THE HOMEWORK GAP IN NORTH CAROLINA

A Pilot Study of K-12 Households

NC DIT Broadband Infrastructure Office
NORTH CAROLINA DEPARTMENT OF INFORMATION TECHNOLOGY

THE WILLIAM & IDA FRIDAY INSTITUTE FOR EDUCATIONAL INNOVATION

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Photos courtesy of the NC Department of Information Technology.

Presented by the Broadband Infrastructure Office and the William Ida Friday Institute for Educational Innovation

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Executive Summary

"It truly is the cruelest part of the digital divide," FCC Commissioner Jessica Rosenworcel said when describing what she termed the Homework Gap at the Homework Gap Convening hosted by the North Carolina Broadband Infrastructure Office and the William Ida Friday Institute for Educational Innovation at North Carolina State University. The Homework Gap, a specific subset of the digital divide, occurs when students are assigned homework requiring access to the internet but do not have home access.

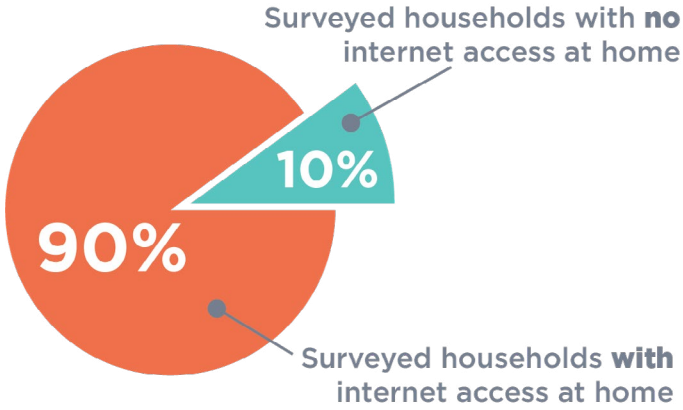
Data from the 2018 Teacher Working Conditions survey issued biannually by the North Carolina Department of Public Instruction (DPI) shows that 70 percent of high school teachers, 60 percent of middle school teachers, and 43 percent of elementary school teachers in North Carolina regularly assign homework that requires internet access to complete (NC Teacher Working Condition Survey Results, 2018). Meanwhile, at least 259,000 North Carolinian households do not have access to adequate broadband in their homes (FCC, 2018). In addition, half of North Carolina's households do not have broadband because they cannot afford it, do not have the skills to use it, do not have a device at home to use it with, or do not see its relevance to their lives (FCC, 2018).

Beyond these figures, the true state of the Homework Gap, its impacts, and specific causes in North Carolina were unknown. Without granular data about the number of North Carolina's school children affected by the Homework Gap, the primary cause for their lack of access, the location and geographic disbursement of these families, and the impact of socioeconomic and demographic factors, targeted, strategic solutions could not be designed.

To gather this data to inform strategic policy design, the Broadband Infrastructure Office (BIO), a division of the North Carolina Department of Information Technology (DIT), partnered with the Friday Institute Research and Evaluation (FIRE) Group at North Carolina State University to issue a survey and host a convening of subject matter experts on the topic of the Homework Gap. Understanding the common reasons for and implications of the Homework Gap provides stakeholders who seek to close the gap with the information needed to design effective programs and policies.

67% of those without internet access cite cost as the primary reason.

The survey results, while not representative of all North Carolinians due to the survey's pilot nature, offer more detail and color to paint a more focused picture of the Homework Gap in North Carolina. Of the nearly 8,500 K-12 households that responded to the survey, 10 percent lack broadband access at home. For those without service, cost of the service was the most cited reason for not having home access.



Lack of access often extended to the ownership of a computer, laptop or tablet. Those without access were less comfortable completing common tasks online in addition to being less comfortable assisting their children with their online homework. Finally, the Homework Gap impacted low-income households and households with lower educational levels more frequently.

Since the partners began studying the issue in 2017, the topic of the Homework Gap has attracted an increasing amount of attention. Just this year, the Department of Education released a report examining the Homework Gap nationwide, the Consortium for School Networking (CoSN) released an updated toolkit designed to assist districts as they address the Homework Gap locally, and in North Carolina, Governor Cooper proposed a $2.5 million grant program to improve home access for students.

This report contributes to the growing body of research and strategic policy recommendations designed to address the Homework Gap. The goal of this report is to equip policymakers at the local and state level as well as educators, school districts, and other key stakeholders with the necessary information to understand the Homework Gap and strategies for addressing it. After careful analysis of the

survey results and a compilation of recommendations made by subject matter experts at The Homework Gap Convening, this report outlines six key recommendations to close the Homework Gap in North Carolina.

RECOMMENDATIONS

1 The State should dedicate funding to establish a grant program housed in NC BIO to close the Homework Gap.

The Homework Gap will not be closed unless it is directly addressed. To directly address it, funding is necessary. The survey data shows that no one school district is immune from the Homework Gap. Instead, students across the state are affected by it. The State should establish a time-limited, flexible grant program through which the school districts can leverage state resources to address the Homework Gap in their districts. Grants would fund solutions such as deploying Wi-Fi enabled hotspot devices to students without access at home or equipping school buses with Wi-Fi. By equipping districts with dediced funds, expertise, and support the State can make significant progress towards closing the state's Homework Gap.

2 The State should pursue the implementation of policies and programs that increase the availability, adoption, and use of broadband.

As the Homework Gap is the result of the broader issues contributing to the lack of broadband access, adoption, and meaningful use—to close the Homework Gap with finality, policies and programs addressing the broader availability of the technology and promoting digital inclusion should be implemented.

Programs such as the just established Growing Rural Economies with Access to Technology (GREAT) Program designed to facilitate the deployment of broadband to unserved areas of the State will contribute to increasing broadband availability and closing the Homework Gap (S.L. 2018-5, 2018). The State should continue the support of this program and implement other proposals found in the 2016 State Broadband Plan designed to lower barriers to broadband deployment and implement programs and policies that close the digital divide (DIT, 2016).

3 The State should foster cross-sector collaborations and public-private partnerships to implement and sustain multi-faceted solutions.

The Homework Gap has far-reaching impacts beyond hampering school children in their educational pursuits. It limits the types of jobs they will be qualified for once they enter the workforce. Failing to equip students with the necessary tools to thrive in a digital society also limits their ability to contribute to their community's future. In addition, the issue is a result of the intersection of multiple factors. Thus, intentional and innovative partnerships between an array of the State's organizations is required to implement the multi-faceted solutions required to close the Homework Gap. The State should foster and lead these innovative partnerships, gathering stakeholders from the business community, local governments, education systems, workforce development organizations and nonprofit organizations to develop solutions that address the primary causes of the Homework Gap.

4 The State should continue to study the Homework Gap.

In CoSN's recently updated "Digital Equity Action Toolkit," the first recommendation for any community seeking to address the Homework Gap is to survey the population to determine the "scope of the problem (CoSN, 2018). BIO's pilot survey provided useful data for understanding North Carolina's Homework Gap. It also provided useful experience in best practices for deploying the survey to K-12 households. However, further study is needed to provide even more granular information and data by which progress can be benchmarked and measured. The state should plan to survey the K-12 population annually or biannually through a single, dedicated survey or through an existing survey to which Homework Gap questions can be added.

5 North Carolina's local governments and LEAs should continue to innovate and partner with the state to close the Homework Gap.

Like many innovations, the two most well-known and tested methods of closing the Homework Gap — distributing hotspots and equipping school buses with Wi-Fi — were first designed and tested in local school districts. Several districts in North Carolina are using both methods. These and other districts should continue to explore and design innovative solutions like these. In addition, they should partner with the state to expand these solutions and share best practices so that the state can equip other communities with the knowledge and ability to close the Homework Gap in their communities.

6 The survey instrument and its distribution should be modified to garner more reliable results.

During the data collection and analysis process, areas in which the questions could be improved were identified. To improve the accuracy and utility of the data, the survey instrument itself should be edited. In addition, the method of distribution should be modified so that the surveyed population accurately reflects the state's population.

Unlike other intractable issues that impact educational outcomes such as hunger, homelessness, or generational poverty, the Homework Gap is a solvable issue. If implemented, these recommendations, further expounded upon in the remainder of this report, will begin to shrink the Homework Gap in North Carolina, thus increasing a generation of North Carolinians' ability to fully participate and thrive in today's society. Implementation of these recommendations requires dedicated leadership, passion, and subject-matter expertise. It also requires the establishment of sustained partnerships across the State.

Introduction

home · work · gap
/'hōm ˌwərk/'gap/
noun
The ‘Homework Gap’ occurs when students are assigned homework requiring access to the internet, but don’t have home access.

Nationally, seven in ten teachers assign homework that requires internet access, but an estimated 5 million households with school-age children do not have internet access at home, according to research from the Pew Research Center (Pew Research Center, 2015). From difficulty in completing homework to diminished educational outcomes, the consequences of the Homework Gap are vast and combine to hinder future career and economic opportunities for both the students and their communities.

And yet, until the U.S. Department of Education released a report in April 2018 compiling data from multiple sources to provide a more robust analysis of the impacts a lack of access to broadband at home has on K-12 households, little was known about the size and scope of the Homework Gap beyond rough national estimates. Even with an increase in data available to measure the national Homework Gap, state, county, and municipal-level data on the Homework Gap are non-existent and are not collected by the federal agencies that measure broadband availability and adoption. However, before targeted policies and programs to bridge the Homework Gap can be designed and implemented, its size, scope, and regional distribution must be determined.

This need for granular data, coupled with the desire to address the Homework Gap holistically and systemically led the BIO and The FIRE Group to partner to conduct a pilot research study on the topic. The two organizations designed and piloted a survey to collect information on the Homework Gap, who it affects, and its primary causes for North Carolina households.

Both organizations have a long history of advancing research, policies and programs designed to bridge the digital divide in North Carolina’s public schools and communities. The FIRE Group leads the development and current implementation of the “North Carolina Digital Learning Plan,” which highlights the digital learning needs of the state to include out of

school access (The Friday Institute, 2015). In 2016, the BIO released Connecting North Carolina State Broadband Plan with nearly 80 policy recommendations to ensure all North Carolinians who seek to adopt broadband have access to it by 2021 (DIT, 2016). Given the importance of ensuring the state's youth are adequately prepared to participate in a 21st century economy, closing the Homework Gap became one of the primary topics the plan addressed. Among the four recommendations focusing specifically on the Homework Gap, the plan recommended conducting statewide research on out-of-school internet access to fully articulate the breadth of Homework Gap challenges for NC students.

More specifically the plan reads:

> HG2.1 The state should distribute a survey in the schools for parents to complete and return to obtain more granular data on where the Homework Gap exists. This could be a telephone, internet, or paper survey (or all the above) targeted at parents. The Friday Institute at North Carolina State University is regarded nationally for developing and evaluating these types of surveys.

To this end, the BIO partnered with the FIRE group to 1) develop and administer a pilot Homework Gap survey, and 2) hold a convening of educational technology leaders to brainstorm solutions to eradicate the Homework Gap. This report details these activities.

Understanding the Big Picture: Context for the Homework Gap

The Homework Gap is a subset of the digital divide or "the gulf between those who have access to computers and internet and those who do not," (Oxford Dictionary, 2018). Both the Homework Gap and the digital divide can be studied through the lens of broadband adoption or households who subscribe to broadband service.

Causes for the Homework Gap mirror those that prevent households from adopting broadband in their homes. Research shows that the four major obstacles to broadband adoption are:

1. a lack of digital literacy knowledge
2. the unaffordability of either the internet service or the digital device necessary for utilizing the internet
3. a lack of access to broadband service
4. the lack of understanding how the internet is relevant to a person's life.

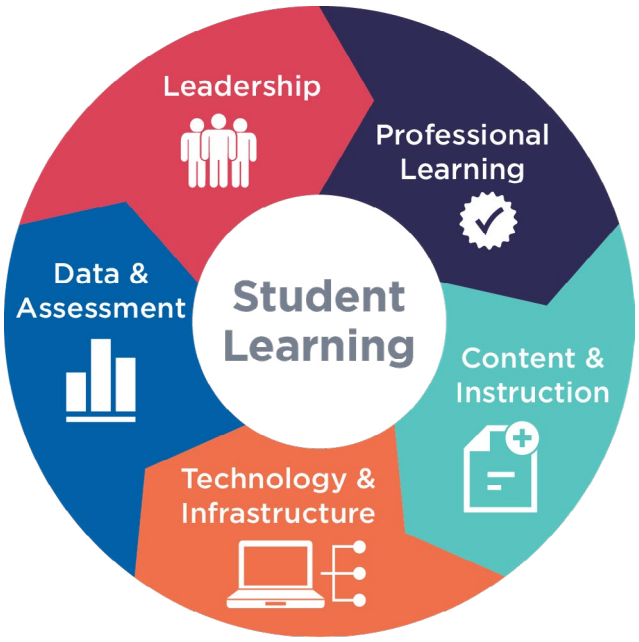
In the 2015 study, The Numbers Behind the Broadband 'Homework Gap', the Pew Research Center found that households with K-12 students are more likely to adopt broadband than households without them. The study found that 82.5 percent of surveyed households with K-12 students adopt broadband, while roughly 73.5 percent of households without K-12 students adopt. But among households with K-12 students, low-income households fall about 20 percentage points behind average income households, and Pew found they make up a disproportionate portion of the 5,000,000 households in the Homework Gap. In addition, the Homework Gap disproportionately impacts low-income black and Hispanic households, which are about 10 percentage points more likely to fall into the Homework Gap than white households.

Data from previous North Carolina reports mirror these findings. In a 2013 survey, 86 percent of respondents with children in the household reported having home internet service while 81 percent of respondents overall reported having internet service (Wilson, 2014).

Meanwhile, school districts, schools, and teachers increasingly use digital resources and tools in and outside the classroom to supplement or replace their traditional teaching methods. For those without home access or digital devices, the Homework Gap results in digital inequities that prevent those students from participating at the same levels as their peers.

Two 2013 statutes passed by North Carolina's General Assembly encourage a transition from a reliance on physical textbooks to a comprehensive digital learning ecosystem in North Carolina's K-12 schools (S.L. 2013-11 and S.L.2013-12). The FIRE Group developed a digital learning plan for the State Board of Education and DPI to guide the statute's implementation. The plan identified five major components of the education system to address and support to successfully implement a digital learning environment: 1) leadership, 2) professional learning, 3) digital-age content and instruction, 4) technology infrastructure and devices, and 5) effective use of data and assessment (The Friday Institute, 2015).

FIGURE 1
Digital Learning Progress Rubric Categories



All five components of the plan rely upon a robust broadband infrastructure in the schools and their surrounding communities to effectively implement and realize the full benefits from the plan. In addition, the plan indicates that equity of access to all schools and students cannot be achieved without reliable, consistent access to digital resources.

Building from this plan, the Friday Institute hosted the "Equity for Digital-Age Learning Convening" in 2016 where attendees learned from subject matter experts the necessity of promoting digital equity practices and programs within and outside of the schoolhouse. Attendees also brainstormed solutions for solutions to five key topic areas, all of which impact the Homework Gap in some way: 1) out of school internet access, 2) professional development and preparation for educators, 3) personalized learning in high-need classrooms, 4) building parent and community support, and 5) planning for sustainability for devices, networks and resources (The Friday Institute, 2016).

The convening accentuated BIO's finding from the State Broadband Plan — that further study of the Homework Gap at the state level would be necessary to inform the creation of policies and programs to address the Homework Gap (DIT, 2016).

THE CURRENT STATE OF BROADBAND IN NORTH CAROLINA

To understand the Homework Gap, it is necessary to understand the broadband availability and adoption landscape in North Carolina. Broadband availability — also sometimes referred to as access or deployment — measures the supply of broadband while broadband adoption measures its demand.

Broadband availability and subscription data are provided by the Federal Communications Commission (FCC). According to its latest data release, 93.7 percent of North Carolinians have access to broadband at the FCC recommended speed threshold of 25 Mbps download/3 Mbps upload (2018). Due to the FCC's method of data collection and analysis, the data are overstated, thus the estimates reported underestimate the number of North Carolina residents without broadband access. The state's rural areas are particularly affected by the lack of access with 95 percent of those without service in rural communities.

As previously discussed, households cannot adopt broadband if access is unavailable at their locations. For 259,000 households in North Carolina, a lack of access is their primary barrier to adoption as broadband service is not available at their home (FCC, 2018). Within North Carolina, 43 of the 100 counties have a household broadband deployment rate at the FCC recommended speed threshold, equal to or above North Carolina's average of 93.7 percent (FCC, 2018).

See Figure 2, opposite page

North Carolina's subscription rate at 25/3 is 49.8 percent, and ranks 18th in the country (FCC, 2018). This indicates that just under half of North Carolina's households purchase broadband at this speed threshold in their homes, according to data from the FCC's Internet Access Services 2016 report (FCC, 2018).

See Figure 3, opposite page

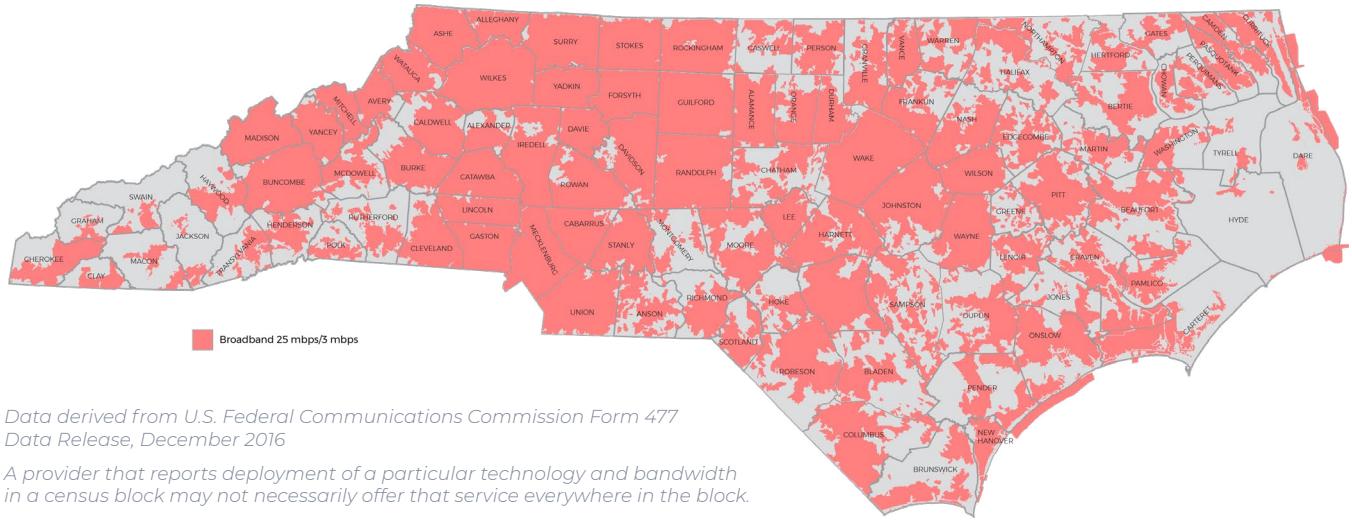
As speeds decrease, subscriptions increase. When considering all speeds, North Carolina's adoption rate of 81 percent outranks the United States average of 80 percent (American Community Survey, 2015).

See Figure 4, opposite page

Data on the availability and adoption of broadband form part of the picture of where the Homework Gap exists, who it impacts, and what causes it. However, because broadband availability data are overstated, adoption data are only granular to the county level, and neither dataset systematically studies how households with school-age children are impacted, the partners determined a systematic study of the Homework Gap in North Carolina was needed.

FIGURE 2

Broadband Availability: Advertised Speeds of at least 25 MBPS Download/3 MBPs Upload



Data derived from U.S. Federal Communications Commission Form 477 Data Release, December 2016

A provider that reports deployment of a particular technology and bandwidth in a census block may not necessarily offer that service everywhere in the block.

