DIGITAL INCLUSION IN AUSTIN

Final Report

2018 Austin Digital Assessment Survey

The University of Texas at Austin

JOE STRAUBHAAR, SHARON STROVER, JAEWON CHOI, SOYOUNG PARK, MARIA SKOURAS, MELISSA SANTILLANA, CAIFAN DU, ADOLFO MORA

Table of Contents

List of Figures

LIST OF TABLES

EXECUTIVE SUMMARY

1. The City of Austin, in collaboration with the University of Texas at Austin, conducted a survey to assess access and adoption of digital technology within the city. The survey was sent to 11,000 random addresses, and 997 respondents completed the survey, a 9% response rate. The survey indicates that 95% of respondents have a home broadband Internet connection, slightly higher than in 2014 which was 92%. This is much higher than comparable national statistics--65%, according to Pew Research Center. Further, about two-thirds of respondents without home broadband use the Internet in some way, whether on a smartphone or at a public location. In terms of devices, 99% of City residents have a cellphone (of them 97% have a smartphone), 76% a laptop, 69% a tablet, and 48% a desktop.
2. Respondents who said they do not use the Internet share some the same opinions about Internet services that are reflected in national research findings.
    a. 58% of respondents in Austin agree or strongly agree that Internet is too expensive (down from 61% in 2014);
    b. 77% say broadband would have to cost less than $10 a month for them to subscribe, while 11% percent say they would be willing to pay $36 or more monthly;
    c. 73% say they know enough to go online on their own while 27% need help;
    d. 79% agree or strongly agree that they have security and privacy concerns about using the Internet, compared to 55% in 2014;
    e. 61% do not need a computer or the Internet for their work;
    f. 55% say using the computer is too difficult;
    g. 41% are simply not interested;
    h. 40% do not need to use the Internet because someone else will go online for them.
3. Two key results from respondents who do not have home Internet access indicate that there the City of Austin and community partners should strengthen efforts to increase awareness among non-users of technology services and resources in Austin:
    a. Respondents who do not have home access do use the Internet at work and retail locations often, but they use libraries and public WiFi connections less often than respondents who do have home Internet access.
    b. People without a home Internet connection are far less likely to use city locations with free public WiFi than people who already have Internet connections at home;
    c. 76% of non-users report that they do not know enough to go online themselves or that they would need help.
4. Respondents in Austin who do not use the Internet are more likely to be Hispanic, men, have less than a high school education, and be either 25 to 34 years in age or over 55. Many have devices that could access the Internet, particularly tablets, and over half live in homes that have an Internet connection.
5. According to data from the Pew Research Center, the national estimate for people who only access Internet access via smartphone is 17%; however, the number is much lower in Austin, below 4%. When asked about specific activities conducted online, some are primarily completed with smartphones, some with computers, and some with both. In line with national figures,

smartphone use is slightly higher among Hispanic residents (92%) than non-Hispanic White (87%), Asian (86%) or African American residents (79%).

a. Respondents primarily use smartphones to contact ride share services, check city information, find public transport info, and buy bus passes;
b. Respondents use both smartphones and computers to find directions, read the news, and contact family or friends, research products before purchase, find information about health, and research city information and resources;
c. Respondents primarily use computers to complete forms, apply for jobs, learn new skills, and pay city bills, although over a quarter of respondents also use smartphones to complete the same tasks.

More Non-Hispanic White and Asian respondents access the Internet from home or work than respondents from other racial/ethnic groups. African-American respondents use public or library access more than others. Men are more likely to access the Internet at retail places and women are more likely to access the Internet at libraries. Respondents over the age of 65 are least likely to use home access. Respondents under 34 are most likely to access the Internet at libraries. Respondents with an income less than $10,000 are least likely to access the Internet at home and most likely to access the Internet at libraries.

Nonusers are most likely to be Hispanic, male, have less than a high school education, and be between the ages of 25 and 34 or over 65. (Remember that there were only 71 nonusers.) Both users and nonusers tend to have smartphones.

The main reason given by nonusers for not using the Internet was concern about safety and privacy. The next most common reason was that they did not need the Internet for their work, followed by a home Internet connection is too expensive, too difficult to use, they were not interested, and that someone else could go online for them. Most respondents reported that they know enough to go online on their own. Almost 80% of nonusers said Internet access would have to cost less than $10 for them to subscribe.

The survey developed a comprehensive set of questions to assess digital literacy or capability. Capability varies most clearly by age, with the youngest respondents having the best overall literacy and capabilities. Literacy and capability also improve with increases in educational attainment, but levels off after a respondent attains a four-year college education.

Among the 19 questions about digital literacy, three distinct groups of capabilities or types of literacy emerged from the statistical process called factor analysis. The first reflects basic capabilities for using the Internet and a smartphone. The second reflects an intermediate level of capability related to both more advanced work and personal purposes, like the abilities to use productivity software or online banking. The third grouping reflects advanced skills like coding or the ability to create content as well as protecting themselves from malware.

For survey respondents with children or grandchildren for whom they were responsible, the survey asked about the homework gap, i.e. whether their children/grandchildren had trouble completing homework due to lack of computer access, Internet access, or required computer skills. Although 50% of respondents

with children say their children can access the internet at a public or school library, 12% feel that their children cannot do their homework for lack of Internet access. Twenty percent say their children cannot complete homework because of lack of access to computers. Twenty-two percent of respondents with children feel that their children's computer skills are not good enough to complete homework, and 18% do not feel that their children are learning the computer skills at school that will prepare them for the future.

In terms of health-related information, the survey shows that most people look on the Internet for health information for themselves, found health information on a mobile phone, and accessed health websites. In terms of health information sources, people turned first to healthcare professionals and second to health websites. In terms of trust in information, people trust health care professionals, health agencies and groups, health websites, family/friends, and health mobile apps.

1. Background on the Survey Project

The 2018 Austin Digital Assessment Project was supported by the Telecommunications & Regulatory Affairs Office of the City of Austin, the Telecommunications and Information Policy Institute at the University of Texas, and faculty and graduate students from the Department of Radio, Television, and Film at the University of Texas. This study on Internet and technology use surveyed a core sample of 8,000 randomly selected addresses in Austin and an additional oversample of 3,000 households in geographic areas with lower median incomes throughout Austin. The sample of 11,000 randomly selected addresses was ordered from the US Data Corporation (see Appendix 1 for a list of the zip codes from which addresses were sampled.) Potential respondents could complete the questionnaire either online or via hard copy questionnaire that was mailed to them with a postage-paid return envelope.

The Dillman method for surveying was implemented, with a postcard notifying selected residents about the survey mailed in January 2018, two weeks before the arrival of the mailed questionnaire. The postcard contained instructions on how to access the survey online if residents preferred to use their computer. The online survey paralleled the paper survey. The survey was self-administered and received Institutional Research Board approval at the University of Texas at Austin. A total of 635 paper surveys and 354 online surveys were received by the research team, creating a sample size of 997 returned surveys. Additionally, 206 surveys from the random sample were undeliverable and returned by the USPS. Of the randomly sampled addresses, seven were returned due to the addressee being deceased, four respondents anonymously refused to complete the survey, while 16 respondents chose to opt out from taking the survey but allowed their access code to be used to remove them from future mailings.

The American Association for Public Opinion Research (AAPOR) has standardized definitions for calculating response rates based on conservative measures of eligibility within a sample. According to methods for mail and Internet surveys as defined by the AAPOR Standard Definitions Report (2011), the

2018 Austin Digital Assessment Project had a response rate of 9%. This response rate is acceptable for self-administered, mail-based surveys.

2. Respondent Demographics

A weighting procedure developed by Dr. Sharon Strover was used to compensate for the unrepresentativeness of the randomly sampled set of respondents. Using criterion data supplied by the 2016 American Community Survey, SPSS 22's raking procedure generated a weight used in subsequent analyses.[1] The four weighting variables included respondent's education level, race/ethnicity, and age. Age and educational attainment data had to be interpolated by the research team in order to match the current survey's categories. Furthermore, the income level of respondents could not be weighted since the current survey's income categories did not conform to any reference set. With the weighting procedures, the survey results are generalizable to the Austin population. Table 1 and Table 2 illustrate the results for basic demographic characteristics of the sample. We provide comparisons of the unweighted and weighted frequencies.

[1] The relevant comparative data are reproduced at http://www.austintexas.gov/page/demographic-data.

TABLE 1 RACE AND ETHNICITY, AGE, EDUCATION LEVEL, AND GENDER: WEIGHTED, NON-WEIGHTED, AND CENSUS RESULTS FOR AUSTIN (*N* = 997)

	Unweighted Sample (%)	Weighted Sample (%)	2016 ACS Parameter (%)
Race and Ethnicity			
White (non-Hispanic)	74.1	52.7	48.9
Hispanic	14.0	32.1	34.5
African American	5.2	7.6	7.2
Asian	3.2	6.8	6.7
Other	1.4	.9	.5
Gender			
Male	48.3	47.9	50.5
Female	50.3	51.5	49.5
Educational Attainment			
Less than high school	1.1	12.0	8.5
High school	6.9	16.4	13.0
Some college	15.9	23.9	20.8
College degree	39.3	30.2	21.8
Postgraduate	34.8	17.5	11.9
Age (18 plus)			
18-24	1.0	14.5	14.4
25-34	12.3	28.1	22.0
35-44	18.8	20.0	15.7
45-54	14.5	15.2	12.0
55-64	20.2	12.1	9.6
65-74	20.0	6.1	4.8
75-84	6.3	2.7	2.1
85+	1.7	1.2	1.0

Note: Only one respondent selected a non-binary option, genderqueer.

As Table 1 shows, the weighted race and ethnicity composition of the sample is 53% non-Hispanic White, 32% Hispanic, 8% African American, and 7% Asian. Overall, even with the weighted sample, over 50% of respondents have obtained a four-year college degree. The mean age of the weighted sample is 42 years old and the median age is 38, which is older than the median age of 33 for Austin in 2017.[2]

The unweighted mean household size of the sample is 2.2 people (compared to the 2014 report 2.1). Table 2 shows that about one-third of the sample live alone (21% in the previous survey), while another 52% live with one other adult (47% in the previous survey). Eighty percent of households in the same have no

[2] American Community Survey (ACS). Available at https://www.census.gov/programs-surveys/acs/

children living with them. About 10% of households in the sample have one child and another 7% have two children.

