attendance has grown to nearly 1,500 people, including several hundred students who participate in a special youth track. Speakers have included Apple Co-Founder Steve Wozniak, Dan Zarella of Hubspot and Tan Le of Emotiv.

Nebraska Code Camp (<http://nebraskacodecamp.com>) is an annual conference held at Lincoln's Southeast Community College. The event brings over 300 software developers in the region together.

Heartland Developers Conference (<http://www.heartlanddc.com/>) is a 3-day software design and development event for tech professionals. The event is run by AIM Events Team and a handful of volunteers from the software design and development community.

Meet Ups, Maker Spaces, Coworking Facilities

The Big Plate (<http://thebigplate.com>) is a Lincoln-based collaborative kitchen to accelerate startups, to educate, share, collaborate and create.

1 Million Cups (1MC) (<http://www.1millioncups.com>) brings together entrepreneurs, mentors, and advisors. Every Wednesday morning, two entrepreneurs give a six-minute presentation and engage in 20 minutes of feedback and questioning. The program meets the first three Wednesdays of the month at Mammel Hall at the University of Nebraska Omaha and the last Wednesday in Lincoln at Nebraska Global.

Open Nebraska (<http://www.meetup.com/Open-Nebraska-Meetup>) is a volunteer-led civic innovation organization that leads the development of apps to solve real problems in Nebraska communities. Its goal is to help citizens interact with local government by providing the information resources needed to make better decisions.

Omaha Coding Women (<https://www.facebook.com/events/726007264088309>), **Coding Women** (<http://Inkcodingwomen.org>), and **Women in Technology of the Heartland** (<http://www.meetup.com/witheartland>) provide networking opportunities for women in the technology field.

The Omaha Maker Group (<http://omahamakergroup.org>) exists to facilitate a place where people can explore technology, science and art, operating a community workshop in Omaha, Nebraska and having bi-weekly meetings where people can collaborate, share resources, create, and learn together.

Metropolitan Community College Fab Lab (<http://mccneb.edu/fablab/>) brings rapid prototyping capabilities to local and surrounding communities. The lab hosts several classes where participants get to design and/or build their own ornaments, musical instrument, t-shirt designs, bird house, vinyl graphics and lettering. Local entrepreneurs are encouraged to take their own ideas from the drawing board to prototypes to start their business. Lab capabilities include 3D printing, CNC milling, circuit production, laser cutting/engraving, precision mill, and a vinyl plotter.

Libraries as Maker Spaces—Libraries in Nebraska are beginning to provide access to 3D printers and other materials which facilitate collaboration and creativity. The Nebraska Library Commission produced a Tech Talk on Libraries as Maker Spaces. It is available at <http://www.youtube.com/watch?v=hxzJErZJLRO>.

UNL Maker Space (<http://innovate.unl.edu/>) will be built on Innovation Campus. The space is tentatively set to have woodworking and metalworking tools, 3D printers, and digital weaving and sewing machines. There may even be lasers, a culinary space and a music studio.

Co-Working Spaces. A number of facilities, especially in the Omaha and Lincoln areas, offer co-working spaces and/or cater to creative enterprises. **The Mastercraft** (<http://themastercraft.com>) is a budding creative center that attracts a diverse crowd of small business owners and entrepreneurs. The building in North Downtown Omaha once housed the Mastercraft Furniture factory. **Co-Lab** in the TipTop Building in North Downtown Omaha provides shared office space for 13 businesses with a creative bent. The space was created by Alley Poyner Macchieto architects. Other coworking spaces in Omaha include **CoVis CoWorking** (<http://www.covisco.com>), and **Cali Commons** (<http://calicommons.com>) **Fuse Coworking** (<http://www.fusecoworking.com>) provides coworking facilities in Lincoln's Haymarket district. **Catalyst** (<https://catalyst.ubt.com>) and Union Bank & Trust offer meeting space in Lincoln's West Haymarket area which can be reserved by entrepreneurs, startups and small businesses. Brent Comstock, chief innovator and owner of Bcom Solutions, has started a coworking facility in Auburn.

