

Research Proposal: Broadband Barriers of Entry

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Introduction

Throughout the development of the United States the reliance on an internet connection has continued to grow. The COVID-19 pandemic has caused this growth to expand exponentially as work and education has moved remote. For those that already lacked access to connection, they will continue to be left behind. In order to address this, more information is needed on what barriers of entry exist and who lacks access. The question being posed is, what are the barriers of access to a broadband connection for Illinois residents?

Background

The FCC reports that in 2019 roughly 95% of the United States has a terrestrial internet connection that meets their definition of broadband. Meaning that they have a physical connection to the internet that provides adequate performance at a speed of 25 megabits per second download and 3 megabits per second upload. This coverage drops greatly in rural areas down to 82%. It should also be noted that this number reported has been challenged by scholars and deemed inaccurate, potentially allowing for a larger population to be without a connection. While the United States still lags behind in providing infrastructure to connect citizens to the internet, more information is needed to determine additional barriers. There are plenty of underserved communities in rural, urban and suburban areas that might have the infrastructure for an internet connection but still remain disconnected. This issue greatly limits the occupational, educational, and social outlets that an individual can take advantage of. This research proposal is designed to shed light on this missing data. What are the known and unknown barriers of entry that individuals face when looking to connect?

The importance of a broadband connection can not be understated. While some may take this resource for granted, its importance to every day citizen needs to be clarified. Many

individuals rely on the internet for occupational opportunities or require it to work remotely. Post the COVID-19 Pandemic and the increase in remote jobs, there is now a group of individuals who could use the flexibility of remote work but lack the resource. A child that will now be asked to utilize the internet to complete their course work will now be left behind as well. Even if the child is provided a connection either through a library, restaurant or allowed to stay at school, someone else is being asked to pick up the slack. As our society becomes more reliant on technology and the internet, more work will be needed to allow this resource to be equitable.

Literature Review

Through this section there will be a review of relevant information that can influence this research. The research covered is from the Federal Communications Commission (FCC), the Government Accountability Office, the State of Illinois, and various researchers.

First, the most recent FCC Broadband Deployment report will be discussed to understand a perspective of the current broadband landscape across the country. Through this report the FCC details their current efforts in how they have improved access throughout the country. For clarity, the connection speeds being referenced forward will match the format in the FCC reports. It is dictated as download speeds first and upload speeds second separated by a slash. An example is provided here 25/3. The speeds that are measured depend on the respective technology. For instance, fixed lined internet is measured at multiple levels starting at 10/1, 25/3, 50/5, 100/10 and ending with 250/25. Mobile data is measured at a lower speed starting with 5/1, 5/3, 10/1 and ending with 10/3. Through their fixed lined reporting they are measuring that 95.6% of Americans have access (Federal Communications Commission [FCC], 2021). The FCC (2021) also claims as high a 99% of citizen have access to 4G mobile data. For fixed lined in rural areas the FCC (2021) claims an 82.7% coverage and a 79.1% coverage in tribal areas. As a population

the FCC (2021) claims that 14.5 million Americans are without a fixed broadband service. This report provides an introduction into the issue of broadband availability and its status from a federal government lens. What is not provided are potential barriers of entry to accessibility. The FCC shows broadband and internet availability but does not conduct research on accessibility.

The next article to cover was created by the Government Accountability Office (GAO), as research to find a more accurate number of citizens without a broadband connection. The GAO offers a critique to the methodology utilized by the FCC when gathering their deployment report data. They claim two issues can be seen with the FCC's data, first that many times addresses are reported twice, and that when counting census blocks for broadband availability, only part of that area needs access. To be more specific, as the FCC counts a census block as having access, they are counting a whole collection of addresses as being connected even if only a few houses have broadband availability. To combat this the GAO attempted to work with data organizations and internet service providers to create something known as a location fabric (Government Accountability Office [GAO], 2021). This is a way for information to become more granular and can separate houses with and without a connection. They felt this was a more accurate way of showing specific areas and populations that may not have a connection. This report did not provide any additional evidence on how many addresses could have been missed as this report was an update on the current process. This resource provides insight that while the FCC might highlight their successes with their deployment reports, there could be a much larger group of people without available broadband. This also shows a new resource that can be used in the future to better understand geographical areas that are underserved.