TABLE 2 ADULTS & CHILDREN IN HOUSEHOLD (UNWEIGHTED)

		Frequency	Percent (%)
# of Adults (including oneself)	1	316	31.7
	2	516	51.8
	3	92	9.2
	4	22	2.2
	5	9	.9
	6	1	.1
	Missing	41	4.1
# of Children (under 18)	0	760	76.2
	1	103	10.3
	2	74	7.4
	3	28	2.8
	4	1	.1
	Missing	31	3.1

The median income level of respondents is $50,000 to $74,000, comparable to the 2017 estimates from American Community Survey's estimate of a median yearly household income of $63,717 for Austin.

In terms of employment, almost 60% of respondents reported that they work full time, and 8% reported working part-time. The American Community Survey's 2017 estimates note an "in labor force" statistic for Austin of 73% among people 16 years and older. Eleven percent of respondents reported being a student. A separate 11% of the respondents were retired.

TABLE 3 SAMPLE EMPLOYMENT & INCOME

		Frequency	Percent (%)
Household Income	Less than 10K	35	3.5
	$10K – $19,999	69	7.0
	$20K – $29,999	70	7.0
	$30K – $39,999	47	4.8
	$40K – $49,999	65	6.6
	$50K – $79,999	240	24.1
	$75K and Over	383	38.4
	Prefer not to answer	82	8.2
Employment Type[*]	Employed Full Time	581	58.3
	Employed Part Time	84	8.4
	Self-Employed Full Time	81	8.1
	Self-Employed Part Time	61	6.1
	Student	112	11.2
	Full time Homemaker	44	4.4
	Looking for Work	52	5.2
	Stopped Looking for Work	13	1.3
	Retired	106	10.6
	Disabled	29	2.9
	Unemployed	45	4.5
	Other	4	.4

Note: Respondents could make multiple responses to the question about employment type, such as "student" and "employed part time."

Tables 4 through 6 illustrate some of the relationships within the sample regarding education, race, and age. Overall, the Hispanic population has the lowest education level, followed by the African American population, as more than 35% of both populations have an education level up to high school. On the other hand, a majority of non-Hispanic White and Asian respondents in our weighted sample have some form of college-level education or higher.

When it comes to age, people over 65 report higher levels of educational attainment. The youngest age group, 18 to 24 years old, show the highest proportion of college-level education.

TABLE 4 EDUCATION BY RACE

Education	Race and Ethnic Categories					
	White *(non-Hispanic)*	Hispanic	African American	Asian	Other	**Total (N)**
Less than HS	1.0%	34.7%	5.3%	0.0%	0.0%	**120 (12.0%)**
High school	11.0%	23.1%	32.9%	7.2%	12.5%	**163 (16.3%)**
Some college	22.1%	26.3%	18.4%	31.9%	37.5%	**239 (23.9%)**
College Degree	41.3%	8.4%	34.2%	40.6%	37.5%	**301 (30.2%)**
Graduate degree	24.6%	7.5%	9.2%	20.3%	12.5%	**175 (17.5%)**
Total	**525 (52.6%)**	**320 (32.1%)**	**76(7.6%)**	**69 (6.9%)**	**8 (0.8%)**	**998**

TABLE 5 EDUCATION BY AGE

Education	Age Brackets								
	18 – 24	25 – 34	34 – 44	45 – 54	55 – 64	65 – 74	75 – 84	85 –	**Total**
Less than HS	0.0%	9.6%	12.6%	27.6%	0.0%	32.8%	0.0%	41.7%	**119 (11.9%)**
High school	21.4%	12.1%	12.1%	13.8%	26.4%	18.0%	25.9%	16.7%	**162 (16.2%)**
Some college	35.2%	21.4%	23.1%	19.1%	28.9%	13.1%	25.9%	25.0%	**239 (24.0%)**
College Degree	43.4%	33.9%	31.2%	21.7%	26.4%	14.8%	29.6%	8.3%	**303 (30.4%)**
Graduate degree	0.0%	22.9%	21.1%	17.8%	18.2%	21.3%	18.5%	8.3%	**174 (17.5%)**
Total	**145 (14.5%)**	**280 (28.1%)**	**199 (20.0%)**	**152 (15.2%)**	**121 (12.1%)**	**61 (6.1%)**	**27 (2.7%)**	**12 (1.2%)**	**997**

TABLE 6 EDUCATION BY INCOME

Education	Income Levels							
	Less than 10K	$10K-$19,999	$20K-$29,999	$30K-$39,999	$40K-$49,999	$50K-$74,999	$75 and Over	**Total**
Less than HS	14.3%	43.5%	38.6%	12.5%	0.0%	21.3%	0.0%	**119 (13.1%)**
High school	34.3%	29.0%	14.3%	16.7%	10.8%	22.2%	9.2%	**145 (16.0%)**
Some college	5.7%	8.7%	21.4%	35.4%	44.6%	21.3%	27.5%	**225 (24.8%)**
College Degree	31.4%	15.9%	15.7%	25.0%	24.6%	24.3%	36.6%	**259 (28.5%)**
Graduate degree	14.3%	2.9%	10.0%	10.4%	20.0%	10.9%	26.7%	**160 (17.6%)**
Total	**35 (3.9%)**	**69 (7.6%)**	**70 (7.7%)**	**48 (5.3%)**	**65 (7.2%)**	**239 (26.3%)**	**382 (42.1%)**	**908**

3. USING THE INTERNET: DEVICES AND PLACES

There are several ways to assess Internet usage. Basic access to the Internet is frequently measured in terms of home access, namely a home subscription to a broadband service. The majority of the sample, 95%, has a home Internet connection, and nearly all of the respondents use the Internet.[3] Among the 5% of respondents that does not have a home Internet connection, 72% use the Internet at another location, like public libraries, or by another means, such as using a mobile connection.

The survey listed several electronic devices that can be used in conjunction with the Internet. As Table 7 illustrates, 99% of respondents have cell phones and 97% of them own a smartphone. The majority of respondents (76%) also own a laptop, but that rate is 7% lower than it was in 2014. Over half of the respondents own a tablet computer. The sample's ownership and usages of electronic devices, smartphones, and cellphones is similar to national averages reported by Pew Research Center,[4] except that only 5% of respondents in Austin depend primarily on smartphones for Internet access compared to the national average of 20%.

Table 7 Home Internet Connection and Device Ownership (% of *N* = 997)

Device	2014 (%)	2018 (%)
Home Internet Connection	92%	94.7%
Desktop Computer	56.8%	47.8%
Laptop Computer	83.4%	76.1%
Tablet Computer	59.8%	69.2%
Cell Phone	95.6%	99%
Smartphone	83%	97%[5]

Table 8 shows what people do with three of the main devices and how the type of device influences what a respondent does online. Respondents use smartphones, computers, and tablets to use diverse city services, complete personal tasks, and do work-related activities. The use of tablet computers, in addition

[3] A very small percentage (1.3%) of people said they themselves do not use the Internet even though their home has a connection.

[4] Hitlin, P. (2018). Internet, social media use and device ownership in U.S. have plateaued after years of growth. Available at: https://www.pewresearch.org/fact-tank/2018/09/28/internet-social-media-use-and-device-ownership-in-u-s-have-plateaued-after-years-of-growth/

[5] Smartphone use is measured as a percentage of those with cell phones.

to smartphones and computers, is more frequently observed in everyday activities such as searching for news or health information, shopping online, and communicating with family and friends.

However, there are distinct differences in the ways people use the Internet with each kind of device. For example, respondents use smartphones more than computers for transportation and other location-based services. Smartphone usage also surpasses computer usage in getting news and staying connected with friends and family. This illustrates the pervasive role of Internet-connected mobile devices in Austinites' daily lives. But certain kinds of online activities, especially work-related tasks, are still more common on computers than on smartphones. Tablets seem to only occupy a niche space in the respondents' digital device usage.

TABLE 8 DEVICES USE BY ACTIVITY (% OF *N* = 997)

	Smartphones (%)	Computers (%)	Tablet (%)
Use city services			
Buy bus pass	10	3	1
Pay city bills	31	58	9
Get public transportation info	38	19	4
Get info on or apply for govt. services	25	30	6
Contact ride share services	47	3	1
Check city info and resources	42	43	8
Work-related			
Complete work for current job	38	61	12
Learn job-related skills	22	45	10
Apply for new job	24	38	**7**
Health			
Get information about health	57	56	19
Complete forms for health/other services	26	55	6
Purchases			
Check out product before buying	69	64	24
Information/news			
Get directions	92	48	15
Read news/current events	84	57	30
Social			
Connect with friends or family	88	53	18

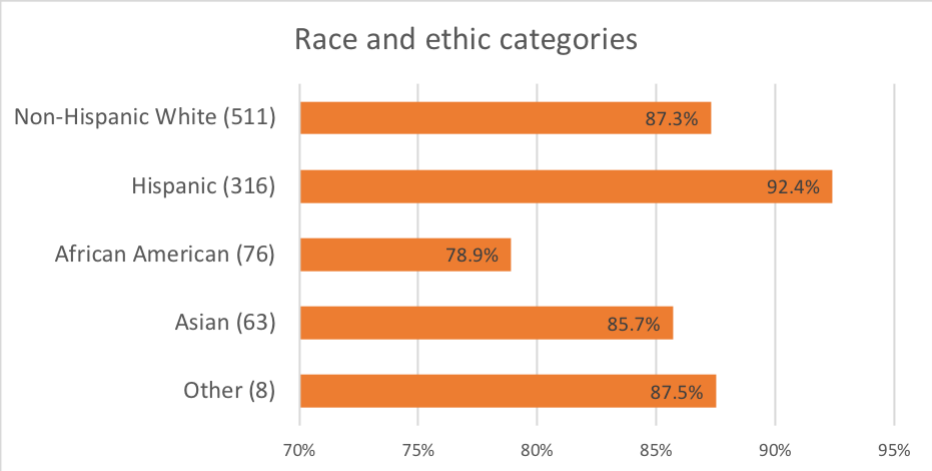
Note. The total percentage for each row does not add up to 100% as it displays values as a percentage of a respective field.

While national survey results conducted by Pew Research Center through 2013-2018 reported Americans' growing reliance on smartphone use for internet access[6], with 17% using smartphones for Internet but not having home broadband, our survey shows that there are very little number of "smartphone-only"

[6] Pew Research Center, February 2018, "Mobile Fact Sheet." Available at: https://www.pewinternet.org/fact-sheet/mobile/

Internet users in Austin. Out of the whole respondents, only 34 people (3.4%) in Austin answered they own smartphones, but do not have traditional home broadband connection.