Venture Capital/Business Innovation Grants

Venture capital investments in Nebraska have been growing. The *Omaha World-Herald* recently reported that at least 23 Nebraska-based startups attracted around \$43 million in investments in 2013.²

In-state firms and programs include:

- Dundee Venture Capital (<http://dundeeventurecapital.com>)
- Treetop Ventures (<http://www.treetopventures.com>)
- Nebraska Angels (<http://www.nebraskaangels.org>)

² World-Herald editorial: Venture capital breakthrough
<http://www.omaha.com/article/20140221/NEWS08/140229841>

- Nebraska Global (<http://www.nebraskaglobal.com>)
- Linseed Capital: (<http://linseedcapital.com>)
- Prairie Ventures: (<http://www.prairieventures.net>)
- Invest Nebraska (<http://www.investnebraska.com>)

Business Innovation Act of 2011 (<http://www.neded.org/business/talent-a-innovation-initiative/business-innovation-act>) provides funding to help businesses develop new technologies that lead to quality job opportunities across the state. Competitive grants provide funding and technical assistance for research at Nebraska institutions, new product development and testing, and help expand small business and entrepreneur outreach efforts. These programs were extended by the Legislature in 2014. The program offers several distinct areas of assistance listed below:

- Nebraska Small Business Innovation Research Initiative (SBIR)
- Nebraska Innovation Fund
- Nebraska Research and Development Program
- Nebraska Microenterprise Assistance Program

Highlights: Household adoption and business use of broadband technologies

Broadband Subscribership

Most households in Nebraska (82%) have broadband service, according to a 2014 survey of Nebraska households. However, there are significant-rural-urban differences in broadband adoption. Ninety percent of households in the Lincoln area and 87% of households in the Omaha have broadband service. In comparison, the percentage of households with broadband service in other regions of the state ranges from 72% to 77%.

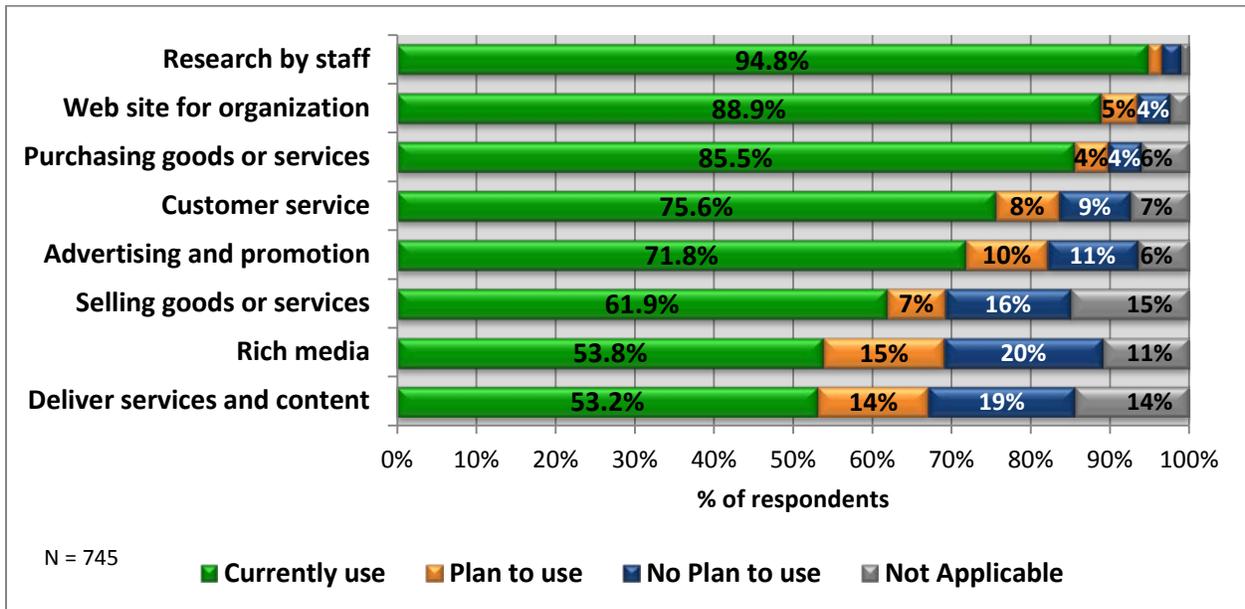
Broadband Service at Home	2014
Nebraska Households with Broadband Service at Home	82%
By Region	
Lincoln Area	90%
Omaha Area	87%
Southeast	77%
South Central	76%
West Central	74%
Panhandle	73%
Central	73%
Northeast	72%

*For the survey, broadband was defined as anything faster than dial-up.