FIGURE 3

Broadband Adoption: Broadband Adoption Rates at all Speeds, 2015

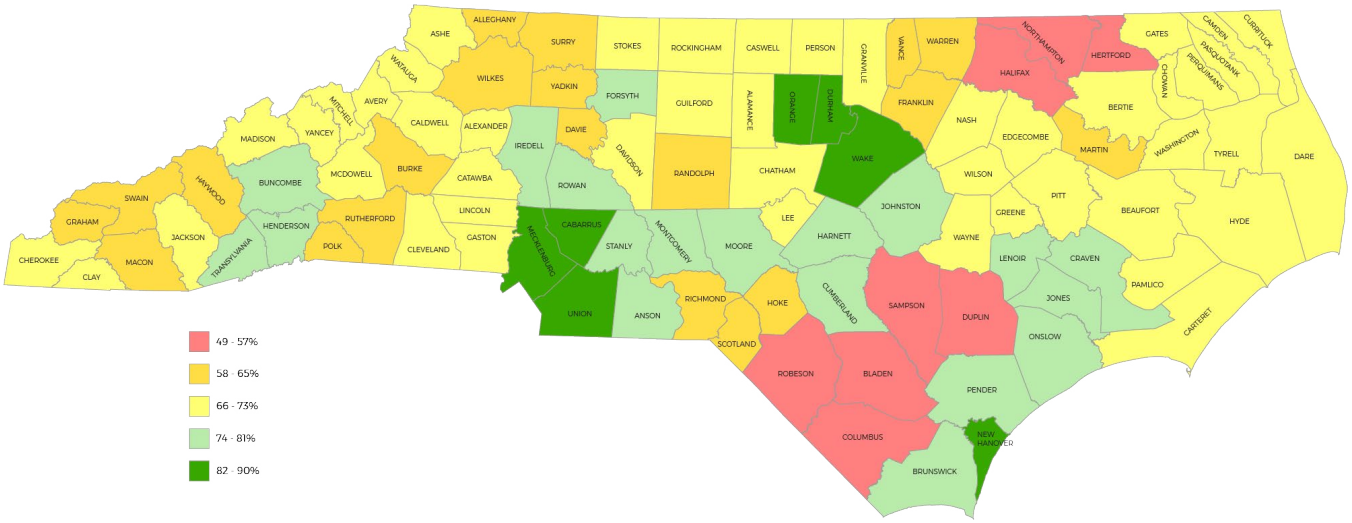
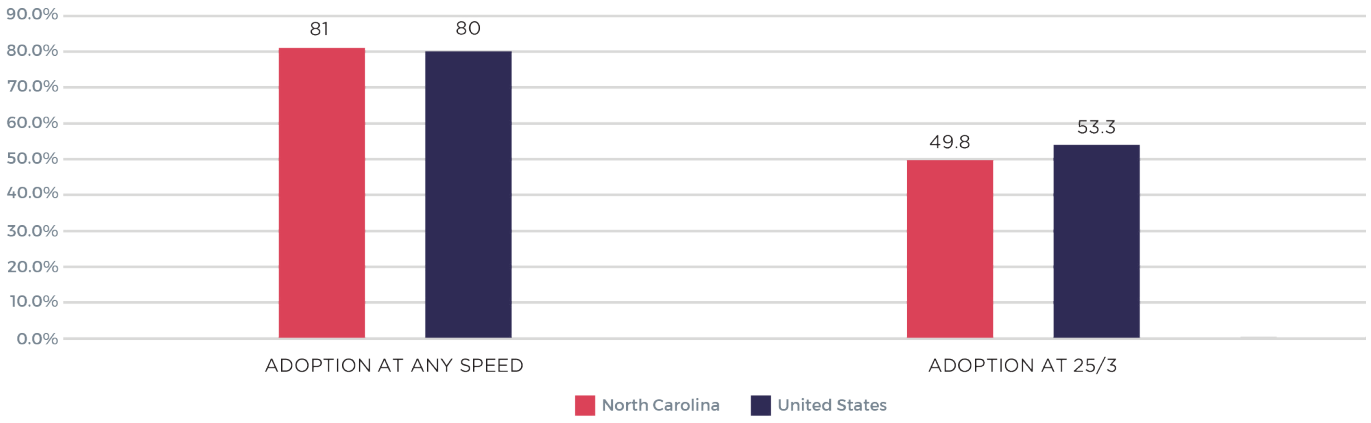


FIGURE 4

Broadband Adoption Rate: North Carolina v. United States, 2016



Developing the Pilot Survey

RESEARCH PURPOSES:

1. **To understand the scope of the Homework Gap in North Carolina's Legislative Education Authorities (LEA's)**
2. **To better understand the barriers to students' access to internet and their use of it for homework and school activities**

Without national or state datasets to measure the Homework Gap quantitatively, the researchers developed a mixed-method survey to measure its size, scope, causes, and impacts. The researchers identified two primary purposes:

① To understand the scope of the Homework Gap in North Carolina's Legislative Education Authorities (LEAs)

② To better understand the barriers to students' access to internet and their use of it for homework and school activities

Given the Homework Gap's close relation to broadband adoption, the researchers began the survey development process by compiling a list of relevant questions from surveys previously administered by broadband and education researchers such as BIO (and its predecessors, NC Broadband and eNC Authority) the Pew Research Center, CoSN, the Census Bureau and SpeakUp!. From this list, the researchers selected the questions that best matched the research's purpose.

The researchers then modified and adapted the questions from previous research to ensure each question served the research goals. Additional questions were added to achieve the research goals. The researchers also consulted with subject matter experts on final format and design. The final survey was a mix of 17 quantitative and qualitative questions, including demographic questions. It was also translated into Spanish to reach more households. The survey was primarily administered online, however some districts and partners distributed and collected printed copies of the survey.

The target survey population for the survey was all North Carolina households with school-age children (K-12). Given the pilot nature of the study, the time restraints, and the limited budget, researchers were unable to survey the entire target population. Instead, the researchers employed a nonprobability volunteer sample strategy. This strategy consisted of partnering with several organizations that interact with K-12 households to highlight the survey in their communication with them or to distribute the survey to them directly (see Appendix F for full list of partners). Online and paper versions of both the English and Spanish versions of the survey were provided. The primary mode of distribution was online; however, partners were provided with a printable version to print and distribute if they chose. The researchers provided partners with a packet of prepared and customizable information to use to distribute the survey (see Appendices B-D). Most partners distributed online, however, several individual schools and at least one entire district printed the survey to distribute to students.

Through DPI, the researchers asked North Carolina's 115 school districts to distribute the survey to their student population. Similarly, the State Librarian's Office informed all the state's libraries of the survey, some of whom printed the survey for patrons to complete while visiting the library. To test the process of distributing paper surveys, BIO printed and distributed paper copies of the survey to one elementary school in Durham. All print surveys from the test school and all other locations were delivered to BIO who recorded the data for analysis. Data from the paper surveys was flagged when entered to allow for comparative analysis to surveys completed online.

The survey was open for nearly two months. Initially slated to be open for six weeks, from March 15, 2017, to May 1, 2017. The researchers extended the time to May 12, 2017 to allow for the collection of paper versions of the survey from partners.

LIMITATIONS

Methodological limitations include the unforeseen limitations of the survey logic in the online version, the structure of responses provided for one or two survey questions, and the inherent limitations of reaching an accurate population sample when the primary distribution method is online.

Due to the limitations resulting from the distribution methodology, the sampled population did not represent the average North Carolinian. As such, the survey results are not generalizable, nor can they be used to estimate a definitive number of North Carolinian households impacted by the Homework Gap. However, given the results' similarity to previous adoption studies, the results reliably report the barriers to internet access that impact K-12 households and how a lack of access impacts their and their children's usage of the internet as well as their own comfort using the internet.

The pilot study, and lessons learned in its distribution, will inform future research efforts.

Survey Analysis

From the primary research questions, the researchers compiled a list of questions designed to provide a framework for analysis and a deeper understanding of the responses. In addition to summary statistics compiled for each survey question, statistical tests were performed. The following section contains the major findings from the analysis. The full analysis is found in Appendix E.

ABOUT THE RESPONDENTS

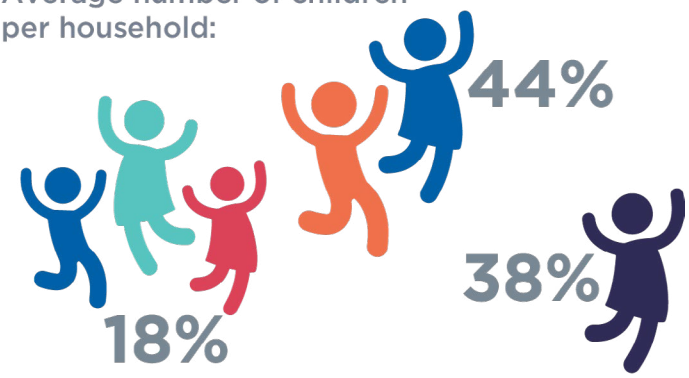
The survey was completed by 9,490 participants. Of the total participants, 8,485 completed the survey in full and were included in analysis. Of the 8,485, 752 participants completed a paper version of the survey while 7,733 participants completed the survey online. The number of responses (N) varies from question to question, but for most questions at least 7,000 respondents completed the question and are included in the analysis.

RESPONDENTS BY THE NUMBERS

Total Survey Participants	9,490
Usable Results	8,485
Completed Online	7,733
Completed on Paper	752

Mothers or female guardians primarily completed the survey on behalf of their households — 82.85 percent of respondents were female, and 16.67 percent were male. Respondent's children overwhelmingly attended North Carolina's public schools — 96.98 percent reported that their children attend public schools.

Average number of children per household:



The respondent's household size varied — 38 percent of respondents had one child, 44 percent of respondents had 2 children, and 18 percent had three. Most respondents were white, with 79.88 percent of respondents selecting "white" as their race/ethnicity. As table 1 (below) shows, respondents who reporting being Black/African American made up 9.61 percent of the responses and were the second-largest population represented.

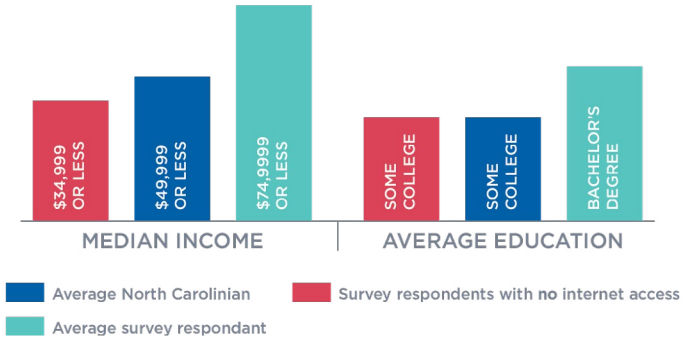
TABLE 01
Respondents by Race/Ethnicity

RESPONSE	#	%
Asian/Pacific Islander	112	1.41
Black/African American	761	9.61
Hispanic/Latino	411	5.19
Native American/American Indian	152	1.92
White	6,324	79.88
Other	157	1.98

On average, respondents reported a higher level of household income than the average household in North Carolina. The median income level for respondents was $74,999, whereas the state's median income level is $49,999.

Respondents also reported higher levels of educational attainment than the average North Carolinian. The average survey respondent's educational attainment level was 'Bachelor's Degree' while the average North Carolinian has completed "some college" according to data from the American Community Survey (ACS, 2017).

Demographics of households surveyed:



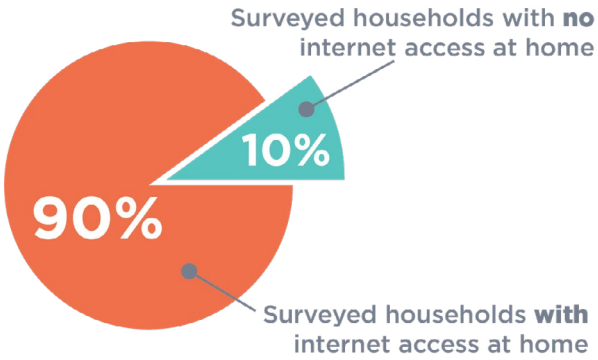
At least one household participated from 99 of North Carolina's 100 counties. Some school districts and schools promoted the survey more heavily than others, so some regions were disproportionately represented in the sample population. Of the 9,490 total respondents who completed the survey, 110 completed the Spanish version of the survey.

See Figure 5, page 16

Major Findings

The survey analysis unearthed seven major findings that address the primary research purposes: to better understand the scope of the Homework Gap in North Carolina's 115 school districts, and to better understand the barriers to students' access to the internet and their use of it for homework and school activities.

FINDING 1
10 percent of respondents reported not having broadband access at home.



Contrary to the researcher's hypothesis, people who completed the survey online as opposed to the paper version did not differ in the extent to which they reported having internet access in their homes as seen in Table 1. However, due to the survey's limitations caused by sampling method, this figure of 10 percent is not generalizable to the state as whole. Meaning, the statewide percent of K-12 households who lack access to broadband is still unknown.

However, this finding does not significantly differ from national and previous state estimates. Pew Internet estimated the Homework Gap affected roughly 17.5 percent of K-12 households in 2015. 2013 data from the North Carolina's Citizen's Survey indicated roughly 14 percent of North Carolina's K-12 households did not have broadband at home (Wilson, 2014). Thus, while further study is needed to determine the actual percent of North Carolina's K-12 households impacted by the Homework Gap, the difference between the survey's finding and the actual figure is likely not greater than 5 to 15 percentage points.

TABLE 02
Online v. Paper Survey Internet Access

	INTERNET ACCESS	NO INTERNET ACCESS
Online	89.3%	10.6%
Paper	89.1%	10.9%

The lack of access was dispersed relatively evenly across the state, and was present in both rural and urban areas.

See Figure 6, page 16

FINDING 2
Cost was the primary barrier to broadband access for respondents.

67% of those without internet access cite cost as the primary reason.

Of the 10 percent of respondents without access, 65.96 percent (n=799—or the majority of those without access) cited cost as the primary reason for not having internet in their homes.

This is like national data which show that cost and relevancy (a lack of understanding of how the internet impacts one's life) were the two primary reasons households with school-age children cited for not having access in 2015 (U.S. Department of Education, 2018). This was particularly true for those with low incomes (those making less than $34,999) — 76.2 percent of whom indicated cost was the primary barrier.

TABLE 03
Relationship Between Income Level and *'Too Expensive'* as Main Reason Respondent Does Not Have Broadband Home Access; N=777

	INTERNET ACCESS	NO INTERNET ACCESS
Low (Less Than $10,000 - $34,999)	23.8 %	76.2 %
Medium ($35,000 - $74,999)	43.4 %	56.6 %
High ($75,000 - $200,000+)	81.2 %	18.8 %

Lack of access to the service itself was the second most-frequent response with 23.27 percent of respondents citing "it is not available in my area" as a reason for not having access in their home. Respondents could choose multiple reasons.

Cost was also the primary barrier to device ownership. While just 36 respondents reported not owning a single digital device, 69.44 percent of them cited cost as the primary reason for not owning a device.

However, for high-income respondents without broadband access (those with annual incomes greater than $75,000), the primary reason they lacked broadband at home was because it was not available at their household. 71.9 percent of those without access who also had high incomes indicated that it was the main reason they lacked access.

TABLE 04
Relationship Between Income Level and *'Not Available'* as Main Reason Respondent Does Not Have Broadband Home Access; N=777

	IS **NOT** A MAIN REASON	**IS** A MAIN REASON
Low (Less Than $10,000 - $34,999)	87.4 %	12.6 %
Medium ($35,000 - $74,999)	59.8 %	40.2 %
High ($75,000 - $200,000+)	28.1 %	71.9 %

The response option, "Internet Too Slow" was the third-most frequent selection as a reason for not having home broadband access. However, as with the availability of the service itself, this response was more frequent among households with high incomes. 12.5 percent of high-income respondents indicated the speed of the service was their primary barrier, whereas 6.2 percent of low-income households selected the same option.

Other response options — ''Don't see the need for it," "My device does not connect," "I use the internet somewhere else," and "Concerns about online privacy," — did not significantly impact respondents access to broadband in their home.

TABLE 05
Relationship Between Respondents Without Access and Main Reason for Not Having Internet in their Home; N=937

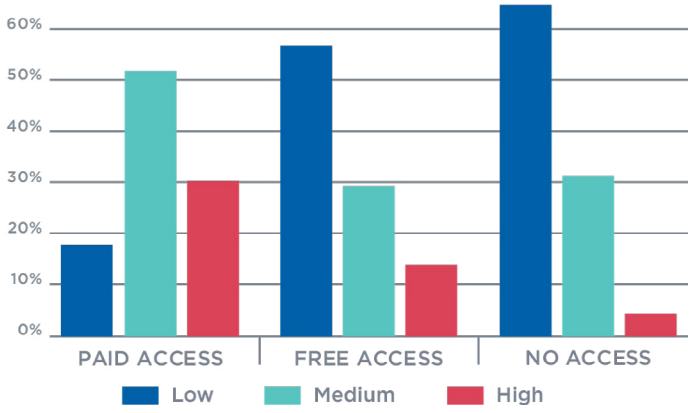
RESPONSE OPTION	**NOT** FOR THIS REASON	**FOR** THIS REASON
Don't see the need for it	96.37 %	3.63 %
Not available in my area	76.73 %	23.27 %
Internet too slow	91.36 %	8.64 %
My device does not connect	97.65 %	2.35 %
Too expensive	34.04 %	65.96 %
I use the internet somewhere else	92.85 %	7.15 %
Concerns about online privacy	97.23 %	2.77 %
Other	89.01 %	10.99 %

Mobile devices and smart phones were included as possible response options for the question that gauged device ownership. As such, many respondents had access to a mobile or smartphone only. However, the survey was constructed in such a way to prevent a calculation of the number of households with a mobile or smart phone only. Future research should separate mobile phone ownership from computer ownership to better understand the true nature of device ownership.

FINDING 3
The lower the respondent's income and education levels, the less likely they were to have broadband access at home.

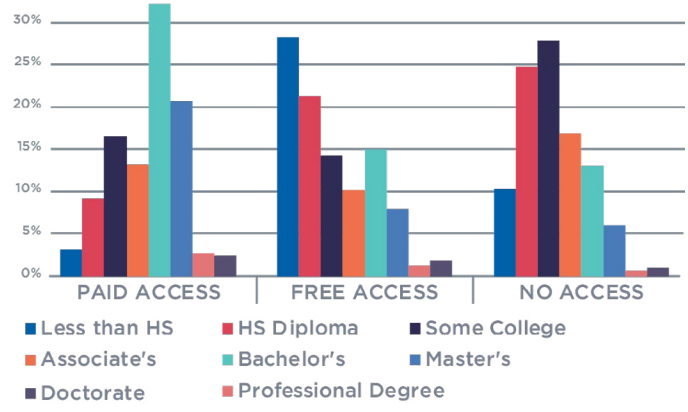
The data show that the higher a household's income, the more likely it was to have access to broadband, even free broadband. And the higher a person's income, the more likely they were to have broadband access. The median income bracket for respondents without access was $25,000-34,999 — 65 percent of those without access reported household incomes of $34,999 or less.

Percent of Respondents with and without Broadband by Income Level



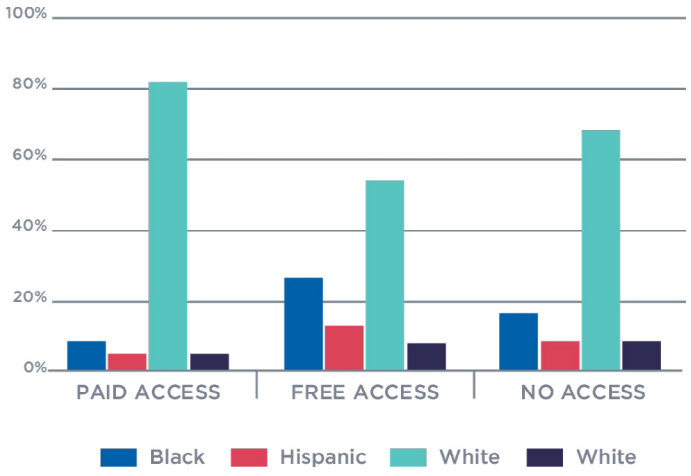
The same is true for educational attainment. The lower the household's educational level, the less likely it was to have access at home. Of those without access at home, 64 percent responded as having completed "Some College" or less. Those with access were more likely to have a bachelor's degree or higher than those without access.

Percent of Respondents with and without Broadband by Education Level



The relationship between race and/or ethnicity and broadband access was less clear. This is primarily due to the make-up of the respondents, which was predominantly white with 79.8 percent. However, national research shows that higher percentages of minority-led households lack access when compared to their white peers (Pew Research Center, 2015). To better understand the relationship between race/ethnicity and broadband access in North Carolina, further research is needed.

Percent of Respondents with and without Broadband by Race/Ethnicity:



FINDING 4

Most respondents without broadband access also do not own a desktop, laptop, or tablet.

78.9 percent of respondents without internet access do not own a desktop computer and 51.4 do not own a laptop computer. Meanwhile, only 9.3 percent of respondents with a paid subscription do not own a laptop computer. The ownership difference between those with and without broadband access is statistically significant for all three digital device types.

However, of the three device types, respondents without broadband access were most likely to own a tablet. 57.1 percent of respondents without access reported owning a tablet, while 48.6 percent reported owning laptops and 21.1 percent indicated they owned a desktop computer.

TABLE 06

Relationship Between at Home Access and Ownership of Tablet; N=8,257

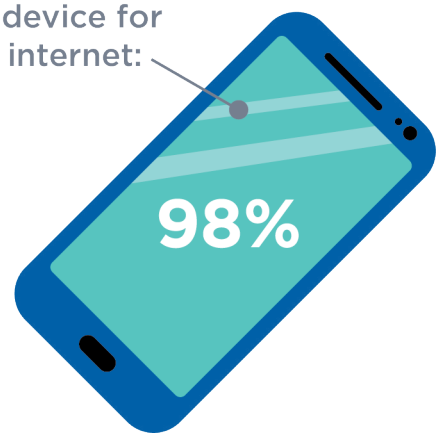
	DOES **NOT** OWN	OWNS
Paid Access	9.5 %	90.5 %
Free Access	28.3 %	71.7 %
No Access	42.9 %	57.1 %

Ownership of other types of internet-enabled devices such as smart TVs, streaming devices, and gaming systems was less frequent than desktop, laptop and tablet ownership among those with broadband access and without. However, those with access continued to own these devices at a greater rate than those without broadband access.