FIGURE 1 RESPONDENTS USING DATA PLAN ON THEIR MOBILE DEVICE BY RACE/ETHNICITY*



**** Use a mobile data plan to get to the Internet "daily" or "several times a week"***

Nonetheless, smartphones are of growing importance for Internet access among respondents. Figure 1 shows that the percentage of smartphone use for Internet connectivity is similar across racial groups. Ninety-two percent of Hispanic respondents use smartphones to access the Internet, followed by non-Hispanic Whites (87%). Even the lowest rates of smartphone use for online access among African Americans and Asians are still relatively high (79% and 86%, respectively). In addition, smartphones play an especially prominent role in providing Internet access to those who have no home broadband connection. As Table 9 shows, 79% of respondents without a home broadband connection own cell phones and over half of them are smartphone owners. This is almost double the rate of laptop computer ownership. Although respondents without a home broadband connection represent a small group of people (*N*=67), over three-quarters of them report that they rely on smartphones for Internet access.

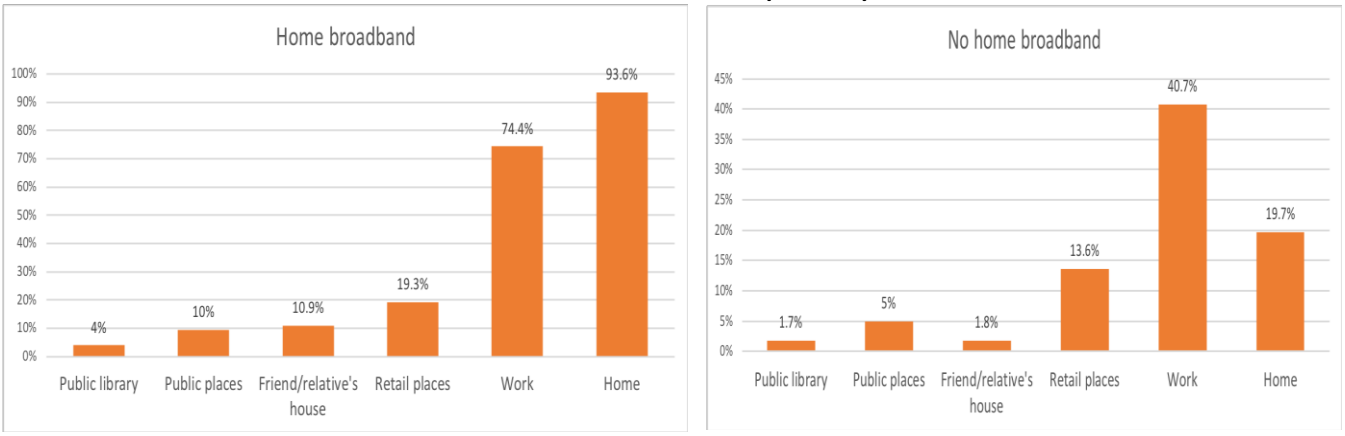
TABLE 9 RESPONDENTS WHO DO NOT HAVE HOME BROADBAND BUT OWN DEVICES (% OF *N* = 67)

Device	Ownership
Desktop Computer	11.9
Laptop Computer	35.8
Tablet Computer	9.0
Cell Phone	79.1
Smartphone	50.7

As Figure 2 demonstrates, home closely followed by work are the two most common places that respondents with a home broadband connection use the Internet. These respondents accessed the Internet occasionally (i.e. less often than monthly) at retail places, like coffee shops, and a family member or friend's home were used occasionally.

A similar pattern of access was observed among respondents who do not use home broadband services, but these respondents us all sites frequently to access the Internet. Approximately 40% of respondents without a home Internet connection accessed the Internet at their workplace. Respondents without a home broadband connection tend to use some of the City-provided sites (e.g. public libraries, community centers, and places with public WiFi) less than at work or at home.

FIGURE 2 HOW OFTEN YOU USE THE FOLLOWING (PLACES) TO GET TO THE INTERNET



**** Note: Those with Home Broadband (N=930), No Home Broadband (N=67)***
***** % of access "daily" or "several times a week"***

The place of access varies by race/ethnicity, as well as by other demographic characteristics, such as age, sex, level of education, and income. Table 10 shows the place of frequent Internet access across a wide range of demographic variables, while Table 11 compares the groups that rarely access or do not have access at each site by demographics.

TABLE 10 FREQUENTLY USED SITES FOR ACCESS BY RACE, AGE, GENDER, INCOME, AND EDUCATION (%*)

	At Home	At Work	Retail Places	Public Places	Public Library
Race					
White (non-Hispanic)	94.6	84.5	18	6.9	2.4
Hispanic	82.6	52	25	12.3	0.3
African American	71.7	53.5	18	13.7	10
Asian	95.6	86.3	38.1	6.3	22.6
Other	100	87.5	16.5	0	0
Gender					
Male	89	73.3	21.2	9.6	2.4
Female	90.4	71.9	17	9.1	5.1
Age					
18-24	100	56.2	0	0	6.2
25-34	83.9	76.9	26	11.2	7.2
35-44	95.9	76.3	20.6	8.9	2
45-54	96.1	92.5	30.1	19.9	0.7
55-64	82.6	69.6	16.2	6.5	0.9
65 and older	71.1	23	7.2	4.8	2.5
Education					
Less than HS	63	36.8	17.5	17.5	0
High School	82.9	44.4	14.5	7.3	5.4
Some college	89.4	84.9	17.2	7	4.8
College degree	97.6	82.4	19.9	8.4	4.2
Some graduate school	98.2	90.2	24.4	9.6	2.4
Income					
Less than 10K	48.6	40	5.9	27.3	48.5
$10K-$19,999	89.8	4.5	1.4	2.9	1.5
$20K-$29,999	56.5	37	11.8	2.9	0
$30K-$39,999	82.6	52.2	22.7	16.3	0
$40K-$49,999	86.2	77.7	31.2	6.5	17.2
$50K-$74,999	92.4	75.9	22	13.6	0.4
$75K and over	97.4	92	19.3	5.8	1.4

**** % of access "several times a week" or "daily"***

TABLE 11 SITES THAT ARE RARELY USED OR NOT AT ALL FOR ACCESS BY RACE, AGE, SEX, INCOME, AND EDUCATION (%*)

		At Home	At Work	Retail Places	Public Places	Public Library
Race						
	White (non-Hispanic)	4.5	13.4	50.1	78.7	86.6
	Hispanic	16.1	46.2	58.1	75.3	96.5
	African American	25.7	46.4	68	72.6	82.9
	Asian	1.5	13.6	44.5	85.7	64.5
	Other	0	12.5	25	87.5	87.5
Gender						
	Male	10.6	25.8	51.5	81.4	91.5
	Female	7.7	25.4	54.9	73.4	84.6
Age						
	18-24	0	43.9	66.2	93.8	81.4
	25-34	16.2	19.8	44.4	76.5	85.3
	35-44	3.5	21.1	51.5	65.7	86.5
	45-54	3.3	6.2	33.5	70.6	95.2
	55-64	9.9	30.5	66.7	80.5	90.9
	65 and older	26.8	75.4	83.3	89.3	93.8
Education						
	Less than HS	37	63.1	65	61.7	100
	High School	13.4	55.6	42.3	86.9	88.6
	Some college	9.4	10.8	73.6	86.9	89.6
	College degree	1.7	15.5	49.4	73.7	83.3
	Some graduate school	1.2	8.6	35.1	74.3	85.7
Income						
	Less than 10K	45.7	60	67.6	72.7	51.5
	$10K-$19,999	10.1	95.5	82.6	58.8	85.3
	$20K-$29,999	42	60	73.5	91.2	89.7
	$30K-$39,999	17.4	36.4	68.2	76.8	88.3
	$40K-$49,999	9.3	15.8	56.2	85.5	65.6
	$50K-$74,999	6.7	23.6	36	78.3	91.4
	$75K and over	1.6	6.7	49.3	80.3	91.4

**** % of "access rarely" or "don't have access"***

Among all racial/ethnic groups, Asian respondents have the highest connectivity in most places, closely followed by White respondents at home and work. Both African American and Hispanic respondents have a lower level of connectivity at work but showed more frequent use of the Internet at public places than other racial groups.

Overall, the sample population aged 25 to 54 accessed the Internet more frequently at every place than other age groups, especially those 65 and older. Household income and education levels were strong predictors of frequent Internet access —the more educated and the wealthier the respondent, the more likely they were to use the Internet at home, in the workplace, and at retail places. Only about one-third

of respondents with less than a high school education access the Internet at work. Access rates at public places are highest among those with the lowest levels of income and education.

Asian and African American respondents most frequently access the Internet at public libraries. White and Hispanic respondents rarely access the Internet at public libraries.

Internet connection at public libraries is most frequently observed among younger respondents from 18 to 34 (13%), though the 18 to 24 age group tends to access the Internet primarily at home. Women tend to more frequently access the Internet at libraries and other public places than men.

Public places, such as public libraries, play an essential role in providing Internet connectivity for marginalized populations. For example, respondents in the lowest income bracket, who make less than $10K a year, report the highest use of public places and public libraries for Internet access (27% and 49%, respectively).

However, respondents living in households with an annual income ranging between $10K-$40K, are the group least likely to go to public libraries to access the Internet. Furthermore, respondents who did not graduate high school seldom access the Internet at public libraries, although they access the Internet most frequently at public places (18%) compared to other education levels. A follow-up survey with less advantaged residents who use digital inclusion services by major City of Austin partners is investigating if these segments of the population are aware of the public library's offering of digital resources.

As shown by the maps in Figures 3 and 4 below, access to the Internet is much lower in the eastern-most regions of the city. This parallels a pattern in which many low-income residents of Austin are being pushed further northeast, east, and southeast out of the city limits[7]. One common factor that could be driving these trends is the rising cost of living in the city. Low-Income residents in these areas may be faced with a choice between having a home internet connection or satisfying other financial needs. Additionally, residents in these areas may live further away from key institutions such as public libraries and neighborhood centers, and they may be outside of the service areas for many Internet Providers.