Older adults, those with lower incomes and those with lower levels of income are also less likely to have broadband service at home.

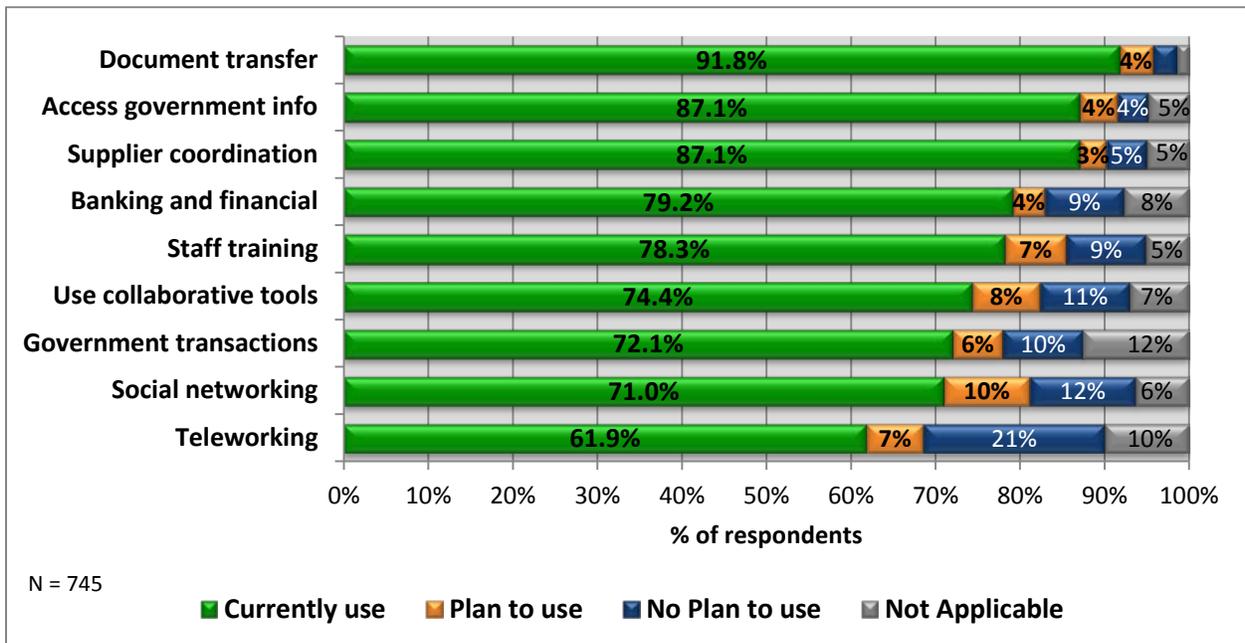
Use of Broadband by Nebraska Businesses

e-Commerce Uses of Broadband



Source: [Nebraska Broadband eSolutions Benchmarking Report](#)

e-Process Uses of Broadband



Source: [Nebraska Broadband eSolutions Benchmarking Report](#)

Glossary of Telecommunications Infrastructure Terms

The glossary includes some commonly used infrastructure terms. Here are a number of sources which provide telecommunication infrastructure definitions:

- Nebraska Information Network Technology Definitions
http://www.nin-telcom.com/Resources/tech_def.htm
- TIA
<https://www.tiaonline.org/resources/telecom-glossary>
- Technopedia
<http://www.techopedia.com/>
- ALTHOS Online Communication Dictionary
http://www.voipdictionary.com/aw_definitions_main.asp
- FCC Broadband Plan
<http://www.broadband.gov/> (Glossary is on page 351, appendix C).
- Newton's Telecom Dictionary is another useful source.

Access Point. Location on a network where switches or other electronic devices have been installed so that there is access to the network. There are also pricing access points where the network is not actually accessed but the service is priced as if there was physical access to the network at that location. The carrier "backhauls" the service to the physical location point.