FINDING 5

Smart phone device ownership was nearly universal among respondents, but those without home broadband access were more likely to not own a smart phone.

Most popular device for accessing the internet:



The most popular device for accessing the internet among respondents was the smart phone. 98% (n=7,691) of households reported owning at least one smart phone.

TABLE 07

Relationship between Access at Home and Ownership of Smart Phone Devices; N=8,653

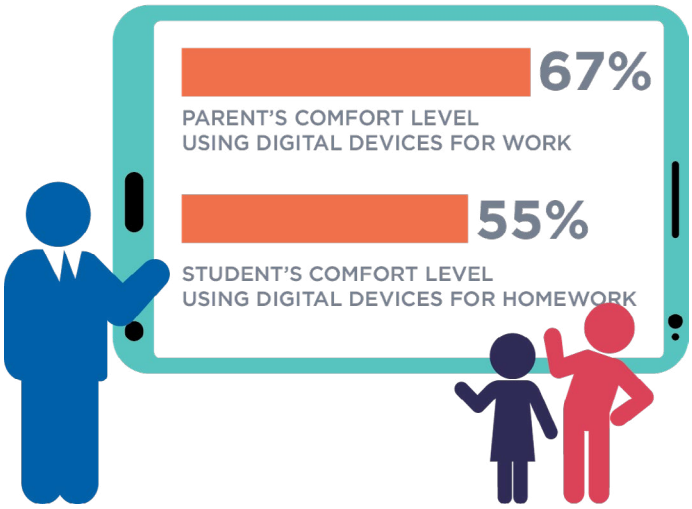
	0	1	2	3	4
Paid Access	1.8 %	10.4 %	34.7 %	27 %	26.2 %
Free Access	4.7 %	23 %	26.7 %	19.3 %	26.4 %
No Access	9 %	29.2 %	33.6 %	15.4 %	12.8 %

However, analysis demonstrated a statistically significant difference in the number of smart phones individuals reported owning based on their internet access at home. Those with home broadband access were more likely to own more smart phones. Those without access were more likely to own fewer smart phones or no smart phone at all. For instance, 9 percent of those without broadband access reported not owning a smart phone, while for those with access, just 1.8 percent reported not owning a smart phone.

FINDING 6

Households without broadband access were less comfortable in helping their children with schoolwork and completing other online tasks themselves.

"Very Comfortable" Respondents:



The difference in levels of comfort in assisting their children with online schoolwork between respondents with access and those without was statistically significant. In addition, there was a statistical difference between those with and without access and their level of comfort in using digital devices and the internet to complete each of the categories surveyed: online banking, completing work, online shopping, accessing personal information, job searching, and accessing entertainment. Meaning respondents with broadband access were more comfortable navigating and using digital devices than those without access at home.

TABLE 08

Level of Parent's Comfortability in Helping Children with Schoolwork by Access Level; N=7,995

	VERY UNCOMFORTABLE	SOMEWHAT UNCOMFORTABLE	SOMEWHAT COMFORTABLE	VERY COMFORTABLE
Paid Access	9 %	6.1 %	22.3 %	62.6 %
Free Access	13.9 %	7.4 %	29.2 %	49.5 %
No Access	16.5 %	11.3 %	28.1 %	44.1 %

FINDING 7

Students without broadband access at home use the internet most frequently in someone else's home.

To better understand where K-12 students complete homework that requires internet access, the survey asked parents to rate the frequency at which their children visited a variety of locations to complete homework requiring the internet. 'Someone Else's Home' was the most frequent response from all respondents and those without access. Of those without access, 45 percent reported accessing the internet in someone else's home at least once a week while 20 percent of the total respondents reported the same. Restaurants and libraries were equally popular (at 31 percent) among those without access while for the entire survey population restaurants (at 12 percent) outranked libraries (at 9 percent).

Respondents access the internet in these locations once a week or more often:

These results mirror national data which also identified "someone else's home" as the most popular place to access the internet outside of school (U.S. Department of Education, 2018). Public libraries outrank restaurants by 13 percentage points in the national data, however, indicating further study of North Carolina's most popular destinations is needed.

FIGURE 5
Count of Survey Participants by Zip Code

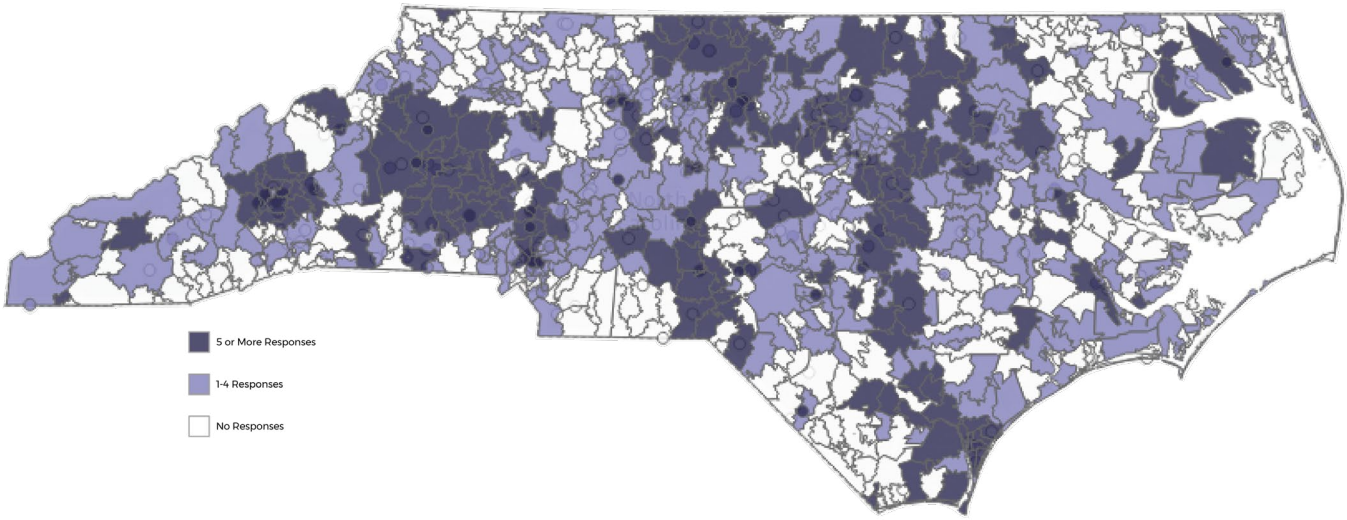
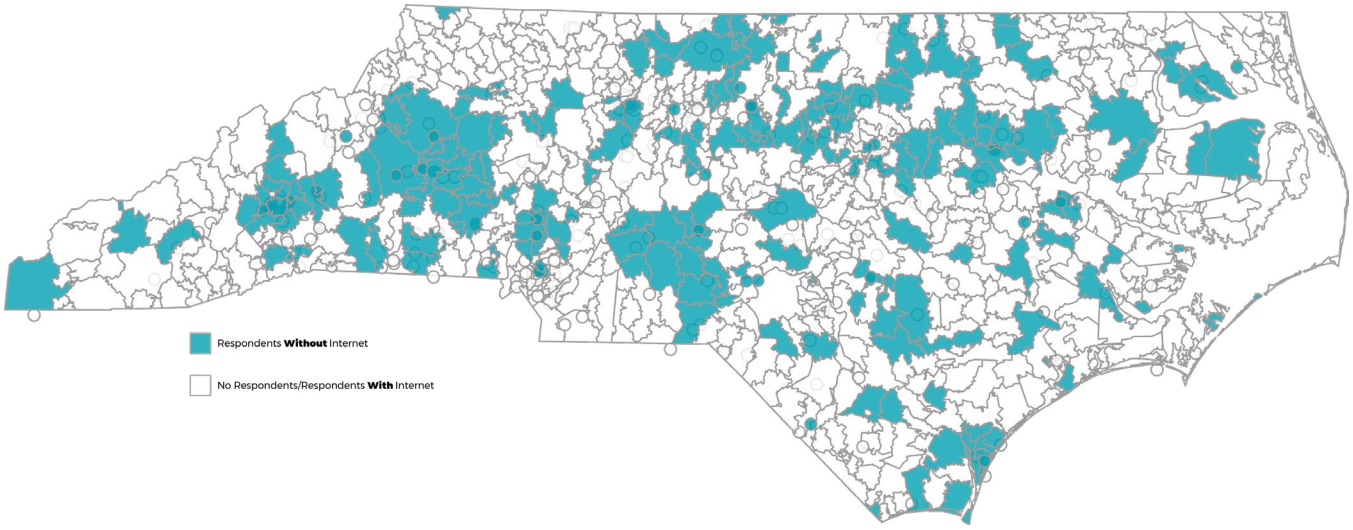


FIGURE 6
Count of Households Reporting They Do Not Have Home Access by Zip Code



The Homework Gap Convening Summary

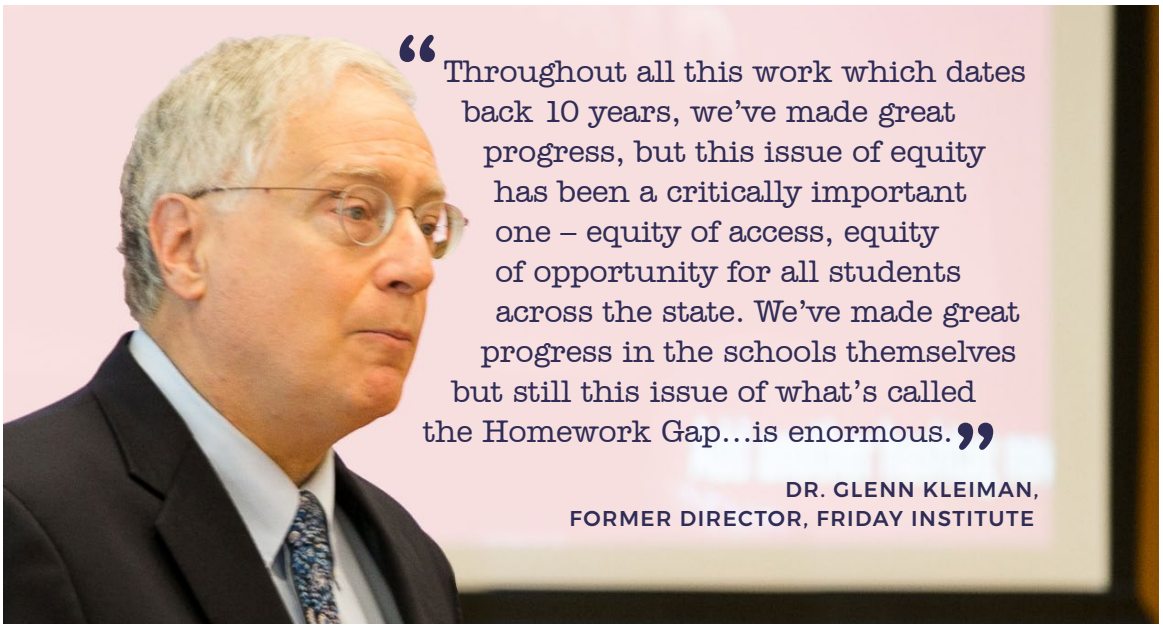
To continue conversations held during the 2016 “Digital Equity Convening,” reveal and discuss the preliminary data and findings from the survey, and engage stakeholders and subject matter experts in designing solutions to close the Homework Gap, the partner organizations hosted a convening called “The Homework Gap Convening” on September 13, 2017 at the Friday Institute. Representatives from local and state governments, institutes of higher education, private business, public organizations, and schools/districts assembled to engage in productive conversations about eradicating the Homework Gap.

The schedule for the day was intentional. Each session addressed eliminating the Homework Gap and provided opportunities for the participants to engage in meaningful discussion. The following sections of this paper will provide an overview of the day, including participants’ feedback during working groups and recommendations for addressing digital inequities in NC.

OPENING SESSION

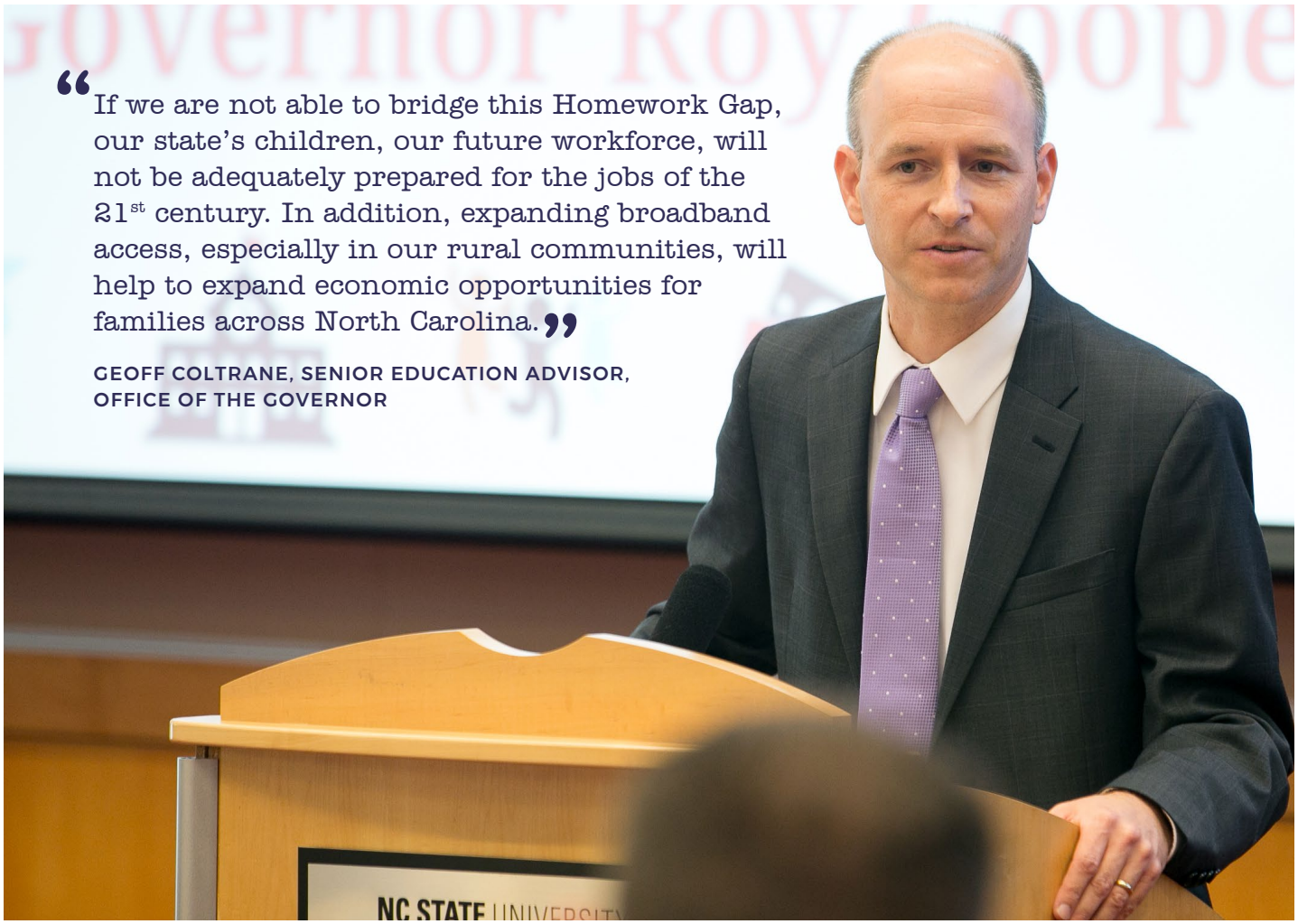
The Convening featured speakers from the partner organizations as well as Governor Roy Cooper’s Senior Education Advisor Geoff Coltrane, Department of Information Technology’s Secretary Eric Boyette, and a keynote address from FCC Commissioner Jessica Rosenworcel. Dr. Glenn Kleiman set the tone for the day with a welcome and a brief explanation of the importance of addressing digital inequities in North Carolina’s schools.

Kleiman then invited attendees to settle in for a day filled with the promise of making a difference in the lives of students. He closed by mentioning that the very solution to the Homework Gap could reside in the minds of the diverse crowd assembled for the convening. "This is a working session in which we plan to put you to work to get your best ideas."



Jeff Sural, BIO's Director, provided an overview of BIO and its interest in solving the Homework Gap. In addition, he provided a working definition for the Homework Gap that would be used throughout the day, "students who are assigned homework requiring access to the internet, but don't have home access."

Sural was followed by Coltrane, who brought remarks from the governor's office. Coltrane discussed Governor Cooper's Common Ground Solutions budget, which included $20 million to improve internet access and service to households and businesses in underserved areas of North Carolina. In conclusion, he shared the words of Governor Cooper:



Department of Information Technology Secretary Eric Boyette began his remarks by thanking the convening participants for their attendance and encouraged them to actively engage contacts in their sphere of influence to help reduce the Homework Gap. He lauded the progress made to connect North Carolina’s schools, but pointed to limited levels of access to devices and broadband connectivity as barriers to some students. He ended his remarks by asking participants to dig deep and help move the work forward in a meaningful manner.

HOMEWORK GAP SURVEY DATA PRESENTATION

Representatives from the BIO and the FIRE Group led the following session in which they reaffirmed the definition of the Homework Gap, provided context about the broadband challenges facing North Carolina, and provided an overview of the survey development process, survey administration, the analysis procedures, and the results. The presenters explained the impetus for the survey, the primary findings from the data, and lessons learned in conducting the survey. The data was provided to each participant in a visual report to refer to and use during the brainstorming sessions in the afternoon.

Federal Communication Commissioner Jessica Rosenworcel addresses a room of stakeholders at the Homework Gap Convening.

KEYNOTE ADDRESS: JESSICA ROSENWORCEL, FEDERAL COMMUNICATION COMMISSIONER

Federal Communication Commissioner Jessica Rosenworcel delivered an inspiring keynote address highlighting both the need for closing the Homework Gap and innovative solutions she’s witnessed across the country. She began by recounting how she first encountered the Homework Gap while visiting a middle school, and subsequently coined the term to describe the condition she witnessed when K-12 students are assigned homework that requires internet access, but don’t have access at home. She continued by sharing stories from across the country of how students “cobble together” access by using restaurants, late-night school access, and appealing to family and friends. She complemented the progress North Carolina has made toward narrowing the divide thus far and charged the state to continue refining existing programs and designing new mechanisms to support digital age learning and sustainable, comprehensive solutions for closing the Homework Gap.

> “A grant is a short-term band aid solution to a long-term problem. Eventually, the grants will run out. Eventually, it won’t serve what I need. I need long-term help from organizations bigger than school systems like county commissioners, state budgets, federal budgets that will give me the ability to put devices in the hands of the kids.”
>
> ROB DIETRICH, DIRECTOR OF TECHNOLOGY AND ACCOUNTABILITY, LEE COUNTY SCHOOLS

Panelists pictured from Left to Right, Beth Lancaster, Rob Dietrich, and Bruce Clark.

HOMEWORK GAP SOLUTIONS PANEL

A panel of local leaders from Charlotte, Lee County, and Montgomery County moderated by Phil Emer of the Friday Institute described their efforts to close the Homework Gap. With a mix of rural and urban participants, the panel presented strategies for addressing the Homework Gap for both types of communities.

Bruce Clark, Executive Director of Digital Charlotte, shared information about the implementation of a Sprint 1Million program in Charlotte-Mecklenburg schools that will provide 2,500 hotspots to high school students over five years. Rob Dietrich of Lee County described the partnership with UR Cast and U.S. Cellular to provide low-bandwidth hotspots and caching software through which students can download pages and information from the internet for the completion of homework before leaving school and upload it when they return. And Beth Lancaster of Montgomery County detailed their initiative to install Wi-Fi equipment on school buses with long commutes for students to complete homework while traveling to and from school.

When asked about how they could sustain and expand their efforts, the panelists cited the need for additional grants and engaging support from local elected officials like county commissioners. In addition, Dietrich noted the need for sustainable funding to comprehensively address the Homework Gap in his district and statewide.

Themes, ideas and recommendations for stakeholders considering implementing programs to close the Homework Gap from local expert’s panel:

- **The importance of identifying service providers with which to partner**
- **Map broadband availability data to visualize access availability and gaps**
- **Consider implementing technologies to help bypass a lack of access at home like caching software**
- **Negotiate with broadband service providers to ensure affordability**
- **Consider leveraging programs like E2D’s ReImage CLT program where students refurbish devices**
- **Clearly articulate definition of access at beginning of initiatives**
- **Determine sustainability plans at beginning of projects so initiatives can be sustained beyond life of grant programs**
- **Find advocates for additional funding from local, state, and federal elected leaders**
- **Release state surplus devices to nonprofit technology refurbishers dedicated to closing the digital divide.**

Convening attendees participate in a brainstorming activity in their breakout session.

SOLUTION DESIGN BREAKOUT GROUP SESSIONS

In the afternoon, participants divided into working groups discussing four areas:

1. Technology, Infrastructure, and Devices
2. Sustainability
3. Policy
4. Research and Data

A facilitator guided each group through conversations designed to both define the challenges associated with each topical area and develop thoughtful recommendations for practical next steps.