The next article is titled *"I Don't Use the Internet": Exploring Perceptions and Practices Among Mobile-Only and Hybrid Internet Users*. This article details a qualitative study in which

30 participants in Chile were interviewed to understand their perceptions of the internet. Chile is an interesting case as a large portion of its people do not have access to a fixed line connection so, much of their population relies on wireless 4G and 5G. As a result through this study, it is shown that many mobile only internet users do not consider themselves to be internet users (Pavez & Correa 2020). Many of the people who participated in interviews, did not consider themselves to be internet users, even though they utilized messaging and social media apps that required the internet to connect users. This study also utilized an interesting “ethnographic strategy” in which they asked participants to give a “digital tour” of their phone to understand how they organized their device (Pavez & Correa 2020). With these interviews and digital tours, it was noted that many mobile only user had a limited technological literacy but still developed work arounds to their issues. Through this research we see an interesting conversation about how people view themselves in relation to technology. This shows researchers potential outcomes and limitations regarding the quality of one’s connection and its subjectivity to that individual. This also shows the idea that technological literacy is not a uniform language, people can find work arounds to still be technologically capable outside of an FCC or researchers’ definition.

The next article titled *COVID-19 and Rural Broadband: A Call to Action or More of the Same* shows the importance of an internet connection and its relation to the health and wellness of citizens. Specifically, this article discusses how the lack of broadband has impacted people during COVID-19. One of the first factors discussed in this article talks about the “homework gap” caused when a student who does not have access to a connection is now asked to participate in an online educational environment (Whitacre, 2021). The article mentions an estimated 15 – 17 million school aged students are living in a house with out a reliable internet connection or a device to adequately complete their virtual learning (Whitacre, 2021). This article also shows the

growing gap between rural and urban areas regarding broadband access, by noting a 5 - 10% difference in accessibility in their respective areas (Whitacre, 2021). Lastly this article discusses the need for broadband to access telehealth. This is an area that has not been discussed in other readings, and here it shows the importance of broadband for users to achieve better health care. Through this article the importance of broadband has been reaffirmed, as many underserved communities lack access to resources to benefit their health and education. This also highlights the growing urban and rural divide that has been mentioned in many other readings. The last item to note is something this article hints at and area this research wishes to uncover, and that is the difference between broadband availability and accessibility. The article talks about students who are unable to complete homework due to a lack of adequate devices. This shows that broadband access is a multifaceted issue, and just providing infrastructure may not resolve the problem. More information needs to fully understand what barriers exist.

Chapter 10 of *Understanding US broadband Unavailability* shows an additional take on states and their lack of access. This source provides a thorough analysis of the FCC's report from 2008 and shows a different take on the amount of people without broadband availability. While this is a relatively older source, its information is still valuable to see a long-term context of how states have been affected by broadband availability. Similarly to the GAO article, this reading provides critiques of the FCC's effort in gathering data to understand the number of people with and without a connection. To be able to understand this data more specifically, this study utilizes state based broadband maps. This article also measures different levels of connectedness based on the technology utilized and is measured as a household who has access to Direct Subscriber Line and cable or a household that has a high-speed Direct Subscriber line (Flamm, 2013). While Direct Subscriber Lines are not the modern technology, this still can show how states have had to

update technology to meet the standards of the FCC. The study also measures the amount of Internet Service Providers that exist within certain parts of a state as this measures the amount of competition in that area. The idea behind this is the more competition the more likely a proper connection is truly available to consumers. This study measures the percentage of a state's area that has less than four and less than seven internet service providers (Flamm, 2013). With this information we see that there are more states that are heavily affected by a lack of competition among internet service providers, and this is a factor in broadband availability.

The last document to discuss is not a peer review article but data provided by Illinois' Department of Commerce and Economic Opportunity. This is a map showing different levels of accessibility within the state of Illinois. The data provided is surprisingly comprehensive in how broadband accessibility is measured. In their legend they show the areas that have access to different types of technology like, fiber, cable and direct subscriber line. They also show different areas either at or above the FCC requirements for broadband speed. They do not however show the area that is below the FCC standard for broadband or areas that are not fully connected. This does show us areas that have access to a connection and areas that either have not data or no connection. Using this information, we can target specific counties within Illinois and conduct research in these areas.