[7] University of Texas. (2018). *Uprooted: Residential Displacement in Austin's Gentrifying Neighborhoods, and What Can Be Done About It.* https://sites.utexas.edu/gentrificationproject/

FIGURE 3 AUSTIN INTERNET ACCESS BY ZIPCODE

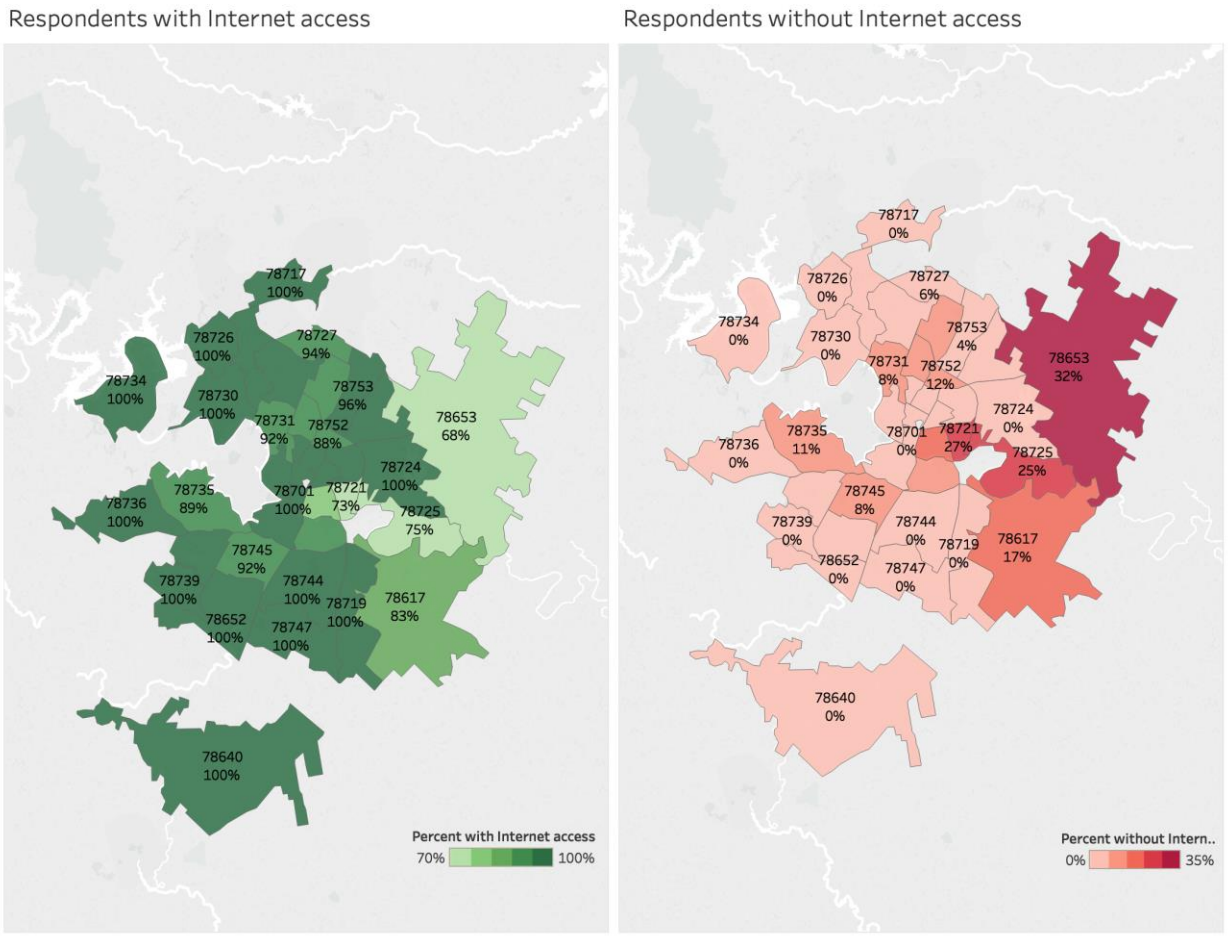
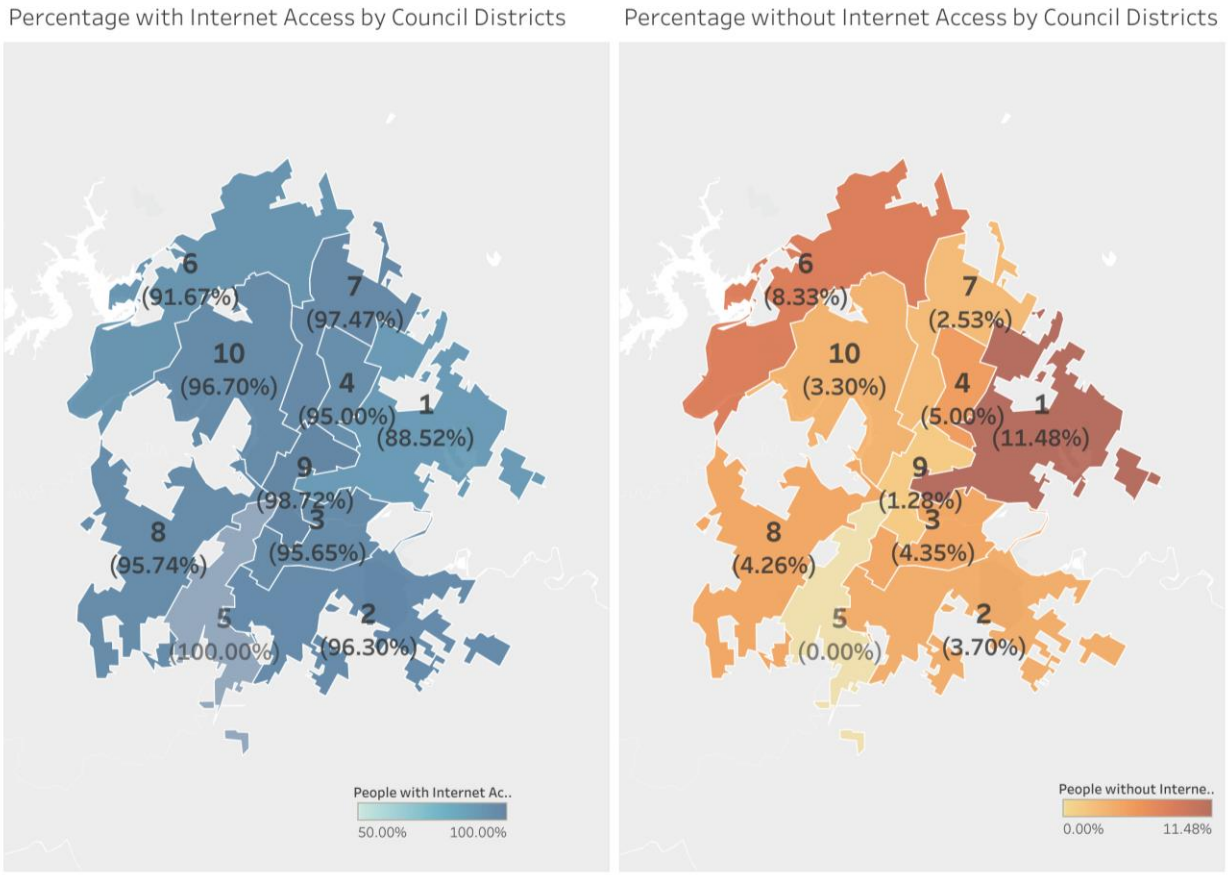


FIGURE 4 AUSTIN INTERNET ACCESS BY COUNCIL DISTRICT



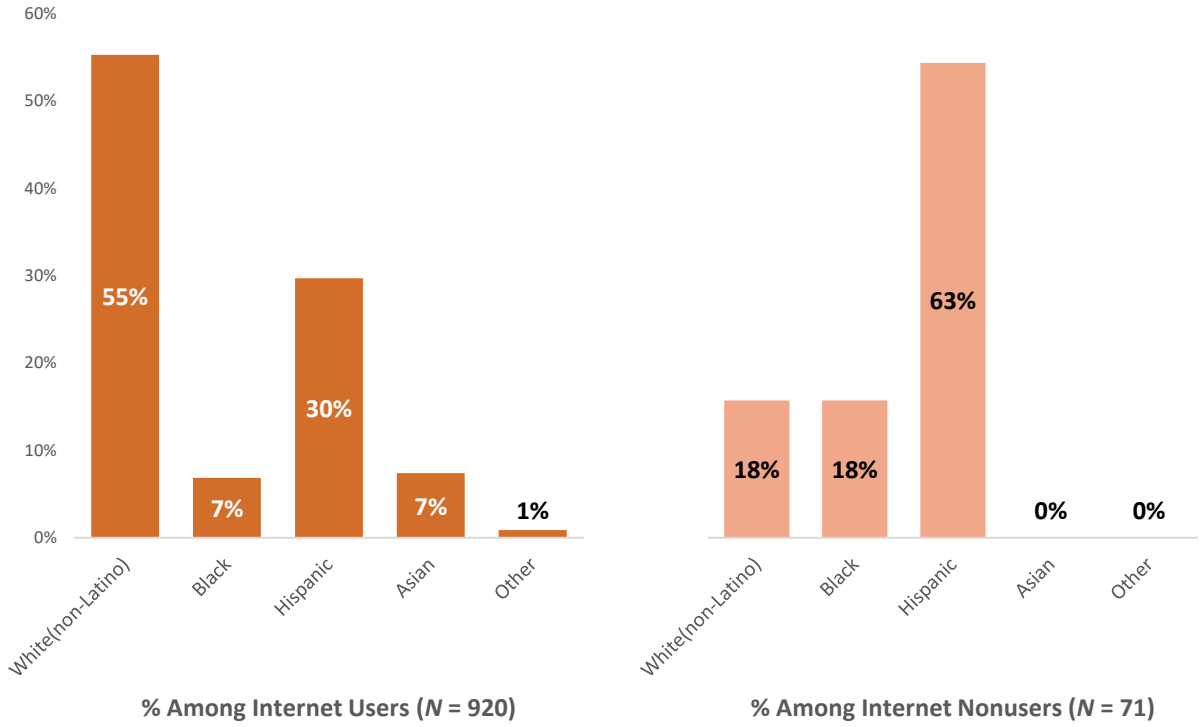
4. PROFILE OF THE NONUSER

The small percentage of people in the sample who said they do not use the Internet (7%) have less than a high school education and the majority of them were male. Seven percent represents about 67,500 people in Austin's adult population (estimated by the 2017 American Community Survey to be 950,715). The majority of nonusers are Hispanic (63%), while the number of non-Hispanic White and African American people who do not use the Internet are the same (18%). About half of the respondents who do not use the Internet were over 55 years old. The other half of Internet nonusers are between 25 and 34 years old.