The concurrent sessions began with a brief introduction of the participants in which they provided their name, organizational affiliation, and their connection to or reason for interest in the Homework Gap. Next, a guiding question aligned to the session topic was posted to generate ideas. Each participant was given small slips of paper to record their answers. The responses were placed on the wall and grouped by similarities. Each participant then received three stickers to select the top three areas they would like to discuss.

Once the top three areas were identified, the group discussed in more detail those areas and produced a list of recommendations from each group discussion (see Appendix G for a full summary). Summaries of the discussions and recommendations from each group follow.

TECHNOLOGY, INFRASTRUCTURE AND DEVICES

The primary question the Technology, Infrastructure and Devices (Technology for short) breakout group was charged with addressing was, *"What technologies are needed to bridge the Homework Gap?"*

In addressing the guiding question, the Technology group's conversation centered around ideas for leveraging existing technologies and creating more efficient pathways to get those technologies into the K-12 schools. For example, much of the discussion centered on the inability of state government agencies to donate their devices to non-profit refurbishers due to barriers found in the state's statutes and administrative code. The group's discussion of this point, acknowledges that much of the technology students need to participate fully in and outside the classroom already exists, but is not always accessible to all populations. As such, the Technology group identified the following potential solutions:

- Determine a way to "unlock" the state surplus law (S.L. 2017-67) passed by the NCGA in the 2017-2018 Session
- Conduct a demand aggregation by school district to gather data on the number of K-12 students who lack devices at home
- Create a clearinghouse for information, resources, and best practices so each school district implementing device programs are not recreating the wheel

Additional recommendations included to continue working to ensure e-Rate modernizes and supports technology expansion in the schools, and to design a state initiative to fund the distribution of devices to students.

SUSTAINABILITY

The primary questions the Sustainability breakout group was charged with addressing was, *"What are some creative financing models for closing the Homework Gap?"* and *"What are the best ways to sustain those models?"*

The Sustainability breakout group discuss how to design sustainable solutions.

The group's discussion centered around four types of organizations that can all impact the sustainability of Homework Gap solutions: State government, Local

government, school districts, and private entities. Potential solutions the Sustainability working group compiled based on the discussion follow:

- **All levels of government**
  - Develop public-private partnerships with entities such as banks, churches, local governments, and state government to address all the factors contributing to the Homework Gap.
- **State government**
  - Reduce costs of wireless service to mobile hotspots to check out to students by using a state-level agency contract to negotiate lower costs for all school districts, just as DPI does for instructional resources (textbooks).
  - The NCGA should create line items that require funds previously dedicated to funding textbooks be used to provide devices or broadband connectivity for students without home access.
- **Local government and school districts**
  - Engage in open conversations with service carriers about allowing them to put cell towers on district properties on a lease.
  - Consider making same option available to nonprofit organizations.

Additional suggestions included encouraging teachers to not assign homework that requires internet access, and a suggestion that the state dedicate funds garnered from the North Carolina Education Lottery to purchase devices and hotspots or other forms of access for students.

POLICY

Participants of the Policy breakout group focused on the question, *"What policy changes are needed at the local, state, and federal level to bridge the Homework Gap?"*

The group spent most of the allotted time discussing state-level challenges and opportunities for modifying existing or designing new state policies to address the primary causes of the Homework Gap. Four potential solutions the group discussed follow:

- Modify existing federal and state laws to allow surplus government computers to be donated to non-profit computer refurbishers dedicated to ending the digital divide. With the additional supply of computers from state agencies, the non-profit refurbishers can scale their current operations to deliver more low-cost computers to households without computers across the state.
- Compile best practices and provide examples of opportunities municipal and county governments can engage in to improve broadband access in their communities within the confines of the current laws.
- The NCGA should clarify S.L. 2011-84 to provide guidance for municipalities who desire to engage in improving broadband access in their communities but are unsure how to do so within the confines of the current law.
- The NCGA should fund and create a state grant program designed to make high-cost rural areas more economical for private providers to deploy service to unserved areas.

RESEARCH AND DATA

The Research and Data working group focused on the guiding question, *"How can we improve upon the pilot research, data collection, and analysis?"* The group spent time considering the various challenges of issuing a statewide survey. For instance, a member of the research team described the inherent costs and challenges of distributing and collecting paper versions of the survey. The group also discussed various ways to improve the survey distribution and collection process to increase the response rate and improve the understanding of the Homework Gap. The potential solutions the Research and Data group devised follow:

- Improve the survey's data collection to ensure there is a wider response from more diverse participants.
- Target distribution to rural and high-need poverty areas as households in those areas are more likely to fall into the Homework Gap.
- Shorten the survey to prevent survey fatigue and increase the full response rate.
- Use data analytics of data from other sources to provide supplemental data to form a more complete view of the Homework Gap. For example, analysis of each student's use of school-purchased education software at home after-school hours could both determine usage trends and be used as a proxy for connectivity.

Closing the Gap: Recommendations to Close North Carolina's Homework Gap

When combined, the survey's findings and the potential solutions supplied by the convening's breakout groups result in six recommendations for policymakers, state leaders, and stakeholders to undertake to close the Homework Gap in North Carolina. The recommendations follow:

① The State should dedicate funding to establish a grant program housed in NC BIO to close the Homework Gap.

The State should establish a one-year pilot grant program with the intention of creating a five-year program, or until state-wide universal access is established, to provide grant funding for mobile hotspot devices or Wi-Fi for school buses for students without internet service, due to access or affordability, at home.

While further research is needed to understand the full scope of North Carolina's Homework Gap, action to close the gap cannot be postponed for the K-12 students who currently fall into the Homework Gap. To date, numerous individual schools and school districts across the state and nation have completed successful pilot programs to close the Homework Gap in their districts. Given the urgency of the need, North Carolina should dedicate funding to enact a time-limited grant program through which LEAs can leverage state funding to develop or scale Homework Gap solutions in their districts.

The grant program should be managed by BIO with expertise provided from partners like DPI and the Friday Institute. The grant will enable LEAs to apply for grant funds from NCDIT to purchase 1) mobile hotspots devices, 2) service for the hotspots and, if eligible 3) equipment and mobile service to provide Wi-Fi on school buses.

Given that homework requiring internet access is regularly assigned across all grade levels in North Carolina (New Teacher Center, 2018), the grant program should serve grades 3 through 12 at minimum. However, since more high school students are assigned homework requiring internet access than middle and elementary students, the grant program should serve high school students the first year and expand to serve lower grade levels in subsequent years.

② The State should pursue the implementation of policies and programs that increase the availability, adoption, and use of broadband.

Due to the interconnected nature of the factors that contribute to a lack of broadband access and adoption and those that cause the Homework Gap, policies and programs that increase broadband access, adoption and use will also contribute to a sustainable solution for closing the Homework Gap. Policies and programs directed towards improving both the availability of broadband and its adoption should be pursued. This includes policies and programs that address the digital divide and digital equity issues.

For example, the North Carolina General Assembly's recent establishment of the Growing Rural Economies with Access to Technology (GREAT) Program designed to facilitate the increased deployment of broadband to unserved areas will contribute to closing the Homework Gap if access is expanded to areas in which K-12 households live where it was previously unavailable (S.L.2018-5).

Other policies to consider are increasing access to affordable devices by allowing state surplus computers to be donated to non-profit refurbishers dedicated to ending the digital divide, programs that increase digital literacy skill class offerings across the state, and implementing dig-once and one-touch policies. Additional policy and program recommendations are found in the State Broadband Plan.

③ The State should foster cross-sector collaborations and public-private partnerships to implement and sustain multi-faceted solutions.

The Homework Gap is a multi-faceted challenge and will require collaboration between a host of partners and stakeholders to solve. Building upon the work of the Convening, the State should engage and convene stakeholders from both the public and private sector to design and implement innovative, sustainable solutions.

Any measure addressing the Homework Gap should take into consideration all its causes. The survey results confirm that the cost of service, the cost and access to devices, and access to the service itself can all inhibit K-12 households from adopting broadband in their homes. In addition, the lack of access at home is intricately bound with the household's ability to effectively utilize the technology to participate in the online activities that define the 21st century. As such, Homework Gap solutions should be designed to address each of these barriers and utilize the subject matter expertise of a range of organizations and partners.

④ The State should continue to study the Homework Gap.

While the survey provided valuable information about North Carolina's Homework Gap, further study is required to understand its full size, scope and the degree to which each factor contributing to it affects North Carolinians. Thus, the BIO and partners should continue collaborative efforts to survey the K-12 population to measure the Homework Gap, its causes, and its effects.

To continue studying the Homework Gap, dedicated, sustainable funding and continued and expanded partnerships with education-focused organizations, school districts and individual schools will be required. Research and data analysis support from partners like the Friday Institute will also be necessary. The BIO and partners should also investigate alternative and cost-effective ways through which the survey can be administered. Incorporating the survey into existing surveys administered to K-12 populations could prove an effective method of continuing the research in the future.

⑤ North Carolina's local governments and LEAs should continue to innovate and partner with the State to close the Homework Gap.

Many of the most innovative solutions to closing the Homework Gap have been designed by those closest to the population affected by the Homework Gap — local governments and local school districts. As the experts on the Local Solutions panel at the Homework Gap Convening demonstrated, closing the Homework Gap requires innovation and a unique understanding of the community's population. In addition, North Carolina's local governments and school districts understand the unique needs of their constituents and citizens. They should continue innovating and testing new solutions and partner with the State to implement best practices.

⑥ The survey instrument and its distribution should be modified to garner more reliable results.

Despite numerous rounds of edits and pre-testing the survey, the survey deployment revealed flaws in the instrument design. For example, the online version of the survey did not allow respondents to answer why they did not have broadband service at home if they had first selected that they had mobile service. Given the intrinsic difference and capabilities of mobile vs. wireline service, questions investigating respondent's subscription to these two types of broadband service should be separated in the future.

In addition, the methods used to distribute the survey were unable to capture a true representation of North Carolina's demographics. Future survey distributions should devise a method by which to reach a more representative sample of North Carolina's population.

Conclusion

The North Carolina's State Board of Education has six primary goals stated on its website. The first is that "every student in the NC Public School System graduates from high school prepared for work, further education and citizenship." Many factors may impact the State education system's ability to reach this goal, among them is an inequity of access to the opportunities and resources the internet provides. ***Should the Homework Gap not be addressed in a systematic, comprehensive way, it will continue to grow.*** If its growth continues unhampered, an increasing number of students impacted by it will not be prepared for the work of the 21st century. Neither will they be adequately prepared to thrive in continuing education environments, or contribute to the well-being of their local, national, and global communities.

As previously noted, the Homework Gap is a solvable issue. Both research and the implementation of innovative pilot programs across the state have proven that if strategic, holistic solutions are implemented, the Homework Gap can be closed. North Carolina has a long history of solving seemingly intractable issues. Through dedicated, strategic partnerships between the General Assembly, multiple Governors and subject matter experts like the Friday Institute, North Carolina led the country in ensuring every school house in North Carolina has access to high-speed broadband. Should a similar partnership and dedicated effort to close the Homework Gap be undertaken, North Carolina could again make history and be the first state to close the Homework Gap for all its citizens.

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Appendices

APPENDIX A

Letter Accompanying Survey for Parents

Form Email to Parents Asking Them to Participate in the Homework Gap Survey

Instructions: You may use this stock email to contact your participants. Insert your organization's information into highlighted sections.

Dear Parents,

Nationally, 7 in 10 teachers assign homework that requires internet access. But an estimated five million households with school-age children do not have internet access at home. Students that fall into this "homework gap"—households where internet access is limited or unavailable—lag behind in education and are less competitive in the workforce.

But as a parent of children in North Carolina's K-12 schools you already know what happens when your children and/or their classmates can't meaningfully access the internet.

Many of you spend hours each week driving your children to a nearby McDonalds or Starbucks to use their Wi-Fi because internet is not available to your house or it's too expensive. Or trek to the local library multiple times a week so your kids can use the computers because your digital device is broken, being used by one of your other children, or you don't have one at home because buying one doesn't fit in your budget.

The State of North Carolina wants to help ensure no child in the K-12 schools falls into the homework gap. But to do so, the State needs to know how widespread the homework gap is and potential challenges students face in accessing digital resources.

To identify this data, our partners, the Broadband Infrastructure Office and the Friday Institute, are conducting a survey of North Carolina households with K-12 students. We would like to encourage you to take the survey so policy makers and education stakeholders can design solutions to this issue.

The anonymous, short survey is available in English and Spanish and can be found here K-12 Internet Access at Home Survey (Encuesta de Accesso a Internet K-12 en el Hogar) or at below link. It remains open until April 30, 2017.

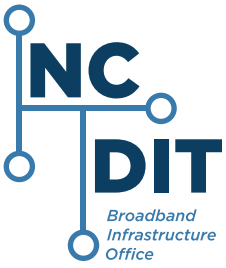
Should you have any questions, concerns, or feedback, you can reach out to the Broadband Infrastructure Office directly at: broadband@nc.gov or (919) 754-6695.

Thank you for your continued support of [INSERT YOUR ORGANIZATION'S NAME HERE], we appreciate all you do.

Sincerely,

[INSERT YOUR NAME HERE]

Survey Link: http://bit.ly/k12hwgap



APPENDIX B

Sample Homework Gap Blog or Newsletter Post

Nationally, 7 in 10 teachers assign homework that requires internet access. But an estimated five million households with school-age children do not have internet access at home. Students that fall into this "homework gap"—households where internet access is limited or unavailable—lag behind in education and are less competitive in the workforce.

But if you're a parent with children in North Carolina's K-12 schools you already know what happens when your children and/or their classmates can't meaningfully access the internet.

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Survey Link: http://bit.ly/k12hwgap

APPENDIX C

K-12 Internet Access At Home Survey

K-12 INTERNET ACCESS AT HOME SURVEY

This survey is for North Carolina parents/guardians of students in grades K-12. The purpose of the survey is to determine how access to the internet outside of school impacts NC's K-12 students' ability to complete homework.

Results will be used to inform further research and policy suggestions for assisting households and communities where internet access is unavailable or inadequate.

Your responses are anonymous and you are free to decline participation at any time. The survey will take 5–10 minutes to complete.

Thank you in advance for your participation. Your input will help inform the State as we work to increase internet access throughout the state.

Should you have any questions or concerns please contact the Broadband Infrastructure Office: email: broadband@nc.gov | phone: (919) 754-6695.

NC DIT Broadband Infrastructure Office
NORTH CAROLINA DEPARTMENT OF INFORMATION TECHNOLOGY

Broadband Infrastructure Office, North Carolina Department of Information Technology

broadband@nc.gov | 919 754 6695

APPENDIX C

Accesso A Internet K-12 En El Hogar

ACCESO A INTERNET K-12 EN EL HOGAR

Esta encuesta es para los padres/guardianes de estudiantes en los grados K-12 de Carolina del Norte. El propósito de la encuesta es determinar cómo el acceso a Internet fuera de la escuela que afecta la habilidad de los estudiantes de K-12 de NC para completar la tarea.

Los resultados se utilizarán para informar más investigaciones y sugerencias de políticas para ayudar a hogares y comunidades donde el acceso a Internet no está disponible o es inadecuado.

Sus respuestas son anónimas y usted es libre de rechazar la participación en cualquier momento. La encuesta tomará 5-10 minutos para completar.

Gracias por tu participación por adelantado. Su contribución ayudará a informar al Estado como mientras trabajamos para aumentar el acceso a Internet en todo el estado.

Si tiene algunas preguntas o inquietudes, comuníquese con la oficina de la Oficina de Infraestructura de Banda Ancha:
Correo electrónico: broadband@nc.gov | teléfono: (919) 754-6695

NC DIT Broadband Infrastructure Office
NORTH CAROLINA DEPARTMENT OF INFORMATION TECHNOLOGY

Broadband Infrastructure Office, North Carolina Department of Information Technology
broadband@nc.gov | 919 754 6695

QUESTION 1

Do you currently have internet access at home?

- ☐ Yes, I pay a monthly subscription for internet.
- ☐ Yes, I have access but do not pay for a subscription.
- ☐ No, I do not have access.

If you answered "No" to question 1, please proceed to question 3.

QUESTION 2

How do you access the internet at home?

Check all that apply.

- ☐ Cellular data plan (e.g., Verizon, Sprint, etc.)
- ☐ Digital Subscriber Line (DSL) (e.g., CenturyLink, Frontier, etc.)
- ☐ Cable modem (e.g., Time Warner, etc.)
- ☐ Fiber-Optic (e.g., AT&T U-verse, etc.)
- ☐ Satellite Internet Service (HughesNet, etc.)
- ☐ Dial-up
- ☐ Not Sure

QUESTION 3

What is the main reason you DO NOT CURRENTLY HAVE internet access in your home?

- ☐ Don't see the need for it
- ☐ Not available in my area
- ☐ Internet too slow
- ☐ My device does not connect
- ☐ Too expensive
- ☐ I use the internet somewhere else
- ☐ Concerns about online privacy

Other *(please specify)* _____

PREGUNTA 1

¿Ud tiene acceso a internet en su hogar?

- ☐ Sí, pago una suscripción mensual por internet.
- ☐ Sí, tengo acceso pero no pago una suscripción.
- ☐ No, no tengo acceso.

Si respondió "No" a la pregunta 1, pase a la pregunta 3.

PREGUNTA 2

¿Cómo accede Ud. a Internet en su hogar?

Marque todas las que apliquen.

- ☐ Plan de datos móviles para un teléfono o dispositivo móvil (e.g., Verizon, Sprint, etc.)
- ☐ Línea de abonado digital (DSL) (e.g., CenturyLink, Frontier, etc.)
- ☐ Módem de cable (e.g., Time Warner. etc.)
- ☐ Fibra óptica (e.g., AT&T U-verse, etc.)
- ☐ Servicio de Internet por Satélite (HughesNet, etc.)
- ☐ Dial-up
- ☐ No estoy seguro

PREGUNTA 3

¿Cuál es la razón principal por la que actualmente no TIENE ACCESO a Internet en su casa?

- ☐ No le interesa
- ☐ Acceso a Internet no es disponible en mi área
- ☐ Internet es muy lento
- ☐ Mi dispositivo digital no se conecta al Internet
- ☐ Acceso a Internet en hogar es muy caro
- ☐ Yo uso el Internet en otros lugares
- ☐ Tengo preocupaciones sobre de la privacidad en línea
- ☐ Otros *(por favor especificar)* _____

DIGITAL DEVICE DEFINITION

A digital device is an electronic tool that can receive, store, process, or send digital information. The picture below provides examples of digital devices.

DEFINICIÓN DE DISPOSITIVO DIGITAL

Un dispositivo digital es un dispositivo electrónico que puede recibir, almacenar, procesar o enviar información digital. La siguiente imagen muestra ejemplos de dispositivos digitales.

QUESTION 4

How many of the following digital devices do you use in your home?

	0	1	2	3	4+
Smart phone	☐	☐	☐	☐	☐
Desktop	☐	☐	☐	☐	☐
Laptop	☐	☐	☐	☐	☐
Tablet/e-reader *(e.g., Kindle, Ipad, etc.)*	☐	☐	☐	☐	☐
Smart TV *(e.g., Android TV, Samsung Smart Hub, etc.)*	☐	☐	☐	☐	☐
Streaming Device *(e.g., Chromecast, Apple TV, etc.)*	☐	☐	☐	☐	☐
Gaming System *(e.g., XBOX, Playstation, Wii, etc.)*	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐

If you DID NOT answer "0" for all of the items in question 4, please proceed to question 6.

PREGUNTA 4

¿Cuántos de los siguientes dispositivos digitales usa en su hogar?

	0	1	2	3	4+
Teléfono inteligente	☐	☐	☐	☐	☐
Computadora de escritorio	☐	☐	☐	☐	☐
Laptop	☐	☐	☐	☐	☐
Tableta/lector digital *(e.g., Kindle, Ipad, etc.)*	☐	☐	☐	☐	☐
Televisión inteligente/Smart TV *(e.g., Android TV, Samsung Smart Hub, etc.)*	☐	☐	☐	☐	☐
Dispositivo de streaming *(e.g., Chromecast, Apple TV, etc.)*	☐	☐	☐	☐	☐
Videojuegos y Consolas *(e.g., XBOX, Playstation, Wii, etc.)*	☐	☐	☐	☐	☐
Otros	☐	☐	☐	☐	☐

Si NO respondió "0" para todos los elementos en pregunta 4, pase a pregunta 6.

QUESTION 5

What is the main reason you DO NOT CURRENTLY HAVE a digital device in your home?

- ☐ Don't see the need for it
- ☐ My current device(s) don't work
- ☐ Too expensive
- ☐ I use computer/devices somewhere else
- ☐ Too difficult to use
- ☐ Concerns about online privacy
- ☐ Other (Please Specify) _____

QUESTION 6

Thinking about your own use of digital devices, HOW COMFORTABLE ARE YOU with using them to do the following tasks:

	VERY UNCOMFORTABLE	SOMEWHAT UNCOMFORTABLE	NOT SURE	SOMEWHAT COMFORTABLE	VERY COMFORTABLE
Help my children with homework	☐	☐	☐	☐	☐
To pay bills	☐	☐	☐	☐	☐
Online banking	☐	☐	☐	☐	☐
For work	☐	☐	☐	☐	☐
To shop online	☐	☐	☐	☐	☐
To access personal information *(e.g., medical records, taxes, etc.)*	☐	☐	☐	☐	☐
Job search	☐	☐	☐	☐	☐
Entertainment *(e.g., watching movies, videos, listening to music, etc.)*	☐	☐	☐	☐	☐

QUESTION 7

Overall, HOW COMFORTABLE ARE YOUR CHILDREN with using a digital device for homework?