Backbone. A high-speed line or series of connections that forms a major pathway within a network. The term is relative as a backbone in a small network will likely be much smaller than many non-backbone lines in a large network.

Backhaul. The telecommunications link used to transport traffic from a geographically distance point, such as a wireless base station, to a significant aggregation point in the network, such as a mobile telephone switching office or Internet peering point. (FCC Broadband Plan Glossary)

Bandwidth. The amount of information can be transmitted at one time based on the range of electrical frequencies the end devices on the network can handle.

Broadband. Data transmission technology that provides two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and at least 200 kbps upstream to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end users within the project area.

Broadband Services. Broadband services exceed 200 kilobits per second in both directions. Some experts estimate that in four to five years, broadband with speeds of 25 to 40 megabits per second will be needed. DSL and cable modems typically provide 1-2 megabits per second. Most of the DSL that is in place is capable of handling 8 megabits per second by changing plug-in cards. DSL equipment is becoming available in two new versions. One version is capable of 20 Mbps and the second is capable of 40 Mbps. Most cable modem systems are capable of 30-40 megabits per second.

Cable Modem Service. High-speed data service received through the cable system. The speed is typically 1-2 Mbit/s, although systems are capable of providing speeds of 30 to 40 Mbps and the distance can be 100 km or even more.

Carrier of Last Resort. The carrier that commits (or is required by law) to provide service to any customer in a service area that requests it, even if serving that customer would not be economically viable at prevailing rates. (FCC Broadband Plan Glossary)

Community Anchor Institutions. Schools, libraries, medical and healthcare providers, public safety entities, community colleges and other institutions of higher education, and other community support organizations and entities.

Dark Fiber. Fiber furnished with no termination equipment (i.e., lasers or electronics). Purchasing or leasing dark fiber requires the entity securing the service to invest the capital dollars for the terminating lasers and electronics.

DSL (Digital Subscriber Line). High-speed services provided over copper telephone lines providing voice and data (typically Internet) services. The reach (distance from the main telephone office or any remote line group in the countryside) has ranged from 18,000 route feet to approximately 24,000 route feet. Recently a new vendor product has become available, being deployed in Nebraska, that allows for retrofitting many of the existing DSL lines to achieve a range of over 40,000 feet providing multiple voice lines and data at speeds up to 712 Kpbs in both directions.

Duct. A conduit, usually placed in “bundles” of four or more (depending upon the number the carrier thinks may be needed in the next 20 or so years), through which fiber cable is placed (pulled). Copper cables occupy many older conduits and can be pulled out to make room for fiber and thus gaining significant capacity.

End User. A residential or business party, institution or State or local government entity, including a Community Anchor Institution, that may use broadband service for its own purposes and that does not resell such service to other entities or incorporate such service into retail Internet-access services. Internet Service Providers (ISPs) are not “end users” for this purpose.

Fiber (Optics). Thin filaments of glass through which light beams are transmitted over long distances carrying enormous amounts of data. Modulating light on thin strands of glass produces major benefits in high bandwidth, low power consumption, small space needs, security, and total insensitivity to electromagnetic interference.

Fiber Cable. The assembling of many thin filaments of glass into a single cable where the bundled glass filaments are then protected by exterior sheathing of polyethylene and sometimes a metal wrap with another sheathing of polyethylene material.

Fiber to the x (FTTX) refers to any broadband network architecture using optical fiber to provide all or part of the local loop. (Wikipedia)

Fiber to the Node or Neighborhood (FTTN) Fiber is terminated in a street cabinet, possibly miles away from the customer premises, with the final connections being copper. (Wikipedia)

Fiber to the Premise (FTTP) or Fiber to the Home (FTTH) Fiber reaches the boundary of the premise. (Wikipedia)

Fixed Wireless Data Service. High-speed services provided over wireless to a fixed location. Often a dish or receiver must be attached to the roof and positioned to face the nearest wireless transmitter.

High-Speed Services. Most consumers consider high-speed services to be anything faster than a dial-up 56 kbps connection. This is the simplest definition and the one that we will use in this workbook. Some people equate the term high-speed services to broadband which is defined by the FCC as faster than 200 Kbps. Others—usually those who have worked with telecommunications for some time—use the term high-speed services to mean speeds faster than a T-1 or faster than 1.544 Mbps.