TABLE 12 NONUSER STATUS BY RACE/ETHNICITY, GENDER, EDUCATION, AND AGE IN AUSTIN

Demographic Characteristics (*N* = 71)	Percentage (%)
Race and Ethnicity	
White (non-Hispanic)	18.3%
Hispanic	63.4%
African American	18.3%
Asian	0%
Other	0%
Gender	
Male	63.6%
Female	36.4%
Educational Attainment	
Less than high school	62.9%
High school	30.0%
Some college	7.1%
College degree	0%
Postgraduate	0%
Age (18 plus)	
18-24	0%
25-34	53.5%
35-44	0%
45-54	0%
55-64	12.7%
65-74	18.3%
75-84	5.6%
85+	9.9%

FIGURE 5 RACE/ETHNICITY OF INTERNET USERS AND NONUSERS



Compared to national data,[8] Austin nonusers are more likely to be Hispanic. Hispanics comprise 63% of nonusers but only 30% of the Internet user population. While roughly 63% of the Internet nonusers are Hispanic, only 30% of the population of Internet users are Hispanic. Nonusers are also less likely to have completed high school (63%). A high proportion of Internet nonusers are in their late 20s and early 30s (54%).

In order to further predict the factors influencing nonuser status, the research team analyzed the data using a logistic regression model (see Table 18 in Appendix 3). The model predicted the probability of being an Internet nonuser in terms of log odds with their basic sociodemographic profile (e.g., age, race, gender, and income and education levels). Regarding the gender dummy and race variable, males and non-Hispanic Whites serve as the respective reference groups.

The result shows that gender, race, education, and income levels are statistically significant predictors of being a nonuser but in different ways. The probability of female respondents being in the nonuser group is higher than that of male respondents ($p < 0.01$). African American respondents are also more likely to be in the nonuser group in comparison to White respondents ($p < 0.05$). On the other hand, the level of

[8] Pew Research Center (2018.3.5), 11% of Americans don't use the Internet. Who are they?. http://www.pewresearch.org/fact-tank/2018/03/05/some-americans-dont-use-the-internet-who-are-they/

income and education negatively predicts the probability of being in the nonuser group (p <0.001), meaning that the higher the level of income and education, the less likely respondents are to be in the nonuser group.

FIGURE 6 AGE OF INTERNET USERS AND NONUSERS

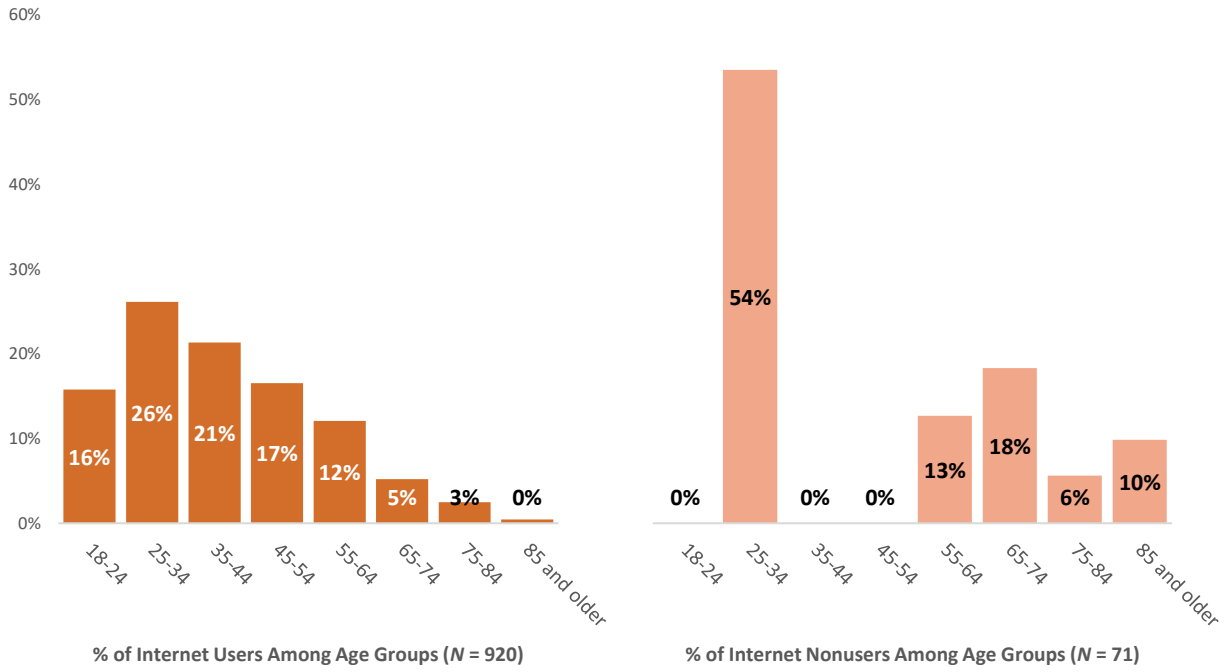


FIGURE 7 INTERNET USERS' AND NONUSERS' INTERNET CONNECTION & MEDIA DEVICES

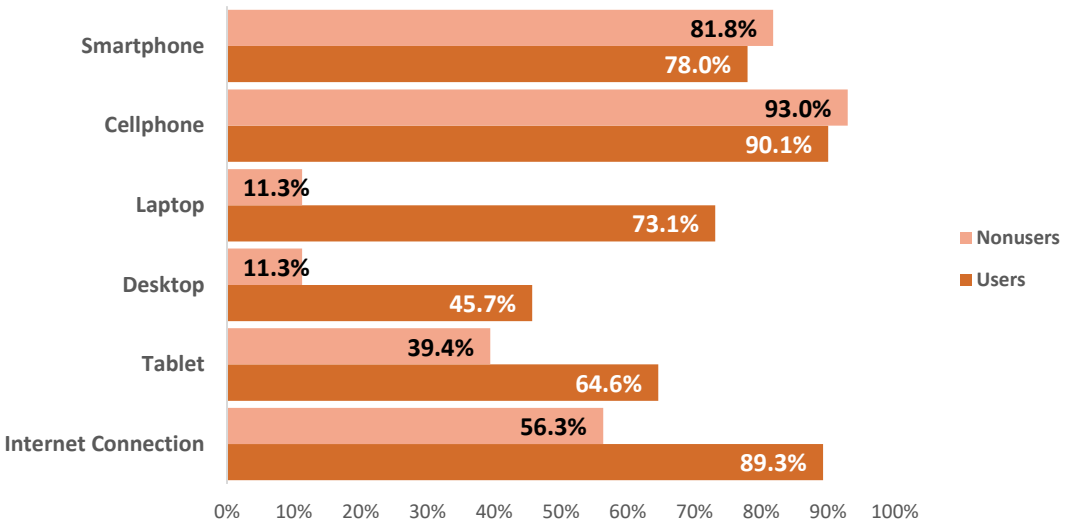
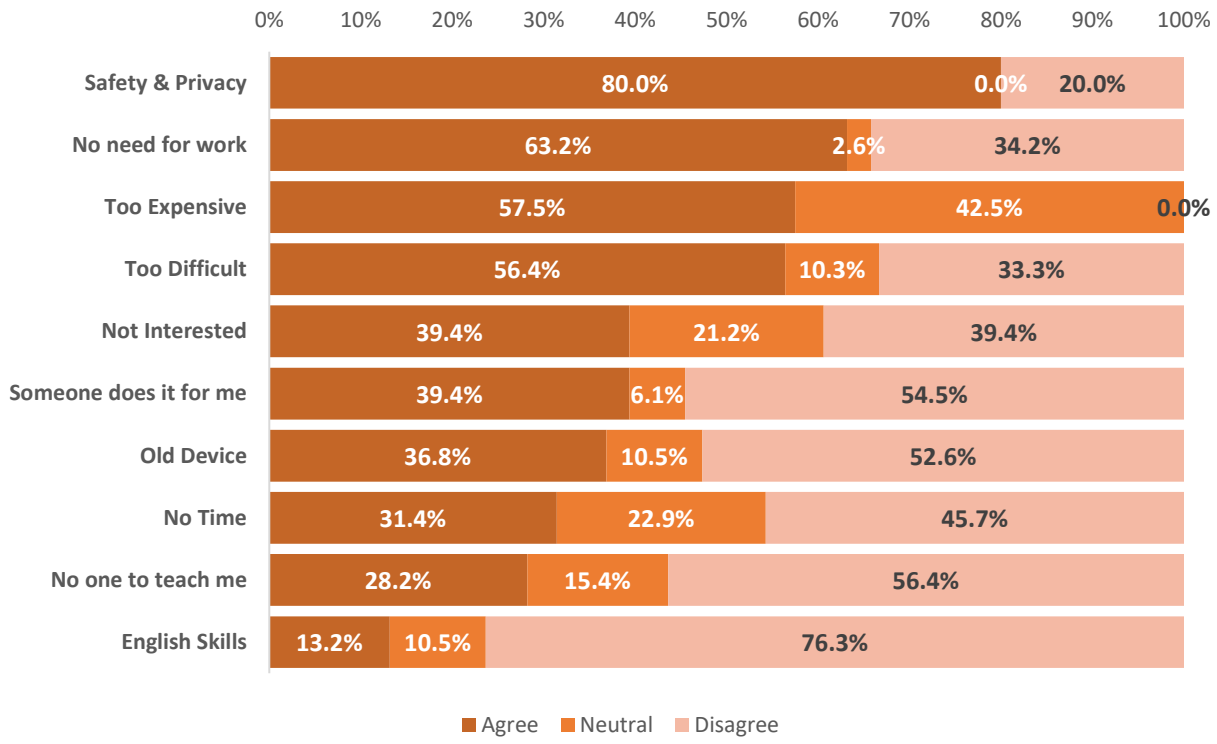


Figure 7 above demonstrates that Internet nonusers do own some digital technologies, but in much lower percentages than Internet users. Compared to people who use the Internet, far fewer nonusers own a desktop or laptop computer. However, nonusers own tablet computers and cellphones/smartphones at higher rates than Internet users. It is worth underscoring that 56% of Internet nonusers do have a home Internet connection. So, while Internet access is still a major issue for many, there may be other reasons for not using the Internet among respondents who do not use the Internet but do have a connection at home.

FIGURE 8 REASONS FOR NOT USING THE INTERNET (%*)



Note:* N *varies from 33 to 40 due to missing values

Figure 8 shows the various reasons why respondents do not use the Internet. The primary reason that respondents cite for not using the Internet is concern for safety and privacy. Moreover, it seems that a substantial proportion of nonusers feel the Internet is too expensive or difficult to use. Many respondents do not use Internet because they do not need it for work. Others report that they have people who would do Internet tasks for them, so they did not need to do it themselves. English language barriers are the least cited factor.

As illustrated in Table 13, when we asked Internet nonusers whether they felt confident enough to use the Internet, 27% said they would need someone to help them. The majority (73%) of those not using the Internet said that they knew enough to go online on their own.