	VERY UNCOMFORTABLE	SOMEWHAT UNCOMFORTABLE	NOT SURE	SOMEWHAT COMFORTABLE	VERY COMFORTABLE
	☐	☐	☐	☐	☐

PREGUNTA 5

¿Cuál es la razón principal por la que Ud. ACTUALMENTE NO TIENE un dispositivo digital en su hogar?

- ☐ No le interesa
- ☐ Mis dispositivos actuales no funcionan
- ☐ Las computadoras y otros dispositivos digitales son muy caros
- ☐ Yo uso dispositivos digitales en otros lugares
- ☐ Son muy difíciles de usar
- ☐ Tengo preocupaciones sobre de la privacidad en línea
- ☐ Otro (Por favor especificar) _____

PREGUNTA 6

Pensando en su propio uso de dispositivos digitales, ¿QUÉ TAN FACIL CREE UD. que es usar un dispositivo digital al:

	TAN DIFICIL	ALGO DIFICIL	NO ESTOY SEGURO	ALGO FÁCIL	TAN FÁCIL
Ayudar a sus hijos con la tarea	☐	☐	☐	☐	☐
Pagar cuentas	☐	☐	☐	☐	☐
Banca en línea	☐	☐	☐	☐	☐
Para trabajo	☐	☐	☐	☐	☐
Comprar de productos en línea	☐	☐	☐	☐	☐
Accesar a información personal *(por ejemplo, registros médicos, impuestos, etc.)*	☐	☐	☐	☐	☐
Buscando trabajo	☐	☐	☐	☐	☐
Actividades sociales *(por ejemplo, ver películas o videos, escuchar música, etc.)*	☐	☐	☐	☐	☐

PREGUNTA 7

En general, ¿QUÉ TAN FACIL SON PARA SUS HIJOS el uso de un dispositivo digital para la tarea?

	TAN DIFICIL	ALGO DIFICIL	NO ESTOY SEGURO	ALGO FÁCIL	TAN FÁCIL
	☐	☐	☐	☐	☐

QUESTION 8

How often do YOUR CHILDREN use their digital device for homework?

DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	DOES NOT ACCESS	NOT SURE
☐	☐	☐	☐	☐	☐

QUESTION 9

How often do YOUR CHILDREN use the following places in your community to access free internet for completing homework?

	DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	DOES NOT ACCESS	NOT SURE
Public Library *(e.g., County, College/University)*	☐	☐	☐	☐	☐	☐
Restaurants *(e.g., Starbucks, McDonalds, etc.)*	☐	☐	☐	☐	☐	☐
Retailers *(e.g., Apple Store, Barnes & Noble, etc.)*	☐	☐	☐	☐	☐	☐
Other Public Institutions *(e.g., community center, park, museum, etc.)*	☐	☐	☐	☐	☐	☐
Someone else's home *(e.g., classmate, friend, family member, etc.)*	☐	☐	☐	☐	☐	☐
Other: _____ *(please specify)*	☐	☐	☐	☐	☐	☐

PREGUNTA 8

¿Con qué frecuencia SUS HIJOS usan un dispositivo digital para la tarea?

DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	DOES NOT ACCESS	NOT SURE
☐	☐	☐	☐	☐	☐

PREGUNTA 9

¿Con qué frecuencia usan SUS HIJOS los siguientes lugares en su comunidad para acceder a Internet gratis para completar la tarea?

	DIARIA MENTE	2-3 VECES POR SEMANA	UNA VEZ POR SEMANA	1-2 VECES POR MES	NO TIENE ACCESO	NO ESTOY SEGURO
Biblioteca Pública *(por ejemplo, Condado, Colegio/ Universidad)*	☐	☐	☐	☐	☐	☐
Restaurantes *(e.g., Starbucks, McDonalds, etc.)*	☐	☐	☐	☐	☐	☐
Minoristas *(e.g., Apple Store, Barnes & Noble, etc.)*	☐	☐	☐	☐	☐	☐
Otras instituciones públicas *(por ejemplo, centro comunitario, parque, museo, etc.)*	☐	☐	☐	☐	☐	☐
El hogar de otra persona *(por ejemplo, compañero, amigo, familiar, etc.)*	☐	☐	☐	☐	☐	☐
Otro: _____ *(por favor especificar)*	☐	☐	☐	☐	☐	☐

QUESTION 10

Some schools provide specific programs to support digital learning for students. These programs include digital device rentals from the school for students to use at home; or extended computer lab hours that allow students to use the computer lab before and after the school's regular hours. Do YOUR CHILDREN take advantage of any of the following resources?

	YES	NO	NOT SURE	NOT AVAILABLE AT SCHOOL
School-Provided Rental Digital Device *(e.g., laptop, tablet, hotspot, etc.)*	☐	☐	☐	☐
Extended-Day Computer Lab Internet Access *(e.g., before or after school programs)*	☐	☐	☐	☐
Other: _____ *(please specify)*	☐	☐	☐	☐

QUESTION 11

Please identify the number of children in K-12 that reside in your home:

	0	1	2	3	4+
Elementary School *(K-5th grade) or (K-6th grade)*	☐	☐	☐	☐	☐
Middle School/ Jr High *(6-8th grade) or (7-9th grade)*	☐	☐	☐	☐	☐
High School *(9-12th grade) or (10-12th grade)*	☐	☐	☐	☐	☐

QUESTION 12

What type of school(s) are your children currently enrolled in?

Check all that apply.

- ☐ Public School (Including Traditional, Charter, Early College, Magnet. etc.)
- ☐ Private School
- ☐ Other (Please Specify) _____

PREGUNTA 10

Algunas escuelas ofrecen programas específicos para apoyar el aprendizaje digital para los estudiantes. Estos programas incluyen dispositivos digitales de la escuela para que los estudiantes los usen su hogar; O horas extendidas del laboratorio de computadora que permiten a estudiantes utilizar el laboratorio de computadora antes y después de las horas regulares de la escuela. ¿Aprovechan SUS HIJOS de cualquiera de los siguientes recursos?

	SÍ	NO	NO ESTOY SEGURO	INDISPONIBLE EN LA ESCUELA
Dispositivo digital de alquiler proporcionado por la escuela *(e.g., laptop, tableta, punto de acceso, etc.)*	☐	☐	☐	☐
Laboratorio computación de día extendido Acceso a Internet *(por ejemplo, antes o después de los programas escolares)*	☐	☐	☐	☐
Otro: _____ *(por favor especificar)*	☐	☐	☐	☐

PREGUNTA 11

Por favor, identifique el número de hijos en K-12 que residen en su hogar:

	0	1	2	3	4+
Escuela Primaria *(grado K-5) o (grado K-6)*	☐	☐	☐	☐	☐
Escuela Intermedia/ Jr High *(grado 6-8) o (grado 7-9)*	☐	☐	☐	☐	☐
Escuela Secundaria *(grado 9-12) o (grado 10-12)*	☐	☐	☐	☐	☐

PREGUNTA 11

¿En qué tipo de escuela están sus hijos actualmente matriculados?

Marque todas las que apliquen.

- ☐ Escuela Pública (Incluyendo tradicional, Carta, Colegio Temprano, Magnet. Etc.)
- ☐ Escuela privada
- ☐ Otros (Por favor especificar) _____

QUESTION 13

Please select your county and write your zip code below.

Alamance	Chowan	Guilford	Mitchell	Rutherford
Alexander	Clay	Halifax	Montgomery	Sampson
Alleghany	Cleveland	Harnett	Moore	Scotland
Anson	Columbus	Haywood	Nash	Stanly
Ashe	Craven	Henderson	New Hanover	Stokes
Avery	Cumberland	Hertford	Northampton	Surry
Beaufort	Currituck	Hoke	Onslow	Swain
Bertie	Dare	Hyde	Orange	Transylvania
Bladen	Davidson	Iredell	Pamlico	Tyrrell
Brunswick	Davie	Jackson	Pasquotank	Union
Buncombe	Duplin	Johnston	Pender	Vance
Burke	Durham	Jones	Perquimans	Wake
Cabarrus	Edgecombe	Lee	Person	Warren
Caldwell	Forsyth	Lenoir	Pitt	Washington
Camden	Franklin	Lincoln	Polk	Watauga
Carteret	Gaston	Macon	Randolph	Wayne
Caswell	Gates	Madison	Richmond	Wilkes
Catawba	Graham	Martin	Robeson	Wilson
Chatham	Granville	McDowell	Rockingham	Yadkin
Cherokee	Greene	Mecklenburg	Rowan	Yancey

Zip: __ __ __ __ __

QUESTION 14

What is your sex?

- ☐ Female
- ☐ Male
- ☐ Other

QUESTION 15

What is your race/ethnicity?

select all that apply

- ☐ Asian/Pacific Islander
- ☐ Black/African American
- ☐ Hispanic/Latino
- ☐ Native American/American Indian
- ☐ White
- ☐ Other

PREGUNTA 12

Por favor seleccione su condado y escriba su código postal abajo.

Código Postal: __ __ __ __ __

PREGUNTA 14

¿Cuál es su sexo?

- ☐ Femenino
- ☐ Masculino
- ☐ Otros

PREGUNTA 15

Por favor especifique su origen étnico(raza):

seleccione todas las que apliquen

- ☐ Asia/Islas del Pacífico
- ☐ Negro/Afroamericano
- ☐ Hispano/Latino
- ☐ Nativo Americano/Indio Americano
- ☐ Blanco
- ☐ Otros

QUESTION 16

What is your household income?

- ☐ Less than $10,000
- ☐ $10,000 to $14,999
- ☐ $15,000 to $24,999
- ☐ $25,000 to $34,999
- ☐ $35,000 to $49,999
- ☐ $50,000 to $74,999
- ☐ $75,000 to $99,999
- ☐ $100,000 to $149,999
- ☐ $150,000 to $199,999
- ☐ $200,000 or more

QUESTION 17

What is your highest degree or level of school completed?

- ☐ Less than high school
- ☐ High school diploma *(or GED)*
- ☐ Some college
- ☐ Associate's degree *(e.g., AA, AS)*
- ☐ Bachelor's degree *(e.g., BA, BS)*
- ☐ Master's degree *(e.g., MA, MS, MBA, MEd)*
- ☐ Professional degree beyond a bachelor's degree *(e.g., MD, DDS, LLB, JD)*
- ☐ Doctorate degree *(e.g., PhD, EdD)*

PREGUNTA 16

Por favor, seleccione su rango de ingresos:

- ☐ Menos de $10,000
- ☐ $10,000 to $14,999
- ☐ $15,000 to $24,999
- ☐ $25,000 to $34,999
- ☐ $35,000 to $49,999
- ☐ $50,000 to $74,999
- ☐ $75,000 to $99,999
- ☐ $100,000 to $149,999
- ☐ $150,000 to $199,999
- ☐ $200,000 o más

PREGUNTA 17

¿Cuál es su grado más alto o nivel de escuela completado?

- ☐ Menos que escuela secundaria
- ☐ Diploma de escuela secundaria *(o GED)*
- ☐ Alguna colegio
- ☐ Grado de asociado *(e.g., AA, AS)*
- ☐ Licenciatura *(e.g., BA, BS)*
- ☐ Máster *(e.g., MA, MS, MBA, MEd)*
- ☐ Título profesional más allá de una licenciatura *(e.g., MD, DDS, LLB, JD)*
- ☐ Doctorado *(e.g., PhD, EdD)*

APPENDIX D

Research Questions and Analysis

NOTE: research questions are numbered and in bold, analysis is labeled "Analysis"

RESEARCH QUESTION 1

Are the respondents representative of the NC K-12 school population as a whole (i.e., can we assume any lessons learned from the data apply to the state as a whole?)

No. For Demographic analysis see tables 65-67.

RESEARCH QUESTION 2

Was there statistically significant:

a. Difference in completed survey on paper vs. online and checked "No" to Question 1?

ANALYSIS

Dichotomized Question 1 into two groups, those with and those without internet access at home. Built a frequency table illustrating the extent to which people who completed the survey online differed from those who completed the survey on paper, with regard to their internet access at home.

TABLE 1
Online v. Paper Survey Internet Access

	INTERNET ACCESS	**NO** INTERNET ACCESS
Online	89.3%	10.6%
Paper	89.1%	10.9%

$\chi 2$ (1, N = 9064) = .032, p = .86. With Yates' continuity correction

$\chi 2$ (1, N = 9064) = .058, p = .81. Uncorrected

People who completed the survey online as opposed to on paper did not differ in the extent to which they reported having internet access or not in their homes.

b. Relationship between how people answered Question 1 and how they answered Question 4?

i. Internet access – number of each device (e.g, smart phone, desktop, laptop etc.) used in home. Question 4 scale: 0,1,2,3,4+

ANALYSIS

TABLE 2
Relationship Between Access at Home and Ownership of Smart Phone Devices; N=8,653

	0	1	2	3	4+
Paid Access	1.8 %	10.4 %	34.7 %	27 %	26.2 %
Free Access	4.7 %	23 %	26.7 %	19.3 %	26.4 %
No Access	9 %	29.2 %	33.6 %	15.4 %	12.8 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the number of smart phones individuals reported owning based on their internet access at home $\chi 2$ (2, N=8653) = 326.91, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant at each pairwise comparison (p<.001).

TABLE 3
Relationship Between Access at Home and Ownership of Desktop Devices; N=7,501

	0	1	2	3	4+
Paid Access	47.5 %	42.1 %	7.2 %	1.9 %	1.3 %
Free Access	56 %	33.7 %	4.8 %	4 %	1.6 %
No Access	78.9 %	19.1 %	0.7 %	0.7 %	0.7 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the number of desktops individuals reported owning based on their internet access at home $\chi 2$ (2, N = 7501) = 256.95, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-no access and paid access and no access comparisons (p<.001), and they were statistically significant in the free access-paid access comparison (p<.05).

TABLE 4

Relationship between Access at Home and Ownership of Laptop Devices; N=8,289

	0	1	2	3	4+
Paid Access	9.3 %	38.7 %	29.2 %	14.3 %	8.4 %
Free Access	19.8 %	41.8 %	20.5 %	9.9 %	8.1 %
No Access	51.4 %	35.4 %	8.7 %	3.2 %	1.3 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the number of laptops individuals reported owning based on their internet access at home $\chi 2$ (2, N = 8289) = 727.59, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant at each pairwise comparison (p<.001).

TABLE 5

Relationship Between Access at Home and Ownership of Tablet Devices; N=8,257

	0	1	2	3	4+
Paid Access	9.5 %	30.2 %	28.9 %	16.7 %	14.6 %
Free Access	28.3 %	33.5 %	19.9 %	7.7 %	10.7 %
No Access	42.9 %	30.6 %	16.1 %	6.6 %	3.8 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the number of tablets individuals reported owning based on their internet access at home $\chi 2$ (2, N = 8257) = 527.38, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant at each pairwise comparison (p<.001).

TABLE 6

Relationship Between Access at Home and Ownership of Smart TV Devices; N=7,675

	0	1	2	3	4+
Paid Access	37.2 %	34.2 %	16.7 %	6.6 %	5.3 %
Free Access	44.8 %	27.6 %	10.3 %	9.2 %	8 %
No Access	66.9 %	20.2 %	6.8 %	3.5 %	2.6 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the number of smart TVs individuals reported owning based on their internet access at home $\chi 2$ (2, N= 7675) = 218.20, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-no access comparison and the paid access-no access comparison (p<.001). However, there was not a significant difference in the number of smart TVs owned by individuals with paid internet access as opposed to individuals with free internet access (p=.28).

TABLE 7

Relationship Between Access at Home and Ownership of Streaming Device; N=7,218

	0	1	2	3	4+
Paid Access	48.1 %	30.5 %	13.1 %	4.5 %	3.7 %
Free Access	65.4 %	17.9 %	11 %	2 %	3.7 %
No Access	91.5 %	6.1 %	1.3 %	0.6 %	0.6 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the number of streaming devices individuals reported owning based on their internet access at home $\chi 2$ (2, N = 7218) = 461.94, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant at each pairwise comparison (p<.001).

TABLE 8

Relationship Between Access at Home and Ownership of Gaming Systems; N=7,974

	0	1	2	3	4+
Paid Access	22.5 %	44.4 %	20.7 %	7.4 %	4.9 %
Free Access	23.8 %	37.2 %	19.3 %	10 %	9.7 %
No Access	43.8 %	38.8 %	9.6 %	3.4 %	4.4 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the number of gaming systems individuals reported owning based on their internet access at home $\chi 2$ (2, N = 7974) = 165.77, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-no access comparison and the paid access-no access comparison (p<.001). However, there was not a significant difference in the number of smart TVs owned by individuals with paid internet access as opposed to individuals with free internet access (p=.17).

TABLE 9

Relationship Between Access At Home and Ownership of 'Other' Types of Devices; N=2,182

	0	1	2	3	4+
Paid Access	89.3 %	5.7 %	2.8 %	1 %	1.1 %
Free Access	83.1 %	9 %	2.2 %	1.1 %	4.5 %
No Access	94 %	2.8 %	1.9 %	0 %	1.3 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the number of other devices individuals reported owning based on their internet access at home $\chi 2$ (2, N= 2182) = 10.82, p<.01. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-no access comparison (p<.01) and the paid access-no access comparison (p<.001). However, there was not a significant difference in the number of smart TVs owned by individuals with paid internet access as opposed to individuals with free internet access (p=.09).

c. Relationship between how people answered Question 1 and how they answered Question 5?

i. Internet access – Main reason for NOT having a digital device in home

TABLE 10
Relationship Between Access at Home and Reason for Not Owning a Digital Device; N=36

	PAID ACCESS	FREE ACCESS	NO ACCESS
Don't see the need for it	33.3%	0.0%	66.7%
My current device(s) don't work	100.0%	0.0%	0.0%
Too expensive	8.0%	8.0%	84.0%
I use computer/devices somewhere else	0.0%	0.0%	100.0%
Too difficult to use	0.0%	0.0%	0.0%
Concerns about online privacy	0.0%	0.0%	100.0%
Other	0.0%	0.0%	100.0%

Note: Sample sizes were not large enough to conduct statistical tests.

d. Relationship between how people answered Question 1 and how they answered Question 6?

i. Internet access – comfort using digital devices for various tasks

ANALYSIS

NOTE ABOUT ANALYSIS

For each of these tables and analyses within research questions D and E, the researcher re-scaled the measure to only include response options 1,2, 4, and 5. 4 and 5 are represented by 3 and 4 in the tables displayed here.

In other words, the tables are scaled as follows, 1="very uncomfortable", 2="somewhat uncomfortable", 3="somewhat comfortable", 4="very comfortable".

TABLE 11
Relationship Between At Home Access and Comfortability with Using Digital Devices to Help Children with Schoolwork; N=7,995

	VERY UNCOMFORTABLE	SOMEWHAT UNCOMFORTABLE	SOMEWHAT COMFORTABLE	VERY COMFORTABLE
Paid Access	9 %	6.1 %	22.3 %	62.6 %
Free Access	13.9 %	7.4 %	29.2 %	49.5 %
No Access	16.5 %	11.3 %	28.1 %	44.1 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the level of comfort individuals felt with regard to using their devices to help their children with schoolwork based on their internet access at home $\chi 2$ (2, N = 7995) = 124.13, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-paid access comparison and the no access-paid access comparison (p<.001). However, there was not a significant difference between individuals with no internet access at home and individuals with free internet access at home with regard to the level of comfort they had using their devices to help their children with schoolwork (p=.11).

TABLE 12
Relationship Between At Home Access and Comfortability with Using Digital Devices to Pay Bills; N=8,012

	VERY UNCOMFORTABLE	SOMEWHAT UNCOMFORTABLE	SOMEWHAT COMFORTABLE	VERY COMFORTABLE
Paid Access	11 %	4.9 %	18.1 %	65.9 %
Free Access	24.9 %	8.1 %	25.9 %	41.1 %
No Access	25.4 %	12 %	29.3 %	33.3 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the level of comfort individuals felt with regard to using their devices to pay their bills based on their internet access at home $\chi 2$ (2, N = 8012) = 369.75, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-paid access comparison and the no access-paid access comparison (p<.001). However, there was not a significant difference between individuals with no internet access at home and individuals with free internet access at home with regard to the level of comfort they had using their devices to help their children with schoolwork (p=.10).

TABLE 13
Relationship Between At Home Access and Comfortability with Using Digital Devices to Conduct Online Banking; N=7,887

	VERY UNCOMFORTABLE	SOMEWHAT UNCOMFORTABLE	SOMEWHAT COMFORTABLE	VERY COMFORTABLE
Paid Access	12.1 %	4.8 %	17.9 %	65.2 %
Free Access	27.7 %	10.7 %	21.5 %	40.1 %
No Access	30.7 %	12.1 %	25.5 %	31.7 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the level of comfort individuals felt with regard to using their devices for online banking based on their internet access at home $\chi 2$ (2, N = 7887) = 399.40, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-paid access comparison and the no access-paid access comparison (p<.001). However, there was not a significant difference between individuals with no internet access at home and individuals with free internet access at home with regard to the level of comfort they had using their devices for online banking (p=.07).