Methodology and Resources

The issue of broadband accessibility is an issue that effects each state, yet some states more than others. To begin to paint a picture on who is left out, beginning this research at a state level can provide an idea of its impact. For this study the state of Illinois will be selected to distribute surveys to. Twenty different counties will be selected based on their geographical location in Illinois, north, south, east, and west and five counties from each direction will be

selected. The counties selected to represent the northern portion are Cook, Dupage, Kane, Dekalb and Ogle County. From the southern portion of Illinois, Marion, Jefferson, Franklin, Union and Pope County have been selected. To represent the eastern portion of Illinois Coles, Effingham Champaign, Edgar and Dewitt County and for the western Adams, Brown, Fulton, Knox, and Scott County. The main reason why these counties have been selected is it provides an equal spread across the state of Illinois and will not focus just rural or urban. The goal of the research is to understand barriers of entry to a broadband connection, and to get a comprehensive look at these barriers. These counties span a wide area and differ greatly in their population, occupation, and median income. Additionally, through the Illinois Department of Commerce & Economic Opportunity, their broadband roll out map details the areas that are “underserved.” This provides a baseline to compare populations who are served and who are underserved.

With the counties selected each residential house within these locations will first receive a mail survey to complete. This mail survey will ask for some basic information to validate that the response is legitimate by asking for the participants address. This will validate that the survey arrived at the correct location and is covering the specified area. Then the survey will cover questions regarding their connection and bandwidth speeds. The first questions will be a yes or no questions with the later questions asking for more specific information. The questions being asked are labeled below...

1. Do you currently have/pay for an at home internet connection? Yes or No
 - a. If no skip to question five
2. For your internet connection do you use fixed line, satellite or mobile? Yes, No or Unsure
3. What is your current download speed? Please provide in mbps.

4. What is your current upload speed? Please provide mbps.
5. If you do not have an at home internet connection, please use the space below to elaborate on why.

These questions provide us the necessary information on if someone has access to broadband, what speeds, and asks to list any barriers of entry. To assist respondents on the third and fourth questions, step by step instructions will be provided on how to conduct an internet speed test through Google or Ookla. These are two very simple resources that test your data speed for you.

After the mail surveys have been delivered and begin to be returned, tracking information on which households have returned will be vital. The second step would be to conduct a follow up telephone survey to the households that did not respond to the mail survey. An automated recording of the survey questions will be utilized partially as a cost saving measures but also to be time effective. The automated survey will ask the questions and prompt the respondent to use their phone keys to answer. As an example, the automated survey will ask participants to press number one for “yes” or number two for “no.” For the questions regarding download and upload speed a range will be provided, for example, “if your download speeds is 24 mbps and lower press one.” Similarly providing multiple choice for the final question of the survey and offering options of “internet is too expensive” or “no quality options.” Our expectations on potential answers will be utilized to create possible selections for this question. The survey will also utilize a Computer Assisted Telephone Interview program to record the data. The mail survey and follow up telephone survey should return a higher response rate.

This section will detail the resources needed to complete this study. The major resources needed would be an organization or person power to create a physical copy of the survey and

then the ability to pack envelopes to be sent out to potential participants. This would cover the first step of the study. Additionally, personnel would be needed to unpack envelopes, organize, and import data that has been gathered. Afterwards the resource needed to cover the phone survey portion would be a program that can automate the collection of the data. As mentioned early the use of a Computer Assisted Telephone Interview program would be needed to compile the information gained through the automated phone interview. Once all the data is compiled, next will be to analyze the data provided. Looking specifically at what barriers exist and how often, and what are the average and mean download and upload speeds.

Lastly to identify the timeline expected. The data is expected to be collected a years' time if not sooner, two months will be provided for the mail surveys to be completed and sent in, after this time it will be assumed that no more mail surveys will arrive. After the two-month window, this will begin the automated phone call survey. This will run for an additional two-to-three months to follow up with any outstanding surveys. The final five-to-six months of this first year can be devoted to understanding our return rate and see if any last-minute efforts are needed to increase it. Finally, an ample amount of time will be needed to compile and analyze the data gathered. Attempting to get surveys back from the entire population of twenty different counties in Illinois will provide a large data set, and the timeline to understand the data could take one-to-two years. With this completed, the study will be finalized, and the findings presented.