TABLE 13 ABILITY TO USE THE INTERNET (%)

	Percentage (%)
I know enough to go online on my own	72.9%
I would need someone to help me	27.1%
Total	100.0% (*N* = 68)

As shown previously, the cost of an Internet connection is one of the most important factors affecting nonuser status. Table 14 below indicates nonusers' desired price points for having a home broadband connection. A majority of respondents said that they would prefer a very low price for an Internet connection. Only a small proportion of nonusers report a willingness to pay more than $36 for home broadband.

TABLE 14 MONTHLY PRICE PREFERENCES FOR HOME BROADBAND (NONUSERS, IN %)

Price Points	Percentage (%, *N* = 65)
$10 or less	78.5%
$11-$20	9.2%
$21-$35	1.5%
$36 or more	10.8%

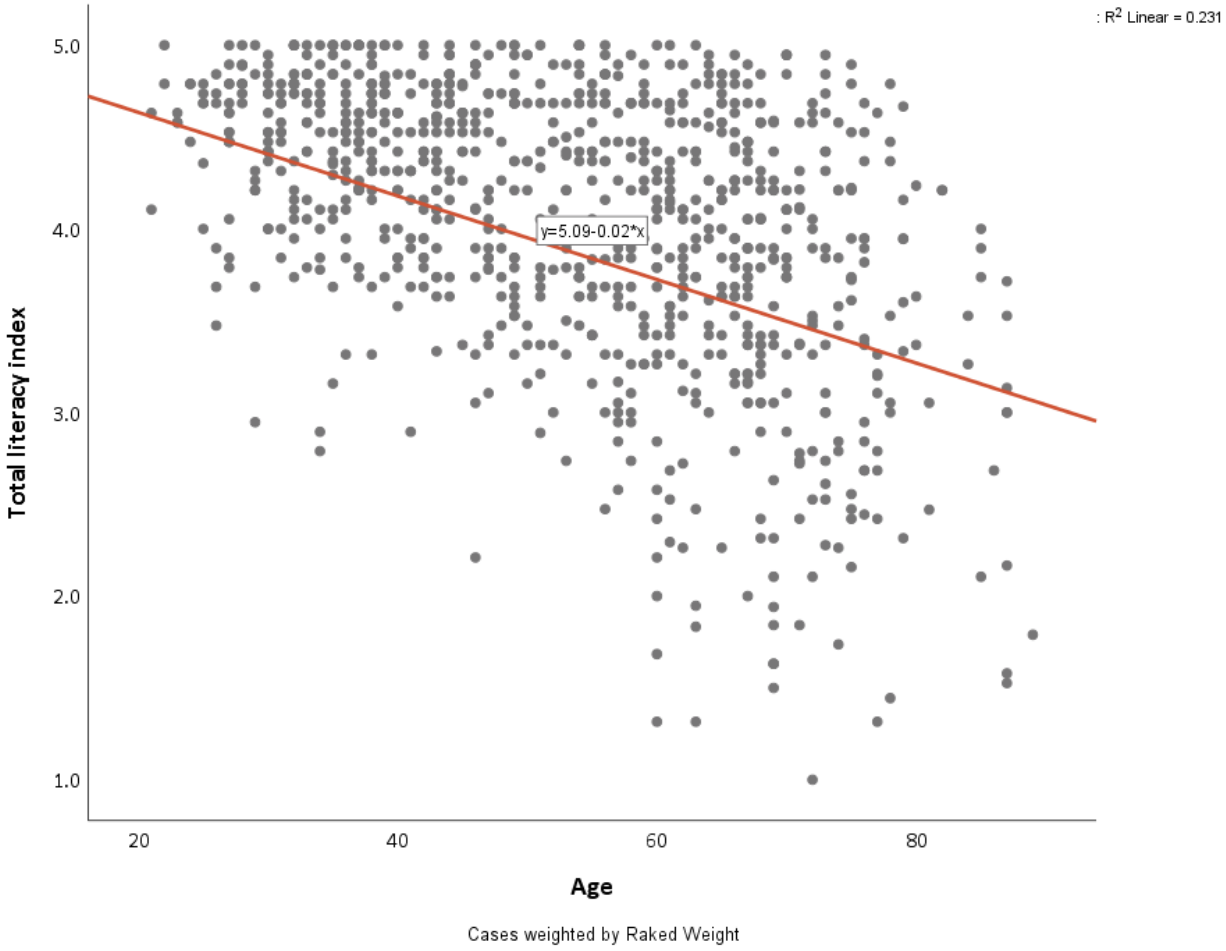
5. DIGITAL LITERACY/CAPABILITIES

The past two surveys of technology access and ownership in Austin in 2011 and 2014 used a short eight-item set of questions about people's digital literacy and capabilities. The 2018 survey added 12 items that Austin Free-Net[9] developed to assess the level of an individual's digital literacy skills before participating in Free-Net training courses. This broader range of questions provides a more fine-grained picture of the range and types of digital literacy within the Austin population.

[9] Austin Free-Net is a digital literacy advocate group, providing various training programs for using information and communication technologies. (http://austinfree.net/)

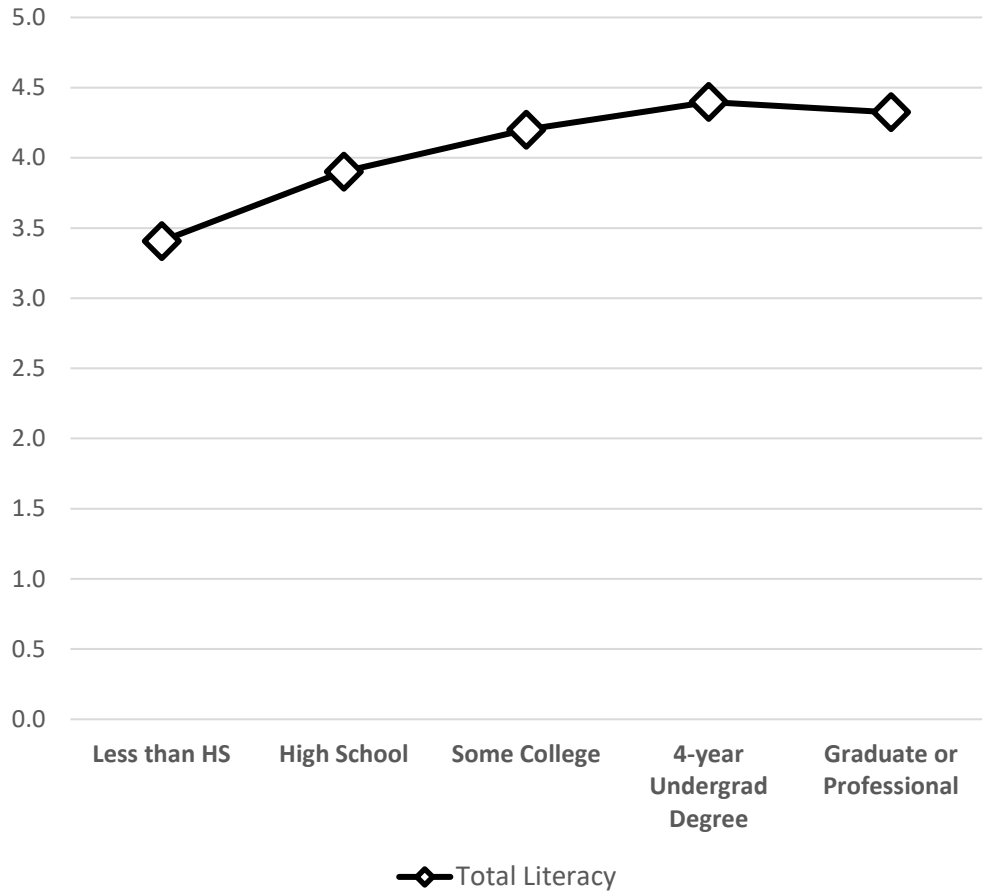
A total of 19 items used for measuring digital literacy and capability showed a substantial level of reliability as an index (Cronbach's α = .944). These items are quite comprehensive, measuring an individual's ability to perform very basic computer activities as well as more complicated skills, such as detecting malware and computer coding. The 19 items were averaged into a single index of general digital literacy and capability.

FIGURE 9 DIGITAL LITERACY/CAPABILITY AND AGE



In order to understand the deeper social implications of digital literacy/capability, the research team generated a scatterplot of the index's relationships with age and education level, as seen in Figure 9. The results showed that digital literacy and capability is negatively correlated with age. That is, the older an individual the lower their digital literacy level. That fits with the results above which show less use of digital technology by older respondents. On the other hand, as Figure 10 shows, digital literacy/capability is positively correlated with education.

FIGURE 10 DIGITAL LITERACY AND EDUCATION



Next, a factor analysis was conducted in order to identify potential subgroups of the digital literacy and capability index. As a result, the elements of digital literacy and capability that were surveyed are separated into the three groups shown in Table 15.

TABLE 15 FACTOR ANALYSIS OF DIGITAL LITERACY/CAPABILITY INDEX

Literacy/Capability Items	Components		
	Basic Capabilities (general use of Internet/mobile)	**Intermediate Capabilities** (personal/work-related purpose)	**Advanced Capabilities** (protection and creation in Internet/mobile)
Utilize smartphone	.818		
Application download	.805		
Upload content to a website	.775		.325
Bookmark a website	.722	.450	
Create & manage personal profile on SNS	.630		.542
Compare and check accuracy of information	.607	.487	.331
Use GPS/Map sites	.495	.453	.332
Turn on and log on to computers	.407	.811	
Utilize productivity software (e.g., MS Office)		.781	
Manage banking online	.490	.682	
Write and post job related documents online	.456	.665	.318
Search health information	.329	.650	
Protect computer from malware, spyware, etc.		.625	.501
Create own personal website			.780
Blocking spam		.301	.772
Make own content (video, photo, etc.)			.715
Adjust privacy settings			.712
Recognize phishing attempt		.576	.592
Write computer code			.488
Reliability of Components (Cronbach's α)	.923	.891	.863

**** Specific capability items corresponding to the red square comprise basic, intermediate, and advanced digital capabilities***
*****Note: All values greater than .3 are displayed.***
******Extraction method: Principal Component Analysis; Rotation method: Varimax with Kaiser Normalization***

Basic capabilities is the first factor or group of digital literacies and is shown on the left side of the table. Individuals in this group are capable of general use of the Internet and mobile phones.
Intermediate capabilities is the second factor in the middle of the table. Capabilities for this group include the use of the Internet, computers, or smart phones for both personal and work-related purposes, such as using productivity software or engaging in online banking.
Advanced capabilities is the third factor on the right side of the table. Advanced users are able to create digital content, websites, or computer code. They can also protect themselves from invasions of privacy, malware, spam, or phishing. These skills require a more in-depth

understanding of information technologies, as well as the ability to utilize technology beyond proprietary and productivity software.