TABLE 14
Relationship Between At Home Access and Comfortability with Using Digital Devices for Work; N=7,761

	VERY UNCOMFORTABLE	SOMEWHAT UNCOMFORTABLE	SOMEWHAT COMFORTABLE	VERY COMFORTABLE
Paid Access	9 %	2.5 %	13.7 %	74.7 %
Free Access	14.7 %	5.6 %	23.4 %	56.3 %
No Access	17.7 %	8.3 %	27.4 %	46.7 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the level of comfort individuals felt with regard to using their devices for work based on their internet access at home $\chi 2$ (2, N=7761) = 263.65, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-paid access comparison and the no access-paid access comparison (p<.001), and they were significant in the free access-no access comparison (p<.05).

TABLE 15
Relationship Between At Home Access and Comfortability with Using Digital Devices to Shop; N=8,065

	VERY UNCOMFORTABLE	SOMEWHAT UNCOMFORTABLE	SOMEWHAT COMFORTABLE	VERY COMFORTABLE
Paid Access	9 %	4.5 %	19.3 %	67.2 %
Free Access	15.2 %	10.3 %	29.9 %	44.6 %
No Access	24.5 %	13.3 %	31.6 %	30.6 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the level of comfort individuals felt with regard to using their devices for online shopping based on their internet access at home $\chi 2$ (2, N = 8065) = 461.05, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant at each pairwise comparison (p<.001).

TABLE 16
Relationship Between At Home Access and Comfortability with Using Digital Devices to Access Personal Information; N=7,712

	VERY UNCOMFORTABLE	SOMEWHAT UNCOMFORTABLE	SOMEWHAT COMFORTABLE	VERY COMFORTABLE
Paid Access	11.2 %	8.4 %	26.2 %	54.2 %
Free Access	19.1 %	15.7 %	28.7 %	36.5 %
No Access	32.3 %	18.6 %	23.9 %	25.2 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the level of comfort individuals felt with regard to using their devices to access personal information (e.g., medical records, taxes, etc.) based on their internet access at home $\chi 2$ (2, N = 7712) = 353.38, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant at each pairwise comparison (p<.001).

TABLE 17
Relationship Between At Home Access and Comfortability with Using Digital Devices for Job Searching; N=7,549

	VERY UNCOMFORTABLE	SOMEWHAT UNCOMFORTABLE	SOMEWHAT COMFORTABLE	VERY COMFORTABLE
Paid Access	8.6 %	3.4 %	20.9 %	67.1 %
Free Access	11.1 %	9.1 %	24.2 %	55.6 %
No Access	14.7 %	8.8 %	32.5 %	44 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the level of comfort individuals felt with regard to using their devices for job searching based on their internet access at home $\chi 2$ (2, N = 7549) = 162.45, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-paid access comparison and the no access-paid access comparison (p<.001), and they were significant in the free access-no access comparison (p<.01).

TABLE 18
Relationship Between At Home Access and Comfortability with Using Digital Devices for Entertainment; N=8,014

	VERY UNCOMFORTABLE	SOMEWHAT UNCOMFORTABLE	SOMEWHAT COMFORTABLE	VERY COMFORTABLE
Paid Access	8.1 %	3.3 %	18.4 %	70.3 %
Free Access	10.2 %	5.1 %	17.4 %	67.2 %
No Access	13.9 %	11 %	28.8 %	46.3 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the level of comfort individuals felt with regard to using their devices for entertainment (e.g., watching movies, videos, listening to music, etc.) based on their internet access at home $\chi 2$ (2, N = 8014) = 181.83, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-no access comparison and the no access-paid access comparison (p<.001). However, there was not a significant difference between individuals with free internet access at home and individuals with paid internet access at home with regard to the level of comfort they had using their devices for entertainment (p=.34).

e. Relationship between how people answered Question 1 and how they answered Question 7?

TABLE 19
Relationship Between at Home Access and Respondents' Children's Comfort Using Digital Device for Homework; N=7,798

	VERY UNCOMFORTABLE	SOMEWHAT UNCOMFORTABLE	SOMEWHAT COMFORTABLE	VERY COMFORTABLE
Paid Access	7.2 %	5.8 %	27.4 %	59.6 %
Free Access	10 %	9.1 %	27.4 %	53.5 %
No Access	12.1 %	8.7 %	30.8 %	48.4 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the level of comfort individuals reported that their children felt with using a digital device for homework based on their internet access at home $\chi 2$ (2, N = 7798) = 46.36, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that

these differences were statistically significant in the free access-paid access comparison (p<.05) and the no access-paid access comparison (p<.001). However, there was not a significant difference between individuals with free internet access at home and individuals with no internet access at home with regard to the level of comfort they reported that their children felt with using a digital device for homework (p=.27).

f. Relationship between how people answered Question 1 and how they answered Question 8?

i. Internet access – frequency of using places in community to access free internet for completing homework

TABLE 20
Relationship Between At Home Access and Frequency of Use of Digital Device for Completing Homework; N=8,400

	DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	DOES NOT ACCESS	NOT SURE
Paid Access	37.8%	24.7%	10.2%	10.7%	11.2%	5.3%
Free Access	34.5%	21.5%	12.3%	6.9%	13.8%	11.1%
No Access	20.9%	18.9%	8.5%	7.6%	34.4%	9.8%

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the frequency in which individuals reported that their children used a digital device for homework based on their internet access at home, $\chi 2$ (2, N = 7898) = 210.07, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-no access comparison (p<.001) and the no access-paid access comparison (p<.001). However, there was not a significant difference between individuals with free internet access at home and individuals with paid internet access at home with regard to the frequency in which individuals reported that their children used a digital device for homework (p=.67).

g. Relationship between how people answered Question 1 and how they answered Question 9?

ANALYSIS

NOTE ABOUT ANALYSIS

The following tables all include values for the "Not Sure" response option. However, for statistical testing, the researcher excluded this response option from the analyses in order to withhold the ordinal nature of the scale.

TABLE 21
Relationship Between At Home Access and Frequency of Use of Libraries to Access the Internet for Completing Homework; N=8,135

	DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	DOES NOT ACCESS	NOT SURE
Paid Access	2.1%	2.4%	2.3%	8.2%	79%	5.9%
Free Access	5.3%	3.7%	9.4 %	15.5%	52.2%	13.9%
No Access	7.1%	12.6%	9 %	15.5%	47.1%	8.7%

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the frequency in which individuals reported that their children used a public library (e.g., county, college/university) in their community to access free internet for completing their homework based on their internet access at home, $\chi 2$ (2, N = 7612) = 525.70, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant at each pairwise comparison (p<.001).

Note: Recognize that there is a different N for the statistical test than there is for the table above

TABLE 22
Relationship Between At Home Access and Frequency of Use of Restaurants to Access the Internet for Completing Homework; N=8,085

	DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	DOES NOT ACCESS	NOT SURE
Paid Access	1.1%	3.4%	5.7%	12.4%	71.6%	5.8%
Free Access	3.8%	7.1%	7.9%	14.6%	51.7%	15%
No Access	3.7%	13.8%	9%	14.3%	49.8%	9.4%

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the frequency in which individuals reported that their children used a restaurant (e.g., Starbucks, McDonalds, etc.) in their community to access free internet for completing their homework based on their internet access at home, $\chi 2$ (2, N = 7564) = 525.70, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-paid access comparison and the no access-paid access comparison (p<.001). However, there was not a significant difference between individuals with free internet access at home and individuals with no internet access at home with regard to the frequency in which individuals reported that their children used a restaurant to access free internet for completing their homework (p=.06).

TABLE 23
Relationship Between at Home Access and Frequency of Use of Retailers to Access the Internet for Completing Homework; N=8,029

	DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	DOES NOT ACCESS	NOT SURE
Paid Access	0.5%	1.5%	2.4%	6.6%	82.1%	7%
Free Access	4.2%	3.4%	3%	9.3%	63.6%	16.5%
No Access	1.4%	3%	2.2%	7.9%	72.8%	12.7%

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the frequency in which individuals reported that their children used a retailer (e.g., Apple Store, Barnes & noble, etc.) in their community to access free internet for completing their homework based on their internet access at home $\chi 2$ (2, N = 7401) = 40.65, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-paid access comparison and the no access-paid access comparison (p<.001), and they were significant in the free access-no access comparison (p<.01).

TABLE 24
Relationship Between at Home Access and Frequency of Use of Other Public Institutions to Access Internet for Completing Homework; N=8,035

	DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	DOES NOT ACCESS	NOT SURE
Paid Access	1.1%	1.8%	2.4%	7.1%	80.1%	7.5%
Free Access	4.6%	4.6%	3.4%	11.4%	58.2%	17.7%
No Access	3.8%	6.4%	6.1%	8.7%	62.9%	12.1%

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the frequency in which individuals reported that their children used other public institutions (e.g., community center, park, museum, etc.) in their community to access free internet for completing their homework based on their internet access at home $\chi 2$ (2, N = 7369) = 157.04, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-paid access comparison and the no access-paid access comparison (p<.001). However, there was not a significant difference between individuals with free internet access at home and individuals with no internet access at home with regard to the frequency in which individuals reported that their children used other public institutions to access free internet for completing their homework (p>.99).

TABLE 25

Relationship Between at Home Access and Frequency of Use of Someone Else's Home to Access Internet for Completing Homework; N=8,106

	DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	DOES NOT ACCESS	NOT SURE
Paid Access	2.1%	6.5%	8.6%	20.1%	55.6%	7.1%
Free Access	10.5%	8.4%	12.1%	18%	36.4%	14.6%
No Access	11.7%	17.8%	11.8%	19.2%	30.7%	8.8%

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the frequency in which individuals reported that their children used someone else's home (e.g., classmate, friend, family member, etc.) in their community to access free internet for completing their homework based on their internet access at home, $\chi 2$ (2, N = 7499) = 319.09, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-paid access comparison and the no access-paid access comparison (p<.001), and they were significant in the free access-no access comparison (p<.01).

TABLE 26

Relationship Between at Home Access and Frequency of Use of 'Other' Location to Access Internet for Completing Homework; N=3,787

	DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	DOES NOT ACCESS	NOT SURE
Paid Access	3.2%	1.6%	1%	1%	72.2%	20.9%
Free Access	4.1%	2.5%	1.6%	3.3%	50.8%	37.7%
No Access	5.2%	1.9%	3.3%	2.4%	55.2%	31.9%

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the frequency in which individuals reported that their children used other locations in their community to access free internet for completing their homework based on their internet access at home, $\chi 2$ (2, N = 2929) = 34.63, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-paid access comparison (p<.05) and the no access-paid access comparison (p<.001). However, there was not a significant difference between individuals with free internet access at home and individuals with no internet access at home with regard to the frequency in which individuals reported that their children used other locations in their community to access free internet for completing their homework (p>.99).

h. Relationship between respondents' responses to Question 1 and the TYPE of device they own?

ANALYSIS

Dichotomized the number of each particular device owned into owned or does not own this particular device. Created a contingency table of device ownership by internet access group (i.e., paid, free, no access).

Note: Treated the ownership as ordinal to better understand how ownership differed across groups.

TABLE 27

Relationship Between At Home Access and Ownership of Smart Phone; N=8,653

	DOES NOT OWN	OWNS
Paid Access	1.8 %	98.2 %
Free Access	4.7 %	95.3 %
No Access	9 %	91 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in whether individuals reported owning a smart phone based on their internet access at home, $\chi 2$ (2, N = 8653) = 171.03, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-no access comparison and the no access-paid access comparison (p<.001), and they were significant in the free access-paid access comparison (p<.01).

TABLE 28

Relationship Between At Home Access and Ownership of Desktop Computers; N=7,501

	DOES NOT OWN	OWNS
Paid Access	47.5 %	52.5 %
Free Access	56 %	44 %
No Access	78.9 %	21.1 %

Kruskal7-Wallis H test demonstrated that there was a statistically significant difference in whether individuals reported owning a desktop based on their internet access at home, $\chi 2$ (2, N = 7501) = 260.43, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-no access comparison and the no access-paid access comparison (p<.001), and they were significant in the free access-paid access comparison (p<.05).

TABLE 29
Relationship Between At Home Access and Ownership of Laptop Computer; N=8,289

	DOES NOT OWN	OWNS
Paid Access	9.3 %	90.7 %
Free Access	19.8 %	80.2 %
No Access	51.4 %	48.6 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in whether individuals reported owning a laptop based on their internet access at home, $\chi 2$ (2, N = 8289) = 1061.28, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant at each pairwise comparison (p<.001).

TABLE 30
Relationship Between At Home Access and Ownership of Tablet; N=8,257

	DOES NOT OWN	OWNS
Paid Access	9.5 %	90.5 %
Free Access	28.3 %	71.7 %
No Access	42.9 %	57.1 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in whether individuals reported owning a tablet based on their internet access at home, $\chi 2$ (2, N = 8257) = 740.05, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant at each pairwise comparison (p<.001).

TABLE 31
Relationship Between at Home Access and Ownership of Smart TV; N=7,675

	DOES NOT OWN	OWNS
Paid Access	37.2 %	62.8 %
Free Access	44.8 %	55.2 %
No Access	66.9 %	33.1 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in whether individuals reported owning a smart tv based on their internet access at home, $\chi 2$ (2, N = 7675) = 253.05, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-no access comparison and the no access-paid access comparison (p<.001), and they were significant in the free access-paid access comparison (p<.05).

TABLE 32
Relationship Between at Home Access and Ownership of Streaming Device; N=7,218

	DOES NOT OWN	OWNS
Paid Access	48.1 %	51.9 %
Free Access	65.4 %	34.6 %
No Access	91.5 %	8.5 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in whether individuals reported owning a streaming device based on their internet access at home, $\chi 2$ (2, N = 7218) = 503.22, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant at each pairwise comparison (p<.001).

TABLE 32
Relationship Between at Home Access and Ownership of Gaming System; N=7,974

	DOES NOT OWN	OWNS
Paid Access	22.5 %	77.5 %
Free Access	23.8 %	76.2 %
No Access	43.8 %	56.2 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in whether individuals reported owning a gaming system based on their internet access at home, $\chi 2$ (2, N = 7974) = 175.11, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the free access-no access comparison and the no access-paid access comparison (p<.001). However, there was not a significant difference between individuals with free internet access at home and individuals with paid internet access at home with regard to whether individuals reported owning a gaming system (p=.95).

TABLE 32
Relationship Between at Home Access and Ownership of 'Other' Device; N=2,182

	DOES NOT OWN	OWNS
Paid Access	89.3 %	10.7 %
Free Access	83.1 %	16.9 %
No Access	94 %	6 %

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in whether individuals reported owning other digital devices based on their internet access at home, $\chi 2$ (2, N = 2182) = 10.83, p<.01. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the

free access-no access comparison (p<.01) and the no access-paid access comparison (p<.05). However, there was not a significant difference between individuals with free internet access at home and individuals with paid internet access at home with regard to whether individuals reported owning other digital devices (p=.09).

i. Relationship between Question 9 and grade level of children (i.e. elementary, middle, high) from Question 16?

ANALYSIS

Dichotomized number of children at each grade level to indicate whether the respondent reported having a child at a particular grade level or not, regardless of the number. Then, I removed any respondent who reported having a child at more than one school level. Therefore, each respondent in the following analyses was only responding with regard to their child at a single grade level. Said differently, the responses across school levels are independent of one another.

TABLE 33
Relationship Between Frequency of Use of Library to Access Internet to Complete Homework and Grade Level; N=4,986

	DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	DOES NOT ACCESS	NOT SURE
Elementary School	1%	1.7%	2.6%	8.2%	83%	3.6%
Middle School	2.7%	4.4%	2.7%	9.2%	75.9%	5%
High School	5.4%	4.6 %	3.4%	8.8%	69.4%	8.3%

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the frequency in which individuals reported that their children used a public library (e.g., county, college/university) in their community to access free internet for completing their homework based on their school level (i.e., elementary, middle, high school), $\chi 2$ (2, N = 47390) = 81.21, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the elementary school-high school comparison and the elementary school-middle school comparison (p<.001), and they were significant in the high school-middle school comparison (p<.05).

TABLE 34
Relationship Between Frequency of Use of Restaurants to Access Internet to Complete Homework and Grade Level; N=4,951

	DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	DOES NOT ACCESS	NOT SURE
Elementary School	0.4%	1.8%	3.2%	8.9%	83.1%	2.5%
Middle School	1.2%	4%	7.3%	13.2%	69.3%	5%
High School	2.6%	7.5%	7.5%	16%	56.4%	10.1%

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the frequency in which individuals reported that their children used a restaurant in their community to access free internet for completing their homework based on their school level (i.e., elementary, middle, high school), $\chi 2$ (2, N = 4706) = 281.04, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant at each pairwise comparison (p<.001).

TABLE 35
Relationship Between Frequency of Use of Retailers to Access Internet to Complete Homework and Grade Level; N=4,922

	DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	DOES NOT ACCESS	NOT SURE
Elementary School	0.2%	0.9%	1.4%	3.9%	90.6%	2.9%
Middle School	0.3%	1.8%	2.2%	7.5%	81.7%	6.5%
High School	1%	2.8%	2.5%	9.4%	72.7%	11.6%

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the frequency in which individuals reported that their children used a retailer in their community to access free internet for completing their homework based on their school level (i.e., elementary, middle, high school), $\chi 2$ (2, N = 4635) = 116.63, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant at each pairwise comparison (p<.001).

TABLE 36
Relationship Between Frequency of Use of 'Other Public Institutions' to Access Internet to Complete Homework and Grade Level; N=4,927

	DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	DOES NOT ACCESS	NOT SURE
Elementary School	0.6%	1.2%	1.6%	4.9%	88.7%	3.1%
Middle School	0.9%	2%	4.4%	8.1%	77.5%	7.2%
High School	2.4%	2.5%	2.8%	8.9%	70.1%	13.3%

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the frequency in which individuals reported that their children used other public institutions in their community to access free internet for completing their homework based on their school level (i.e., elementary, middle, high school), $\chi 2$ (2, N = 4607) = 101.29, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the elementary school-high school comparison and the elementary school-middle school comparison (p<.001). However, there was not a significant difference between high school students and middle school students with regard to the frequency in which they use other public institutions in their community to access free internet for completing their homework, as reported by their parent(s) (p=.15).

TABLE 37
Relationship Between Frequency of Use of Library to Access Internet to Complete Homework and Grade Level; N=4,967

	DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	DOES NOT ACCESS	NOT SURE
Elementary School	1.7%	4.7%	7%	14.6%	68.6%	3.5%
Middle School	3.5%	6.2%	10.6%	22.9%	50.8%	5.9%
High School	4.2%	10.5%	10%	24.4%	40.7%	10.2%

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the frequency in which individuals reported that their children used someone else's home in their community to access free internet for completing their homework based on their school level (i.e., elementary, middle, high school), $\chi 2$ (2, N = 4684) = 262.28, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant at each pairwise comparison (p<.001).

TABLE 38
Relationship Between Frequency of Use of 'Other' to Access Internet to Complete Homework and Grade Level; N=2,384

	DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	DOES NOT ACCESS	NOT SURE
Elementary School	1.2%	1.6%	1 %	1.1%	81.8%	13.3%
Middle School	2.7%	1%	2.1 %	0.3%	68.8%	25%
High School	6.8%	1.3%	1.1%	0.6%	58.1%	32.1%

Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the frequency in which individuals reported that their children used other locations in their community to access free internet for completing their homework based on their school level (i.e., elementary, middle, high school), $\chi 2$ (2, N = 1933) = 34.59, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant in the elementary school-high school comparison (p<.001) and the high school-middle school comparison (p<.01). However, there was not a significant difference between elementary school students and middle school students with regard to the frequency in which they use other locations in their community to access free internet for completing their homework, as reported by their parent(s) (p=.24).

j. Relationship between school type from Question 19 (i.e., public, private, other) and response to Question 1?

ANALYSIS:

Due to the sample sizes within cells (e.g., Free access by private school, free access by other, etc.) statistical testing could not be conducted.

TABLE 39
Relationship Between at Home Access and School Type; N=7,922

	PUBLIC	PRIVATE	OTHER
Paid Access	96.9 %	0.8 %	2.4 %
Free Access	97.1 %	0.8 %	2.1 %
No Access	98 %	0.5 %	1.5 %

k. Relationship to response for Question 3 and income level (Question 15)

i. Income level – Main reason for NOT having internet access

ANALYSIS:

For income, rather than reporting the results from 10 different income categories, we condensed the categories down to 3, low, medium, and high-income categories. Low consists of categories ranging from less than 10k-34.99k. Medium ranges from 35k-74.99k. High ranges from 75k-200k+.

Collapsed the ten income categories into three categories (1-4 = Low income, 5-7 = medium income, 8-10 = high income). This should make for more interpretable and practical results. Again, I treated the dependent variable, "yes/no" responses as ordinal. Essentially treated it as "More of a reason" vs. "less of a reason". This allowed for better interpretation across groups, rather than just determining whether the proportion of Yes vs. No was statistically significant within each income group. Kruskal Wallis analyses were used throughout.