ISDN (Integrated Services Digital Network). ISDN can typically provide speeds of roughly 128,000 bits per second over phone lines. ISDN is used for videoconferencing and can be more cost effective than having a T-1 line or fractional T-1 for an occasional user of videoconferencing because it is often priced based on hours of use. ISDN is a 2B + D configuration. The “B” channels are 56Kbps and the “D” channel is 16 Kbps. You can configure up to a 23B + D service which would equal a T-1 or 1.544 Mbps.

Last Mile project means any infrastructure project the predominant purpose of which is to provide broadband service to end users or end user devices (including households, businesses, community anchor institutions, public safety entities, and critical community facilities).

Loup The connection from the network central office to the customers’ premises.

Mesh Networks. Mesh networks provide redundant connections among access points and eliminates the need to have a connection to the Internet at each access point. The new mesh network equipment is making it more affordable to create WIFI networks.

Middle Mile. Project means a broadband infrastructure project that does not predominantly provide broadband service to end users or to end-user devices, and may include interoffice transport, backhaul, Internet connectivity, or special access.

Mobile Digital Wireless Data Service. Voice and data (e-mail, etc.) can be transmitted to a digital cellular phone, PDA, or laptop equipped with a wireless receiver. WIFI is one of the most popular forms of mobile digital wireless data service.

Rural Area. Any area, as confirmed by the latest decennial census of the Bureau of the Census, which is not located within: (i) A city, town, or incorporated area that has a population of greater than 20,000 inhabitants; or (ii) an urbanized area contiguous and adjacent to a city or town that has a population of greater than 50,000 inhabitants. For purposes of the definition of rural area, an urbanized area means a densely populated territory as defined in the latest decennial census of the U.S. Census Bureau.

Service Area. The entire area within which an existing service provider offers broadband service.

Service Location. The specific geographic point or location at which a service provider offers broadband service, such as a specific residence or business.

Underserved Area. An area composed of one or more contiguous census blocks meeting certain criteria that measure the availability of broadband service and the level of advertised broadband speeds.¹² Specifically, an area is underserved if at least one of the following factors is met, though the presumption will be that more than one factor is present: (i) No more than 50 percent of households in the service area have access to facilities-based terrestrial broadband service at greater than the minimum broadband transmission speed (set forth in the definition of broadband above); (ii) no fixed or mobile broadband service provider advertises broadband transmission speeds of at least three megabits per second

("mbps") downstream in the area; or (iii) the rate of broadband subscribership for the area is 40 percent of households or less.¹³ A household has access to broadband service if the household can readily subscribe to that service upon request..

Unserved Area. An area composed of one or more contiguous census blocks where at least 90 percent of households in the service area lack access to facilities-based terrestrial broadband service, either fixed or mobile, at the minimum broadband transmission speed (set forth in the definition of broadband). A household has access to broadband service if the household can readily subscribe to that service upon request.

Voice over Internet Protocol (VoIP). VoIP is the transmission of voice communications over the Internet.

WIFI. WIFI is short for wireless fidelity and refers to any type of 802.11 network which can be accessed by a computer with a wireless networking card.

WiMax. WiMax is a wireless network running the Institute of Electrical and Electronics Engineers Inc.'s 802.16 standard, using licensed and unlicensed radio spectrums. The 802.16d standard, also known as 802.16-2004, can provide line-of-sight communication for up to 30 miles, though in-building coverage is estimated at closer to two miles.

T1. A dedicated connection providing transmission capacity of 1.54 Mbps. A T-1 can be multiplexed into 24 DSO channels. DSO is a 56 Kbps channel—the bandwidth used for voice service. The technical term for a T-1 is a DS-1 where DS stands for Digital Service.

DS-3. Sometimes referred to as a T-3, a DS-3 contains 28 T-1 lines (45 Mbps).

OC-3 (Optical Carrier-3). An OC-3 contains 3 DS-3s (155 Mbps). Note: The math of multiplying the number of T-1s in a DS-3 and the number of DS-3s in an OC-3 does not equate because of bandwidth used for signaling and control of the circuits.

Roger Hahn from the Nebraska Information Network provided assistance in the development of this glossary.