FIGURE 11 THREE LEVELS OF DIGITAL CAPABILITY

Basic Capability

- Use devices (e.g., download app)
- Create online profile
- Surf web and bookmark pages

Intermediate Capability

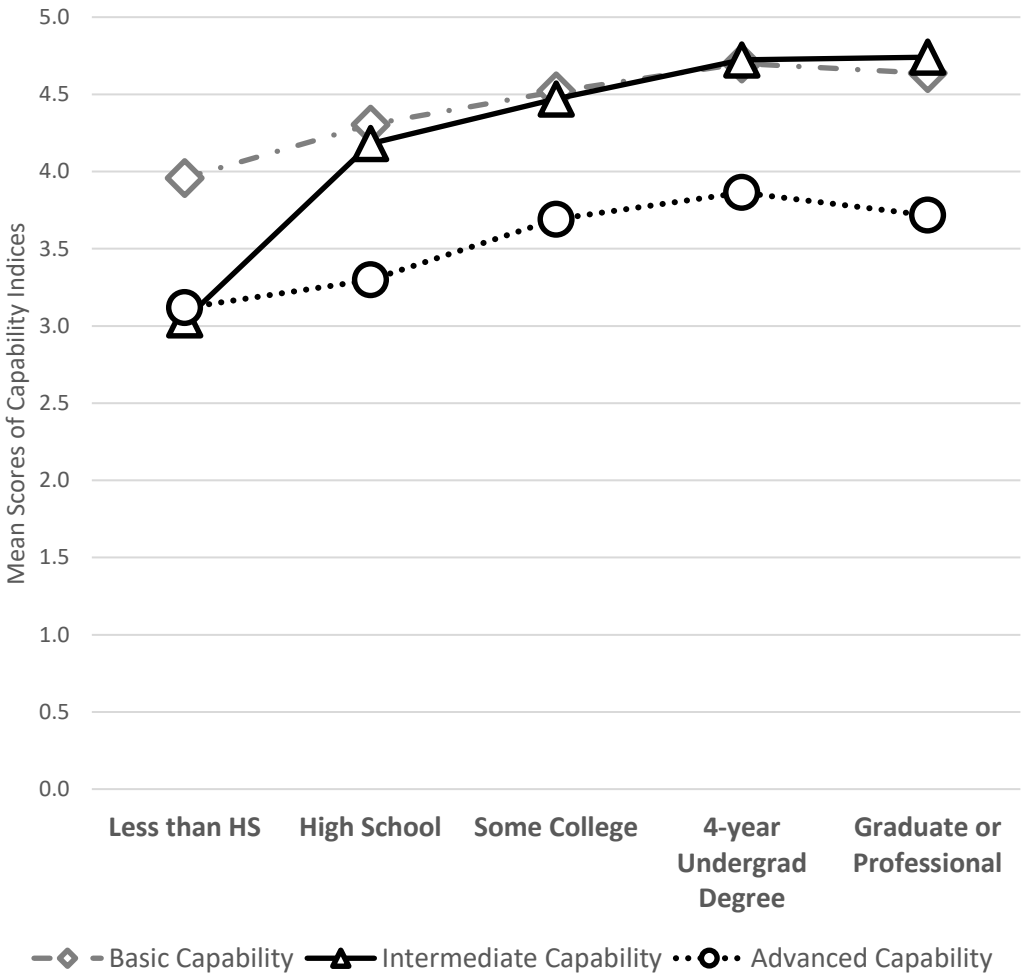
- Work-related computer skills (e.g., Word, Excel, etc.)
- Online banking
- Apply for job, search health information, etc.

Advanced Capability

- Security & Privacy (e.g., detect malware, control privacy setting)
- Creativity (e.g., create content and upload, code computer programs)

According to the factor analysis in Table 15, three capability indices were created by averaging the grouped items. To investigate whether the three sub-factors show different sociocultural patterns, a visual examination of their relationship with education level was conducted. Figure 12 plots the mean scores of each capability index for a given education level. Overall, greater education level corresponds with higher digital capability across all indices. In particular, high school education could play an especially critical role in acquiring intermediate digital capabilities considering the steep rise of the index. Moreover, the sample has a substantial level of basic literacy skills regardless of education level. However, all indices except the intermediate capability showed a slight decline as the education level proceeds from four-year college degree to graduate or professional degree.

FIGURE 12 DIGITAL LITERACY/CAPABILITY FACTORS AND EDUCATION



6. HOMEWORK GAP

The homework gap is a concept used to describe the challenges some children face to complete school-related assignments and work at home. The "gap" refers to the disparity in home Internet and computer access among different groups of children based on demographics factors, such as household income and education level.

Children in households without Internet access, computer access, or needed skills face a challenge in completing their assignments, given that approximately 70% of teachers in the United States assign homework which requires Internet access.[10]

[10] McLaughlin, C. (2016). The homework gap: The 'cruelest part of the digital divide'. Available at: http://neatoday.org/2016/04/20/the-homework-gap/

Nine questions assessed whether parents or grandparents feel that the children under their care can successfully complete their school assignments. Out of the 997 participants, 359 (36%) reported having children under their care.

The homework-related questions asked participants to rank their level of agreement to different statements regarding their children or grandchildren's access to the Internet, computers, technical skills, and ability to complete homework. Table 16 shows the percentages of the participants who "Strongly Agree" or "Agree" with the statements. The responses indicate that 12% of participants feel that their children or grandchildren cannot complete their homework because they do not have access to the Internet. Twenty percent of respondents with children feel that their children or grandchildren cannot complete their homework because they do not have access to a computer at home. Another 22 percent feel that their children's computer skills are not good enough to complete their homework.

TABLE 16 HOMEWORK, ACCESS, AND COMPUTER SKILLS

Homework Items	%	N
Feel that their children or grandchildren cannot complete their homework because they do not have Internet access	12	42
Feel that their children or grandchildren cannot complete their homework because they do not have access to computers	20	71
Say that their children or grandchildren access the Internet at a public library or school library	50	178
Feel that their children's or grandchildren's computer skills are not good enough to complete their homework	22	75
Feel that their computer skills are not good enough to help their children or grandchildren complete their homework	24	84
Don't feel that their children or grandchildren are learning computer skills at school that will prepare them for the future	18	63
Feel that their children or grandchildren cannot safely access public libraries	16	56
Don't feel they know enough to guide their children or grandchildren in setting their educational goals	15	52
Don't feel they know enough to guide their children or grandchildren in setting their career or work plans and goals	23	81

The homework gap is concentrated among members of disadvantaged populations in Austin, particularly on the eastern edge of the city, but also in some spots in the Central, North and Southeast Austin. Figures 13 and 14 show the areas in Austin where children have difficulty with completing homework assignments due to lack of internet and computer access, as reported by parents and grandparents. The concentration of these gaps is in the furthest south eastern zip code, 78617.