TABLE 40
Relationship Between Income Level and 'No Need' as Main Reason Respondent Does Not Have Broadband Home Access; N=777

	IS **NOT** A MAIN REASON	**IS** A MAIN REASON
Low (Less Than $10,000 - $34,999)	98.2 %	1.8 %
Medium ($35,000 - $74,999)	98 %	2 %
High ($75,000 - $200,000+)	100 %	0 %

Participants provided whether or no several potential reasons for not having internet access in their homes was relevant to their situation. Kruskal-Wallis H test demonstrated that there was not a statistically significant difference in the extent to which participants said they did not have a need for internet access based on income level, $\chi 2$ (2, N = 777) = .67, p=.72.

TABLE 41
Relationship Between Income Level and 'Not Available' as Main Reason Respondent Does Not Have Broadband Home Access; N=777

	IS **NOT** A MAIN REASON	**IS** A MAIN REASON
Low (Less Than $10,000 - $34,999)	87.4 %	12.6 %
Medium ($35,000 - $74,999)	59.8 %	40.2 %
High ($75,000 - $200,000+)	28.1 %	71.9 %

Participants provided whether or no several potential reasons for not having internet access in their homes was relevant to their situation. Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the extent to which participants said that internet was not available to them in their area access based on income level, $\chi 2$ (2, N = 777) = 111.85, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant at each pairwise comparison of income levels (p<.001).

TABLE 42
Relationship Between Income Level and 'Too Slow' as Main Reason Respondent Does Not Have Broadband Home Access; N=777

	IS **NOT** A MAIN REASON	**IS** A MAIN REASON
Low (Less Than $10,000 - $34,999)	93.8 %	6.2 %
Medium ($35,000 - $74,999)	89.8 %	10.2 %
High ($75,000 - $200,000+)	87.5 %	12.5 %

Participants provided whether or no several potential reasons for not having internet access in their homes was relevant to their situation. Kruskal-Wallis H test demonstrated that there was not a statistically significant difference in the extent to which participants said their internet connection was too slow based on income level, $\chi 2$ (2, N = 777) = 4.86, p=.09.

TABLE 43
Relationship Between Income Level and 'Device will not Connect' as Main Reason Respondent Does Not Have Broadband Home Access; N=777

	IS **NOT** A MAIN REASON	**IS** A MAIN REASON
Low (Less Than $10,000 - $34,999)	98 %	2 %
Medium ($35,000 - $74,999)	97.5 %	2.5 %
High ($75,000 - $200,000+)	100 %	0 %

Participants provided whether or no several potential reasons for not having internet access in their homes was relevant to their situation. Kruskal-Wallis H test demonstrated that there was not a statistically significant difference in the extent to which participants said their devices would not connect based on income level, $\chi 2$ (2, N = 777) = 4.86, p=.09.

TABLE 44
Relationship Between Income Level and 'Too Expensive' as Main Reason Respondent Does Not Have Broadband Home Access; N=777

	IS **NOT** A MAIN REASON	**IS** A MAIN REASON
Low (Less Than $10,000 - $34,999)	23.8 %	76.2 %
Medium ($35,000 - $74,999)	43.4 %	56.6 %
High ($75,000 - $200,000+)	81.2 %	18.8 %

Participants provided whether or no several potential reasons for not having internet access in their homes was relevant to their situation. Kruskal-Wallis H test demonstrated that there was a statistically significant difference in the extent to which participants said that internet was too expensive based on income level, $\chi 2$ (2, N = 777) = 65.57, p<.001. A Dunn's post hoc analysis with a Bonferroni correction demonstrated that these differences were statistically significant at each pairwise comparison of income levels (p<.001).

TABLE 45
Relationship Between Income Level and 'Use Internet Elsewhere' as Main Reason Respondent Does Not Have Broadband Home Access; N=777

	IS **NOT** A MAIN REASON	**IS** A MAIN REASON
Low (Less Than $10,000 - $34,999)	93.2 %	6.8 %
Medium ($35,000 - $74,999)	92.2 %	7.8 %
High ($75,000 - $200,000+)	96.9 %	3.1 %

Participants provided whether or no several potential reasons for not having internet access in their homes was relevant to their situation. Kruskal-Wallis H test demonstrated that there was not a statistically significant difference in the extent to which participants said they access the internet elsewhere based on income level, $\chi 2$ (2, N = 777) = 1.01, p=.60.

TABLE 46
Relationship Between Income Level and 'Privacy Concerns' as Main Reason Respondent Does Not Have Broadband Home Access; N=777

	IS **NOT** A MAIN REASON	**IS** A MAIN REASON
Low (Less Than $10,000 - $34,999)	98.2 %	1.8 %
Medium ($35,000 - $74,999)	97.5 %	2.5 %
High ($75,000 - $200,000+)	100 %	0 %

Participants provided whether or no several potential reasons for not having internet access in their homes was relevant to their situation. Kruskal-Wallis H test demonstrated that there was not a statistically significant difference in the extent to which participants said they had privacy concerns based on income level, $\chi 2$ (2, N = 777) = 1.04, p=.60.

TABLE 47
Relationship Between Income Level and 'Other' as Main Reason Respondent Does Not Have Broadband Home Access; N=777

	IS **NOT** A MAIN REASON	**IS** A MAIN REASON
Low (Less Than $10,000 - $34,999)	88.8 %	11.2 %
Medium ($35,000 - $74,999)	91.8 %	8.2 %
High ($75,000 - $200,000+)	81.2 %	18.8 %

Participants provided whether or no several potential reasons for not having internet access in their homes was relevant to their situation. Kruskal-Wallis H test demonstrated that there was not a statistically significant difference in the extent to which participants said they did not have internet access for other reasons based on income level, $\chi 2$ (2, N = 777) = 3.92, p=.14.

3. **What was the most common answer to Question 3 for those who checked "No" to Question 1?**

ANALYSIS

Includes only responses from people who checked "NO" to Question 1.

TABLE 48
Relationship between Respondents Without Access and Main Reason for Not Having Internet in their Home; N=937

RESPONSE OPTION	**NOT** FOR THIS REASON	**FOR** THIS REASON
Don't see the need for it	96.37 %	3.63 %
Not available in my area	76.73 %	23.27 %
Internet too slow	91.36 %	8.64 %
My device does not connect	97.65 %	2.35 %
Too expensive	34.04 %	65.96 %
I use the internet somewhere else	92.85 %	7.15 %
Concerns about online privacy	97.23 %	2.77 %
Other	89.01 %	10.99 %

4. **Breakdown with descriptive stats of the responses to each question (i.e., how many people selected each option, what percentage that was of total response rate, etc.)**

ANALYSIS

TABLE 49
Descriptive Stats to Question 1, "Do you currently have internet access at home?"

RESPONSE	N	RAW %	VALID %
Yes, I pay a monthly subscription for internet	7774	81.92	85.77
Yes, I have access but do not pay for a subscription	321	3.38	3.54
No, I do not have access	969	10.21	10.69
Missings	**426**	**4.49**	

TABLE 50
Descriptive Stats to Question 2, "How do you access the internet at home?"; N=8,005

	NOT USING	USING
Cellular data plan	55.94 %	44.06 %
Digital Subscriber	83.1 %	16.9 %
Line (DSL)	77.75 %	22.25 %
Cable modem	43.30 %	56.70 %
Fiber-Optic	88.21 %	11.79 %
Satellite internet service	96.59 %	3.41 %
Dial-up	99.56 %	0.44 %
Not sure	97.73 %	2.27 %

TABLE 51
Descriptive Stats to Question 3, "What is the main reason you do not currently have internet access in your home?"; N=937

RESPONSE OPTION	**NOT** FOR THIS REASON	**FOR** THIS REASON
Don't see the need for it	96.37 %	3.63 %
Not available in my area	76.73 %	23.27 %
Internet too slow	91.36 %	8.64 %
My device does not connect	97.65 %	2.35 %
Too expensive	34.04 %	65.96 %
I use the internet somewhere else	92.85 %	7.15 %
Concerns about online privacy	97.23 %	2.77 %
Other	89.01 %	10.99 %

TABLE 52
Descriptive Stats to Question 4, "How many of the following digital devices do you use in your home?"

	N	0	1	2	3	4+
Smart Phone	8653	2.61%	12.78%	34.27%	25.51%	24.84 %
Desktop	7501	50.86%	39.54%	6.49%	1.84%	1.27%
Laptop	8289	13.60%	38.53%	27.00%	13.10%	7.77%
Tablet/ e-Reader	8257	13.35%	30.39%	27.39%	15.44%	13.43%
Smart TV	7675	40.46%	32.55%	15.45%	6.40%	5.15%
Streaming Device	7218	53.03%	27.65%	11.89%	4.05%	3.38%
Gaming System	7974	24.71%	43.59%	19.54%	7.12%	5.04%
Other	2182	89.73%	5.45%	2.66%	0.87%	1.28%

TABLE 53
Descriptive Stats to Question 5, "What is the main reason you do not currently have a digital device in your home?"

RESPONSE	N	RAW %	VALID %
Don't see the need for it	3	0.03	8.33
Too expensive	25	0.26	69.44
I use computer/devices somewhere else	1	0.01	2.78
Concerns about online privacy	1	0.01	2.78
My current devices don't work	1	0.01	2.78
Other	5	0.05	13.89
Missings	**9454**	**99.62**	

TABLE 54
Descriptive Stats to Question 5, "How comfortable are you with using the digital devices you own to do the following tasks?" N=8,457

	VERY UNCOMFORTABLE	SOMEWHAT UNCOMFORTABLE	NOT SURE	SOMEWHAT COMFORTABLE	VERY COMFORTABLE
Help my children with schoolwork	9.33%	6.26%	5.34%	21.80%	57.27%
To pay bills	12.10%	5.40%	4.62%	18.49%	59.39%
Online banking	13.30%	5.25%	5.89%	17.61%	57.94%
For work	9.27%	2.92%	6.81%	14.16%	66.85%
To shop online	10.19%	5.27%	3.79%	19.95%	60.80%
To access personal information (e.g., medical records, taxes,etc.	12.30%	8.76%	8.00%	23.93%	47.01%
Job search	8.36%	3.70%	9.20%	20.04%	58.70%
Entertainment (e.g., watching movies, videos, listening to music, etc.	8.30%	3.85%	4.52%	18.43%	64.90%

TABLE 55
Descriptive Stats to Question 7, "Overall, how comfortable are your children with using a digital device for homework?"

RESPONSE	N	RAW %	VALID %
Very Uncomfortable	602	6.34	7.12
Somewhat Uncomfortable	481	5.07	5.69
Not Sure	659	6.94	7.79
Somewhat Comfortable	2160	22.76	25.54
Very Comfortable	4555	48.00	53.86
Missings	**1033**	**10.89**	

TABLE 56
Descriptive Stats to Question 8, "How often do your children use the following places in your community to access free internet for completing homework?"

	N	DAILY	2-3 TIMES PER WEEK	ONCE A WEEK	1-2 TIMES PER MONTH	NO ACCESS	NOT SURE
Public Library (e.g., County, College/University)	8135	2.72%	3.50%	3.18%	9.18%	74.98%	6.43%
Restaurants (e.g., Starbucks, McDonalds, etc.)	8085	1.43%	4.55%	6.06%	12.63%	68.88%	6.44%
Retailers (e.g., Apple Store, Barnes & Noble, etc.)	8029	0.71%	1.69%	2.35%	6.76%	80.66%	7.82%
Other Public Institutions (e.g., community center, park, museum, etc.)	8035	1.43%	2.33%	2.83%	7.36%	77.77%	8.29%
Someone else's home (e.g., classmate, friend, family member, etc.)	8106	3.33%	7.67%	9.02%	19.91%	52.58%	7.49%
Other	3787	3.49%	1.66%	1.27%	1.27%	69.66%	22.66%

TABLE 57
Descriptive Stats to Question 8, "How often do your children use a digital device for homework?"

RESPONSE	N	RAW %	VALID %
Daily	3021	31.83	38.25
2-3 week	2019	21.28	25.56
Once per week	848	8.94	10.74
1-2 month	863	9.09	10.93
No access	1147	12.09	14.52
Missings	**1592**	**16.78**	

TABLE 58
Descriptive Stats to Question 10, "Do your children take advantage of any of the following resources?"

		YES	NO	NOT SURE	NOT AVAILABLE AT SCHOOL
School-Provided Rental Digital Device (e.g., laptop, tablet, hotspot, etc.)	8068	28.21%	38.82%	9.58%	23.39%
Extended-Day Computer Lab Internet access (e.g., before or after school programs)	7992	10.55%	50.75%	16.70%	22.00%
Other	2759	3.73%	49.29%	26.35%	20.62%

TABLE 59
Descriptive Stats to Question 11, "Please identify the number of children in K-12 that reside in your home"

	N	0	1	2	3	4+
Elementary School (K-5th grade or 6th grade)	6929	27.88%	48.25%	19.18%	3.58%	1.11%
Middle School/Jr High (6th-8th grade or 7th-9th grade)	6099	55.24%	39.15%	4.64%	0.52%	0.44%
High School (9th-12th grade or 10th-12th grade)	6246	48.64%	40.38%	9.35%	0.88%	0.75%

TABLE 60
Descriptive Stats to Question 12, "What type of school(s) are your children currently enrolled in?"

RESPONSE	N	RAW %	VALID %
Public School (Including Traditional, Charter, Early College, Magnet, etc.)	7751	81.68	96.98
Private School	60	0.63	0.75
Other	181	1.91	2.26
Missings	1498	15.79	

TABLE 61
Descriptive Stats to Question 14, "What is your sex?"

RESPONSE	N	RAW %	VALID %
Male	1334	14.06	16.67
Female	6629	69.85	82.85
Other	38	0.40	0.47
Missings	1489	15.69	

TABLE 62
Descriptive Stats to Question 15, "What is your race/ethnicity?"

RESPONSE	N	RAW %	VALID %
Asian/Pacific Islander	112	1.18	1.41
Black/African American	761	8.02	9.61
Hispanic/Latino	411	4.33	5.19
Native American/American Indian	152	1.60	1.92
White	6324	66.64	79.88
Other	157	1.65	1.98
Missings	1573	16.58	

TABLE 63
Descriptive Stats to Question 16, "What is your household income?"

RESPONSE	N	RAW %	VALID %
Less than $10,000	371	3.91	4.92
$10,000 to $14,999	281	2.96	3.73
$15,000 to $24,999	512	5.40	6.79
$25,000 to $34,999	618	6.51	8.20
$35,000 to $49,999	892	9.40	11.83
$50,000 to $74,999	1470	15.49	19.49
$75,000 to $99,999	1337	14.09	17.73
$100,000 to $149,999	1278	13.47	16.95
$150,000 to $199,999	441	4.65	5.85
$200,000 or more	341	3.59	4.52
Missings	1949	20.54	

TABLE 64
Descriptive Stats to Question 17, "What is your highest degree or level of school completed?"

RESPONSE	N	RAW %	VALID %
Less than high school	356	3.75	4.51
High school diploma (or GED)	877	9.24	11.11
Some college	1387	14.62	17.57
Associate's degree (e.g., AA, AS)	1062	11.19	13.45
Bachelor's degree (e.g., BA,BS)	2350	24.76	29.76
Master's degree (e.g., MA, MS, MBA, MEd)	1489	15.69	18.86
Professional degree beyond a bachelor's degree (e.g., MD,DDS, LB, JD)	196	2.07	2.48
Doctorate degree (e.g., PhD, EdD)	179	1.89	2.27
Missings	1594	16.80	

5. **Profile of the type of person who checked "No" to Question 1 (i.e., do demographics tend to be similar or different).**

TABLE 65
Percent of Respondents With and Without Broadband by Race/Ethnicity

	BLACK	HISPANIC	WHITE	OTHER
Paid Access	8.4%	4.6%	82.1%	4.9%
Free Access	25.9%	12.5%	54.3%	7.3%
No Access	15.8%	8.3%	68.0%	8.0%

TABLE 66
Percent of Respondents With and Without Broadband by Income Level

	LOW	MEDIUM	HIGH
Paid Access	17.6%	51.8%	30.5%
Free Access	56.7%	29.5%	13.8%
No Access	64.7%	31.2%	4.1%

TABLE 67
Percent of Respondents With and Without Broadband by Education Level

	LESS THAN HIGH SCHOOL	HIGH SCHOOL DIPLOMA	SOME COLLEGE	ASSOCIATES	BACHELOR'S	MASTER'S	PROFESSIONAL DEGREE	DOCTORATE
Paid Access	3.1%	9.2%	16.5%	13.2%	32.2%	20.7%	2.7%	2.4%
Free Access	28.3%	21.2%	14.2%	10.2%	15.0%	8.0%	1.3%	1.8%
No Access	10.3%	24.7%	27.8%	16.8%	13.0%	6.0%	0.6%	0.9%

ZIP CODE ANALYSIS – AGGREGATED TO THE REGIONAL LEVEL

For this analysis, I first acquired NC populations by county from the NC office of State Budget and Management (osbm.nc.gov/demog/county-estimates). Next, I paired regions to counties and the summed the population from each county within each region together to attain a regional population value. I then divided this value over the total state population in order to acquire the regional population proportion.

For the survey proportions, I summed up the total number of valid responses to the zip code question (note: this excludes around 2,000 responses from the total survey N). I then paired zip codes to their corresponding regions and totaled up the number of responses we had from each region. These regional totals were then divided over the sum of all valid responses to the zip code question.

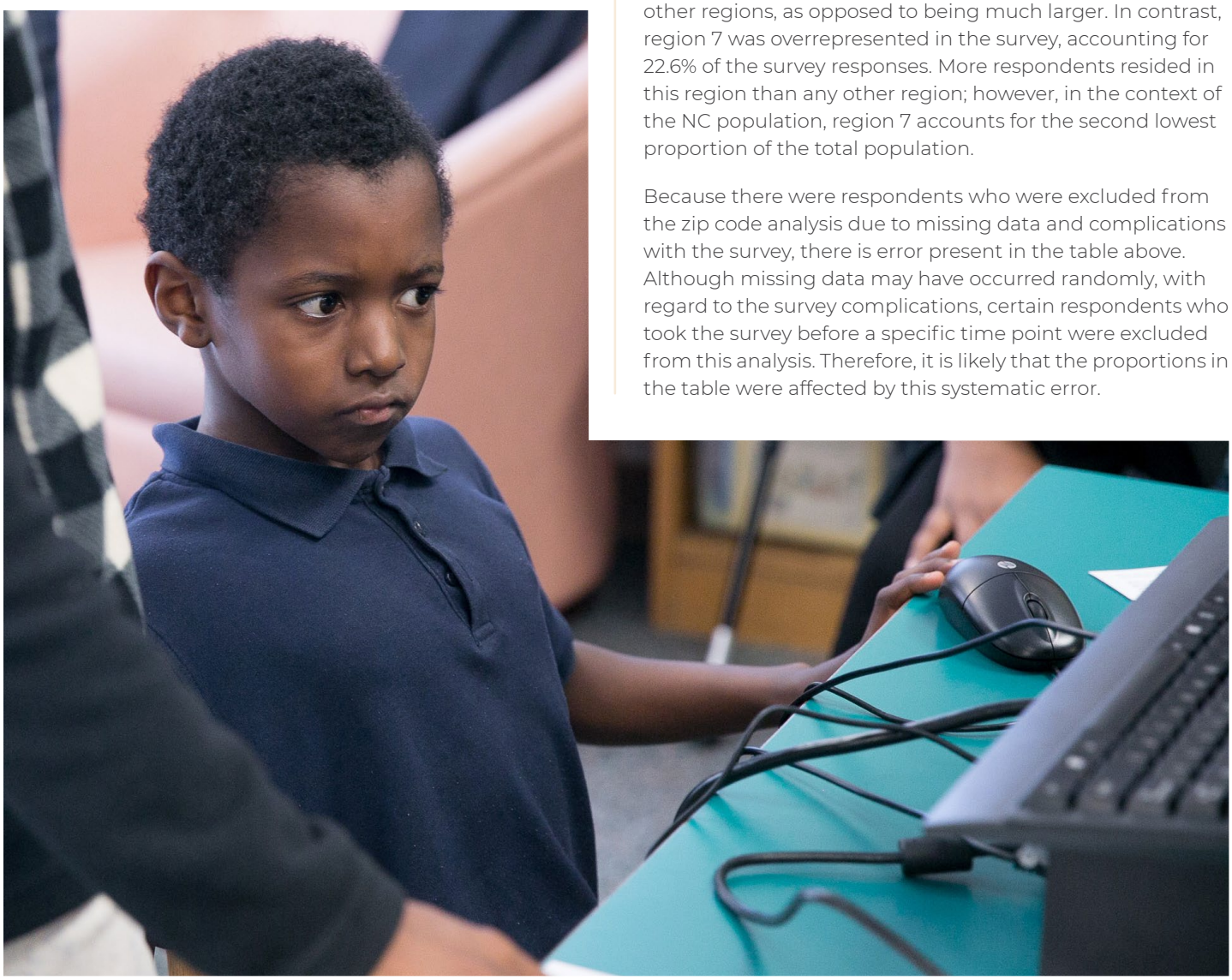
By acquiring proportions for both the NC population by region, and survey responses by region, we can observe the distribution of our respondents by region in comparison to the actual population by region. Ideally, survey proportions are similar to regional population proportions.