Expected Results

This next section will cover the various result that are expected to be returned post survey. The two most likely barriers that could be noted are, either broadband cost is too high or there are not quality options in the area. For the first potential outcome, a high cost, this is an answer that can be expected throughout almost every county listed. This is something that will be

seen in rural areas, but also in specific communities in suburban and urban counties. Some of the counties in the northern area of Illinois have a wide spread of income, so even in areas where the median income is high, these answers would still be expected. The second most expected answer, the lack of quality options, can be seen as previous research and Illinois' own broadband roll out map shows there are still large areas that are underserved. As mentioned previously, the book *Understanding US Broadband Unavailability* the research looks at areas that have less than four internet service providers. This study gathered data from 2008 and had Illinois at roughly 4% of its zip code area having less than four internet service providers (Flamm, 2013). While this number is low back in 2008, there are still many factors that could have caused this to change. With the Illinois broadband roll out map we see a much larger area than 4% that is considered to be "underserved." This could entail there being more than four service providers, but their quality is still poor between the options that are available. Lastly, there are other expected results to be mentioned but they are anticipated to be measured at a much lower frequency. These potential options are, poor technological literacy, no availability, and internet connection is not needed. Poor technological literacy could lead to someone not feeling confident in knowing how much to spend on a connection or if it will suit their needs. Looking at no access at all, there are still large portions of Americans who live in areas without broadband availability and this population is expected to show in this study.

Limitations

As with every study there are various limitations that are expected and limitations that are discovered after the fact. To begin with the most obvious limitation, this would be a lack of funding. This can be seen as an aggressive survey asking each residential household in 20 Illinois Counties to be contacted twice, not to mention that one of them is Cook County, where the city

of Chicago is located. There are many people that will be asked to participate and with that comes increased costs. Part of this limitation has been considered as seen earlier in the Methodology section but there are additional measures that could be taken to lower costs. Potentially surveying only 50% of a counties population and the participants are selected at random. The second limitation to this survey would be technological literacy. This could have an impact on the quality of results we get from respondents, as it could also lead to participants not completing the survey. This limitation can partially be accounted for through clear directions and instructions on how to find the needed information. As for other limitations, the population being surveyed may not provide a proper spread. Looking at many of the urban and suburban counties that exist in the northern section of Illinois, their populations combined could still outweigh the populations from the other fifteen counties. With this the populations surveyed may still weigh heavily to urban and suburban thus altering the results. Additionally, using an automated phone recording to conduct a survey could limit the number of responders especially knowing how pervasive automated scam calls are.

The last two limitations to highlight are more revolving the issue as opposed to the methods being used. The two additional limitations are, that this research may not adequately depict the issues citizens are facing, and that more research will be needed to fully understand these barriers of entry. Noting the first limitation mentioned, shows that broadband accessibility is a multifaceted issue and there are many factors both seen and unseen that can limit someone's access. There can even be cases where a privately owned apartment complexes may struggle to reach broadband speeds due to the age of the building or the equipment and materials used. This is an issue that has not been accounted for in much of the previous research. Policy makers and researchers can access and study local and municipal infrastructure but there is a limit to what

can be researched about privately owned buildings. The second limitation noted is about resolving broadband accessibility issues, as this research only provides a small picture in a specific area. To address this issue holistically, more research will be needed to accurately address the multiple barriers of entry.

Intended Audience

This information would be valuable to state and local politicians to understand the struggles that their voting population might be facing. Politicians who's voting block is in a rural or underserved area could find this specifically valuable as this can be a new platform to motivate voters. This also paints a picture for the entire state legislature as they can use this data to inform policy decisions regarding broadband. This can also be important to other researchers as it can be used to ask additional questions, and dive deeper into a problem seen throughout the United States. This research will depict a small section of a nationwide problem but can be replicated in other states so they can understand these implications as well.

Conclusion

The research being proposed looks to understand more about barriers of entry to a broadband connection and will begin to add to the current conversation on broadband availability and accessibility. The research is designed to provide more insight it additional factor citizens face while attempting to connect. The internet is a valuable resource that can be used to improve someone's quality of life. This research hopes to highlight the voice of those who need the connection, and to show policy makers new barrier to address.

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