TABLE 68
Zip Code Analysis

REGION	REGIONAL POPULATION PROPORTION	REGIONAL SURVEY RESPONSE PROPORTION	DIFFERENCE (IN ABSOLUTE VALUES)
1	5.3%	4.6%	0.7%
2	10.5%	11.7%	1.2%
3	23.4%	12.7%	10.7%
4	8.6%	14.0%	5.4%
5	16.5%	10.2%	6.3%
6	22.4%	10.9%	11.5%
7	6.2%	22.6%	16.4%
8	7.1%	13.3%	6.2%

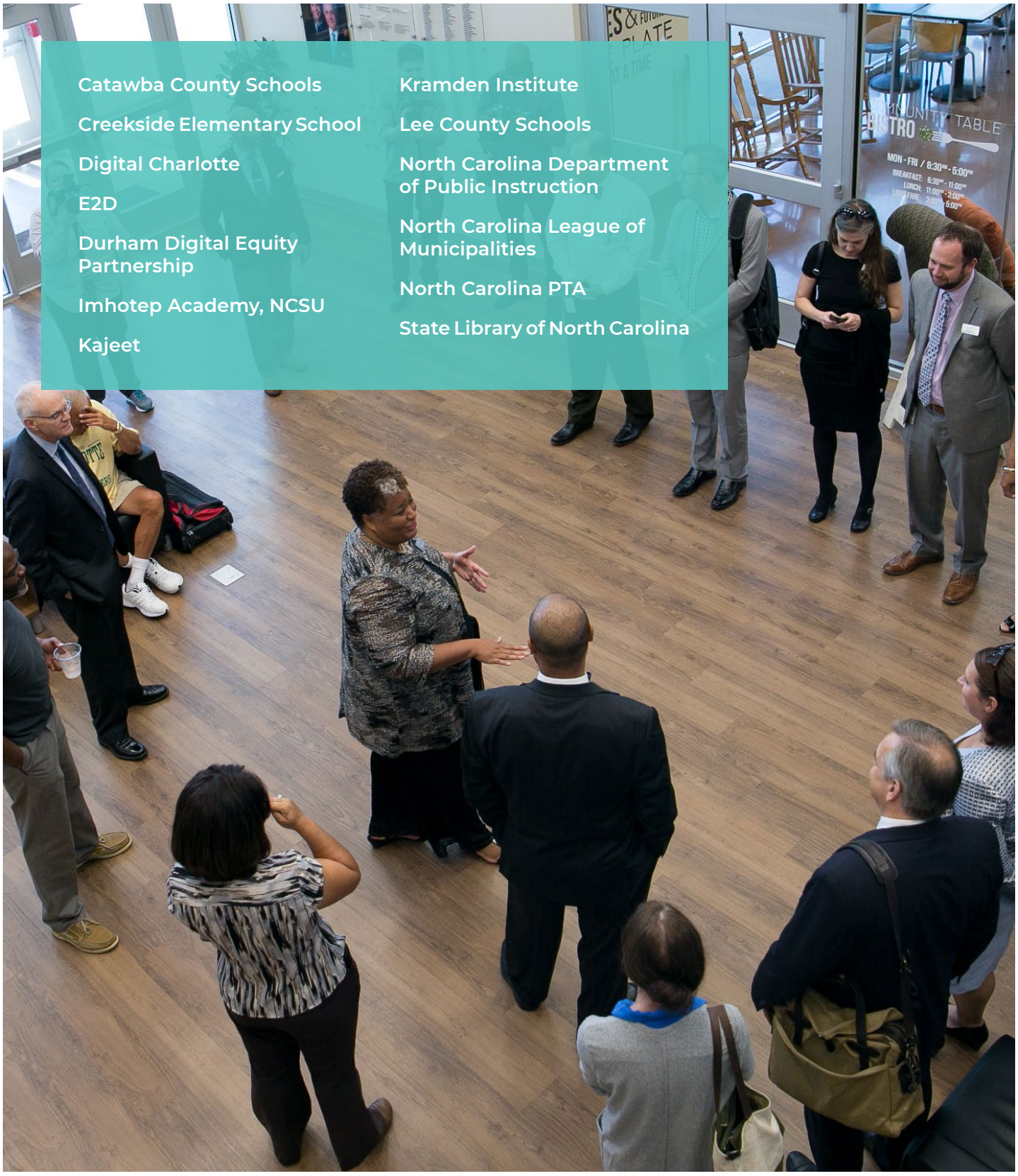
Overall, many of the regions appear to have been proportionately well represented, especially regions 1 and 2. Region 3 and 6 were the most underrepresented regions proportionately, in the survey. Region 3 and 6 are the most populated regions of the NC regions; however, their representation in the survey was roughly equal to most other regions, as opposed to being much larger. In contrast, region 7 was overrepresented in the survey, accounting for 22.6% of the survey responses. More respondents resided in this region than any other region; however, in the context of the NC population, region 7 accounts for the second lowest proportion of the total population.

Because there were respondents who were excluded from the zip code analysis due to missing data and complications with the survey, there is error present in the table above. Although missing data may have occurred randomly, with regard to the survey complications, certain respondents who took the survey before a specific time point were excluded from this analysis. Therefore, it is likely that the proportions in the table were affected by this systematic error.



APPENDIX E

Survey Distribution Partners



- Catawba County Schools
- Creekside Elementary School
- Digital Charlotte
- E2D
- Durham Digital Equity Partnership
- Imhotep Academy, NCSU
- Kajeet
- Kramden Institute
- Lee County Schools
- North Carolina Department of Public Instruction
- North Carolina League of Municipalities
- North Carolina PTA
- State Library of North Carolina

APPENDIX F

Homework Gap Convening Notes

Representatives from city/state government, institutes of higher education, private business, public organizations, and schools/districts assembled to engage in productive conversations about eradicating the Homework Gap. The convening set three main priorities: 1) Continue the conversations held during the 2016 Digital Equity Convening; 2) Discuss new data on the scope and breadth of the homework gap in NC; and 3) Engage stakeholders and subject matter experts in designing solutions to close the gap.

The schedule for the day was intentional. Each component of the agenda included opportunities for the participants to network and engage in meaningful discussion. Each session addressed eliminating the the homework gap. The following sections of this paper will provide an overview of the day including participants' feedback during working groups and recommendations for addressing digital inequities in NC.

OPENING SESSION

Glenn Kleiman, Friday Institute Executive Director
Welcome

Geoff Coltrane, NC Education Advisor
Remarks

Eric Boyett, NC CIO
Remarks

HOMEWORK GAP SURVEY DATA PRESENTATION

Jessica Rosenworcel, Federal Communication Commissioner (FCC)
Keynote Address

HOMEWORK GAP SOLUTIONS PANEL

Bruce Clark, Executive Director Digital Charlotte

Rob Dietrich, Director of Accountability and Technology Lee County School

Beth Lancaster, Director of Project ACCESS Montgomery County Schools

HOMEWORK GAP SOLUTIONS BREAKOUT SESSIONS

Policy

Research and Data

Sustainability

Technology, Infrastructure, and Devices

SOLUTION DESIGN BREAKOUT GROUP SESSIONS

Participants spent part of the afternoon working in group sessions discussing four areas (1. Technology, Infrastructure, and Devices; 2. Sustainability; 3. Policy; and 4. Research and Data). A facilitator guided each group through conversations designed to both define the challenges associated with each topical area and develop thoughtful recommendations for practical next steps.

The concurrent sessions began with a brief introduction of the participants in which they provided their name, organizational affiliation, and their connection to or reason for interest in the homework gap. Next, a guiding question aligned to the session topic was posted to generate ideas. Each participant was given small slips of paper to record their answers. The responses were placed on the wall and grouped by similarities. Each participant then received three stickers to select the top three areas they would like to discuss.

BREAKOUT SESSION 1
Sustainability Solution Design (n=9)

Guiding Questions:

- What are some creative financing models for closing the homework gap?
- What are the best ways to sustain those models?
- How would the addition of this/these solutions be useful in your district or area?
- Why would they be impractical?
- What are the best short-term solutions?
- What are the best long-term solutions?
- Which solution is most feasible?
- What barriers do you foresee?

POTENTIAL SOLUTIONS

- Develop public-private partnerships.
- Shift school funds from textbooks to technology
- Reduce costs of wireless access; use a state-level agency to negotiate lower costs for all school districts, just as DPI does for instructional resources (textbooks).
- The General Assembly should create line items that require funds be used for connectivity.
- Open conversations with service carriers about allowing them to put cell towers on district properties on a lease available to nonprofit organizations.

DISCUSSION SUMMARY

General Assembly

- What is the General Assembly planning to do with the textbooks line item? With the digital resources line item? Can these somehow be reallocated to provide greater access?
- Use lottery funds to purchase laptops, devices, access, etc., by ADM.

Local Government

- Allow local communities to build their own networks, which lowers the costs for the communities.
- Co-ops for building local networks with infrastructure grants
- Libraries that do not take e-rate funding can extend their network beyond their facilities to the community; however, not all libraries are connected by a fiber line.
- Local networks will have ongoing sustainability issues (built by local governments).
- Subsidizing access requires continuous funding from the state or local government, or from private entities, or both.
- Ask local agencies (churches, banks, etc.) to help fund internet access for disadvantaged students.
- Cumberland County model (mapping out places with Wifi and labeling them) helps students find locations to get access. Safety can be a concern for students having to go somewhere outside of the home to use wifi.
- Ask local governments to allocate some of the money they get from leasing space for wireless carrier towers to schools
- Verizon, AT&T, Sprint, T-Mobile = major wireless carriers – should rely on existing carriers for their networks rather than creating their own.

School Districts

- Local corporate partners to assist with providing access by funding on an ongoing basis
- Sustainability for school districts = devices, connectivity, training
- Get corporate sponsorships for hot spot creation, with splashpads, so students can get access. The ad revenue to districts could support purchasing devices and access.
- Have teachers stop assigning homework

Private Entities

- Educational publishers need to understand that instructional resources can only be purchased for one to two years at a time.
- The point of getting more access for students is to provide them an equal footing for education to everyone else, who has access. Once the students have the access at home, even though it's limited, many parents see the value and purchase wireless access for the home.
- School districts purchase for the school year, not monthly.

BREAKOUT SESSION 2
Policy Solution Design (n=19)

Guiding Questions:

- What policy changes are needed at the local, state, and federal level to bridge the homework gap?
- How would this policy change be useful in your district or area?
- Why would it be impractical or cause hardship?
- What are the best solutions (short-term and long-term)?
- Which solution is most feasible?
- What barriers do you foresee?

POTENTIAL SOLUTIONS

- Federal law to encourage the re-use of surplus devices/ make them available to nonprofit organizations
- Repeal HB 129- Municipal government cannot provide internet access
- Local understanding and overcoming regulatory and communication barriers to pave the way for a wider variety of service providers.
- Grant funding to make high cost rural areas more economical for private providers to deploy service to unserved areas.

DISCUSSION SUMMARY

- Clean up the surplus laws that make it easier for distribute the devices. Currently, there is a concern from the state will lose surplus revenue from device sales to other nonprofits, public auction, and for-profit recycling. They want to be sure they can keep some similar level of revenue that they would be losing. If you take care of that part of it which is a big weight on families, then you focus on access.

- HB-129- Law passed at the state level that does not allow local government to provide infrastructure for internet access. Supported by the telecom industry. If you're looking at getting broadband access, it is hard for cities to help. A counterpoint, the cities and municipalities are forced to play on the same level as telecom providers. The outlying areas, such as in western NC, mountaintops or valleys, that are far from the nearest municipality, if a municipality could lay the groundwork, it would free up the municipality to focus others. HB 129 puts limits on the municipalities ability to lay groundwork outside their boundaries. City of Wilson has their own WIFI network and they can go anywhere in the County of Wilson, but they choose not to go to those areas because it isn't cost effective. Does HB 129 limit the creative problem solution for difficult areas? NC Rural Center has researched this a lot. Wilson is a great example of a success but not every municipality should try to copy that model. There are examples of remote areas such as Alleghany that has great fiber access. Educating the municipalities on the variety of options that are available to municipalities. There are grey areas that laws don't allow municipalities to do some things. We could get a common understanding/ best practices list to clarify some of these grey areas and get municipalities on the right track. County folks have the impression that they can't really do much of anything. Municipalities can provide free services.

- A grant program would have the most immediate impact to communities. The state has taken on grant funding to reach the 7% of households that don't have access. Back of the hand calculations to get all of the rural areas access would be $300-400 million. There is no way the General Assembly will appropriate taxpayer dollars to finish that. If you focus on underserved, you will never get to unserved. It is cheaper to speed up locations with access already than to get access to places without any at all. Adoption is the biggest issue. That would dramatically change the business model to make the profitability to go into rural areas much greater.

BREAKOUT SESSION 3
Research and Data Solution Design (n=8)

Guiding Questions:

- How can we improve upon the pilot research, data collection, and analysis?
- What partnerships are needed to distribute the survey directly through the schools to K-12 households?
- What are other ways homework gap data can be collected to bolster the survey results?
- Why would they be impractical?
- Which solution is most feasible?
- What barriers do you foresee?

POTENTIAL SOLUTIONS

- Improve the data collection to ensure there is a wider response from more diverse participants
- Target rural and high need poverty areas
- Shorten the survey
- Use data analytics to determine usage trends

DISCUSSION SUMMARY

- Look at existing data we have and try to fill in gaps where there was no response; that's foundational first-step approach of improving it, is to get as many responses as possible especially in geographic areas where we got low responses, so every zip code in the state would have some type of response.
- One of the staff members shared the difficulty and expense of moving of deploying the paper survey. "I think the hardest part was getting people thinking about the paper aspect of it -- we knew that was such a big deal but the money to fund getting the paper; then if you got the paper, do we mail it in or send someone to pick it up, so the logistics of doing a massive paper survey gave us hesitation, which is why Catawba County agreed to have their own and then we sent some people to pick them up, and we printed on both sides but they still ended up being 4-5 pages stapled, so that's heavy; the online one is easy to send" Offering an online survey to people without internet is problematic. It was suggested that the survey be given through community centers, churches and schools during school events such as open houses.
- In affluent areas, you're gonna get your responses either way because they'll have easier access to surveys; if you want to see where the true gap lies, target the more rural or high need poverty areas; in my opinion as a teacher, those are the areas that need the access the most -- i have kids who live right near downtown Winston-Salem, they don't have internet access and don't even have a device, so that gap would still be there. Can you dig deeper into that, do they see the need to have that device, digging into the root cause of it?
- Those of us on the outside, this expectation that people want to take the survey – the hardest part for us was getting people to finish the survey; more people had access to it but they never finished it; and maybe it's time or survey fatigue, but how can we get what we need to get in the shortest amount of time or questions without it being cumbersome. You can't give them anything more than a page and they're done, they're busy and working and you have to think about the language we're using, writing these questions in -- i have parents who struggle with reading and now you're encountering this frustration piece, so that' something else to consider
- Wake has a lower percentage of lack of access homework gap students than Montgomery or rural areas but in terms of absolute number of students, the number could actually be higher, so the impact of that -- the mixed methods is smart, but one of the things I'd suggest is thinking about tech proxies, so we have a tool that integrates with Google to help districts understand how tech is being used/access across the district and you can check the timing (between 4pm and 7am) and see to what extent that's occurring, so that's another method of getting data; it's data acquisition opportunity, it's not direct but could yield interesting data. 40,000 in CMS don't have it in their home, but i guarantee they have access to 2 or 3 providers at home, so providers can tell you where we don't have service, it's when it's available, why aren't you subscribing? If we're the only provider, we're thrilled 60% of people subscribe, so if we fixed this adoption issue, more people would buy the services and it'd be more economic. You think you'd see more providers doing that with the return on investment.

Technology, Infrastructure, and Devices (n=15)

Guiding Questions:

- What technologies are needed to bridge the homework gap?
- How would the addition of this/these technologies be useful in your district or area?
- Why would they be impractical?
- What are the best short-term solutions?
- What are the best long-term solutions?
- Which solution is most feasible?
- What barriers do you foresee?

POTENTIAL SOLUTIONS

- Determine a way to "unlock" the State Surplus law passed this year
- Demand aggregation for procurement/contracting/ purchasing of devices
- Create a clearinghouse for information/resources so locals are not starting from the ground

DISCUSSION SUMMARY

- Explore state surplus law and how to maneuver through state agencies to get access to devices
- State initiative to fund devices (long term)
- Advocate for legal/policy changes for surplus of devices/computers due to this being a revenue source for State Surplus would need to reviewed and possibly changed
- Inventory the number of students and aggregate demand of the school systems that need devices
- Secure devices with a "keyboard" would be more beneficial (i.e. Chromebook)
  - *Take into account quality of device for grade level being served*
- (Short) Tech companies and data centers and providing devices - Inquire where this starts
- (Long) e-Rate and law changes - State continue to support be modernized

APPENDIX G

Convening Attendees

FIRST NAME	LAST NAME	ORGANIZATION
Aimee	Meacham	National Telecommunications and Information Administration
Allen	Lee	Tyrrell County Schools
Amber	Harris	North Carolina Association of County Commissioners
Amy	Huffman	The Broadband Infrastructure Office, NC Department of Information Technology
Angie	Bailey	ECC Technologies
Beth	Lancaster	Montgomery County Schools
Bill	Holmes	NC Department of Information Technology
Brad	Rhew	Winston-Salem/Forsyth County Schools
Brett	Brenton	The Research Triangle Park
Bruce	Clark	Digital Charlotte
Cal	Shepard	State Librarian's Office of North Carolina
Candace	Salmon-Hosey	Rowan-Salisbury Schools
Casey	Jones	Moore County Schools
Cecilia	Holden	State Board of Education
Chris	Wasko	Wake County Public Schools
Cindy	Johnson	E-Rate Services, LLC
Darren	Bell	Chapel Hill-Carrboro City Schools
Dave	Furiness	MCNC
Dean	Russell	Country Cablevision, Inc.
Derek	Kelly	CenturyLink, Inc.
Donna	Malloy	Wilson County Schools
Dr. S. Janine	Parker	NC A&T University
Elaine	Batten	Durham Public Schools
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Eric	Cramer	Wilkes Telecommunications
Erin	Wynia	North Carolina League of Municipalities
Gene	Ballard	Kajeet
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Jeffrey	Hamilton	State Librarian's Office
Jeni	Corn	Friday Institute
Jennifer	Hererra	Project Ed
Jenny	Myers	E2D
Johanna	Reese	North Carolina Association of County Commissioners
John	Coggin	North Carolina Rural Economic Development Center

J'Tanya	Adams	EveryoneOn
Karl	Rectanus	LearnPlatform
Kendt	Eklund	Moore County Schools
Linda	Jones	City of Raleigh
Lindsay	Saunders	NC Department of Information Technology
Mark	Johnson	MCNC
Mary	Furtado	Catawba County Manager's Office
MaryAlice	Warren	NC Department of Information Technology
Melissa	Thibault	North Carolina School of Science and Mathematics
Mia	Bailey	Charter
Michael	Abensour	Kramden
Michael	Flood	Kajeet
Michael	Maher	North Carolina State University
Monica	Belford	Durham County Library
Phil	Emer	Friday Institute
Ray	Zeisz	Friday Institute
Richard	Bostic	North Carolina School Board Association
Rick	Pilato	Catawba County Manager's Office
Robert	Dietrich	Lee County Schools
Sammy	Roberson	Charter
Samuel	Wicks	Durham Housing Authority
Sara	Weiss	Friday Institute
Stephanie Jane	Edwards	MCNC
Steve	Brewer	CenturyLink
Susan	Miller	Frontier Communications
Tia	Bethea	Google Fiber
Todd	Brantley	NC Rural Economic Development Center
Trey	Rabon	AT&T
Tricia	Townsend	Friday Institute
Veronica	Creech	EveryoneOn
Wes	King	The Broadband Infrastructure Office, NC Department of Information Technology
William	Seiz	Final Mile Communications

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The Friday Institute Research and Evaluation (FIRE) Group, a unit of North Carolina State University's College of Education, provides a unique and comprehensive understanding of innovations in K-12 public education in North Carolina and nationally, including special expertise in developing systemic evaluations for comprehensive, innovative initiatives. Most recently, the Friday Institute lead the development and current implementation of the NC Digital Learning Plan which highlights the digital learning needs of the state to include out of school access. In addition, the FIRE Group is actively pursuing partnerships with community stakeholders to investigate the digital equity challenges in NC districts and schools. By combining exemplary practices, diverse professional backgrounds, and strong working relationships with education stakeholders, the FIRE Group contributes to effective, data-driven decision-making for the continuous improvement of teaching and learning.

NC DIT
Broadband Infrastructure Office
NORTH CAROLINA DEPARTMENT OF INFORMATION TECHNOLOGY

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The North Carolina Department of Information Technology's Broadband Infrastructure Office (BIO) was established by the State Chief Information Officer (SCIO) in 2014 as a statewide resource for broadband access, first responder communication and student connectivity initiatives led by the State of North Carolina. BIO provides policy and strategy guidance and recommendations to community and state leaders on ways to enhance high-speed internet access for global competitiveness, education, public safety, healthcare, and government efficiency.

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