FIGURE 13 HOMEWORK GAP WITH INTERNET ACCESS MAPPED BY ZIP CODE

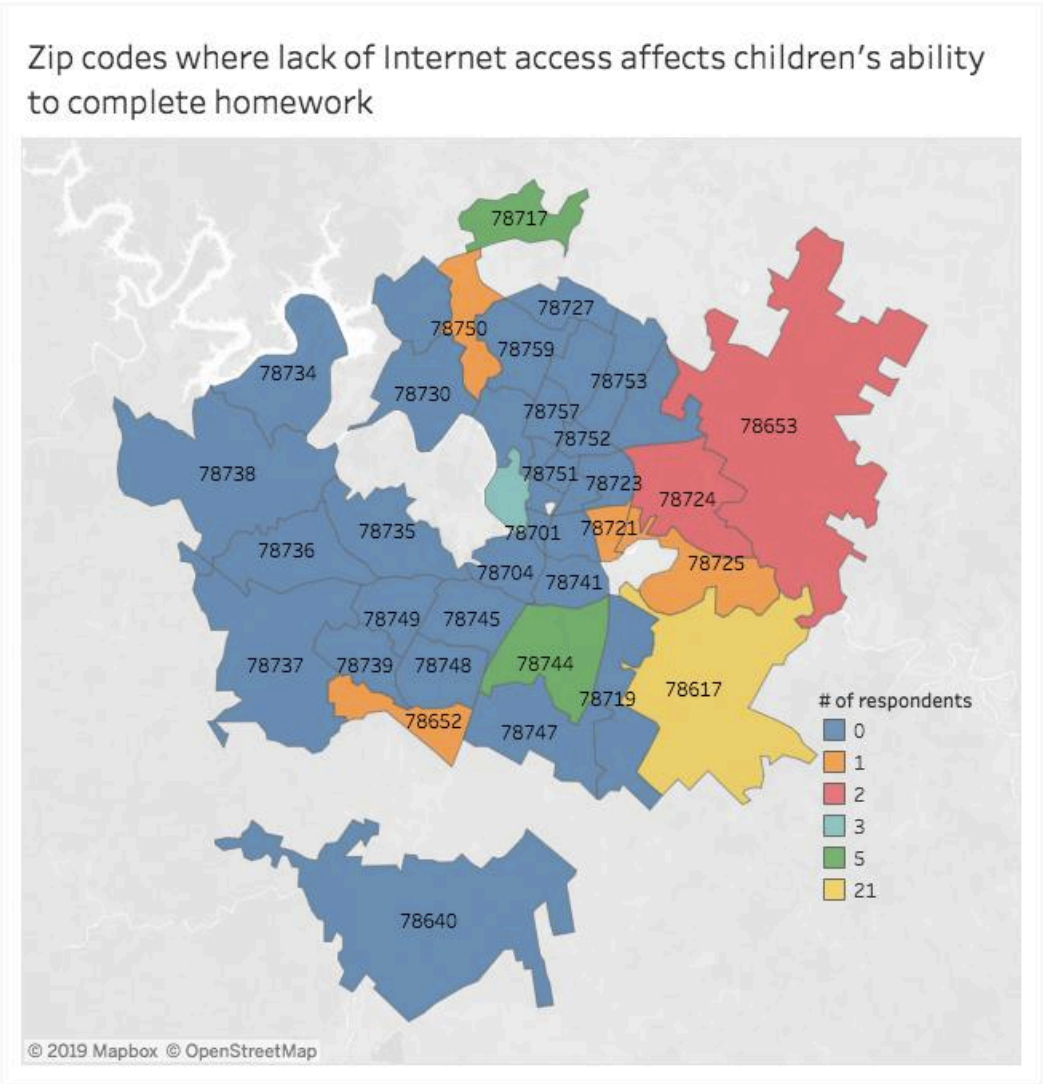
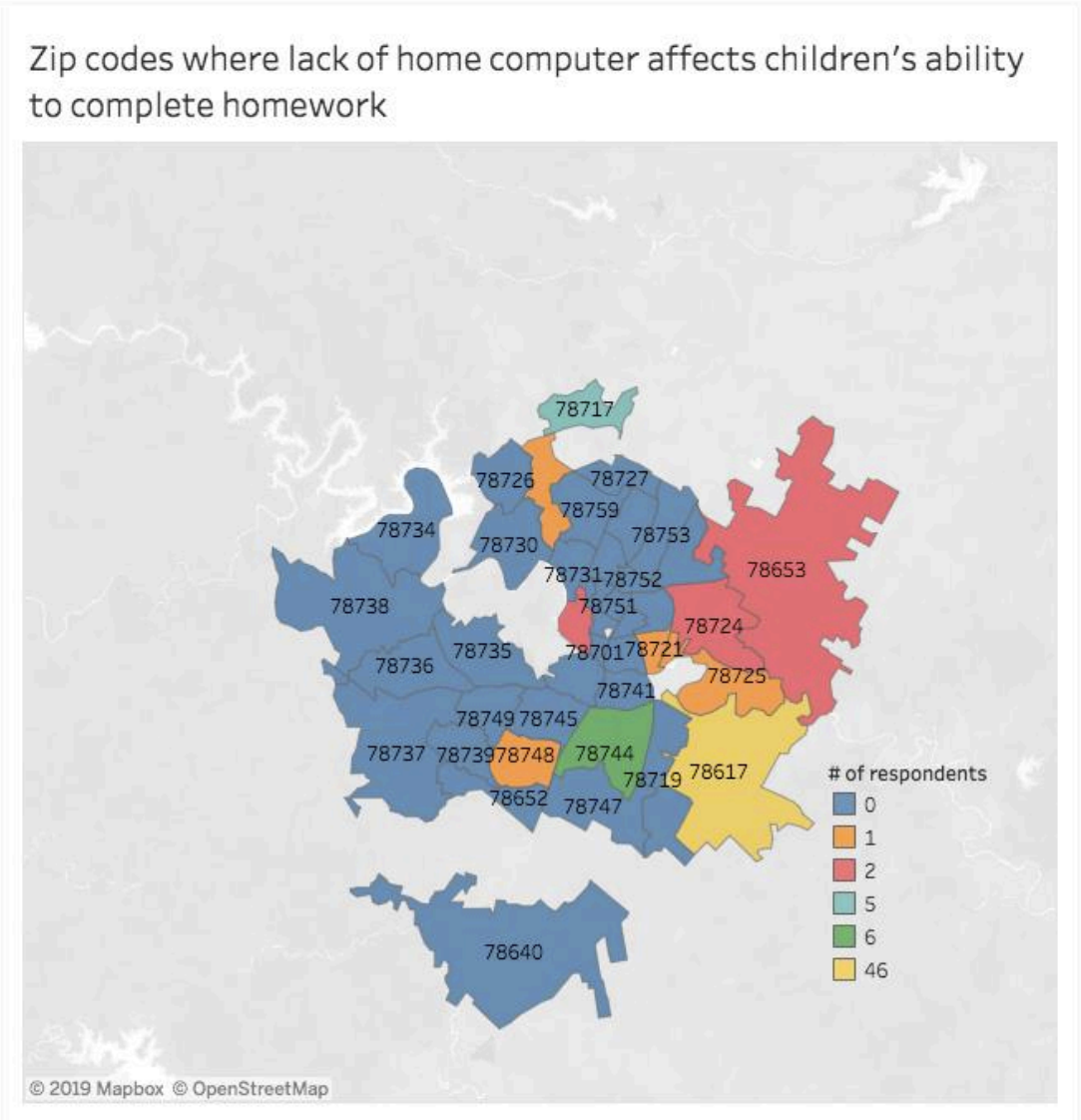


FIGURE 14 HOMEWORK GAP WITH COMPUTER ACCESS MAPPED BY ZIP CODE



Moreover, Figure 15 shows the respondents who "Strongly Agree" or "Agree" with the statements about computer skills by race/ethnicity. The figure shows that 48% of Hispanic respondents and 53% of African American respondents that their children's or grandchildren's computer skills are good enough to complete homework.

Eighty-one percent of White respondents and 68% of Asian respondents reported that they have good enough computer skills to help their children or grandchildren complete their homework.

Additionally, 68% of Hispanic respondents and 72% African Americans also reported that their children or grandchildren are learning computer skills at school that will prepare them for the future.

FIGURE 15 HOMEWORK SKILLS BY RACE AND ETHNICITY

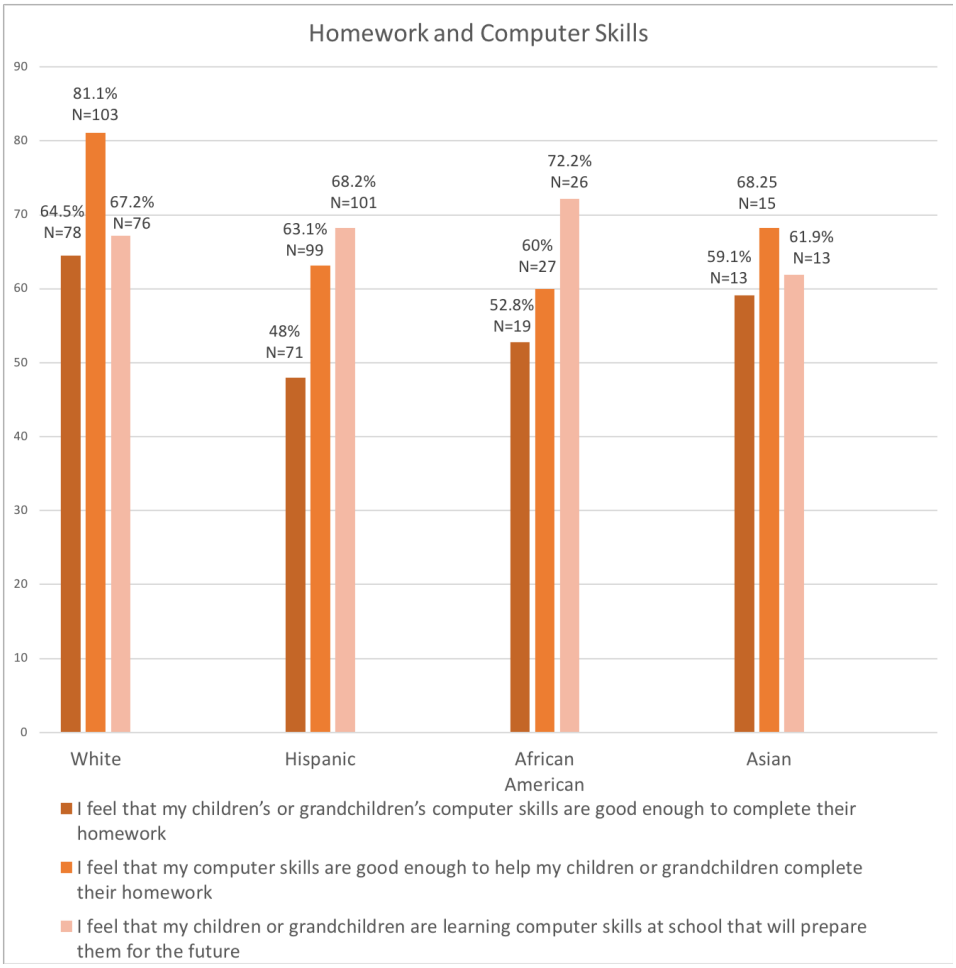
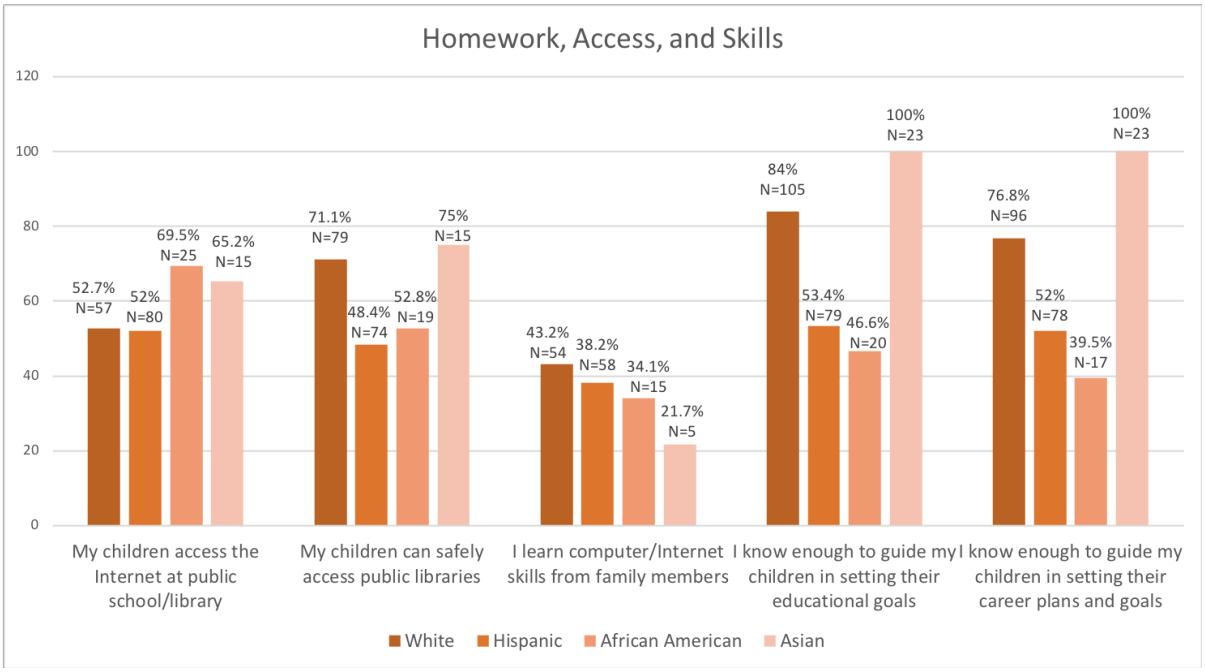


Figure 16 shows how respondents answered questions about access to the Internet in public libraries and public schools and how they feel about having enough skills to guide the children under their care to set career goals and educational paths. African American and Asian respondents reported that their children or grandchildren access the Internet at public schools and libraries at a higher rate than White and Hispanic respondents. White and Asian respondents reported that their children or grandchildren can safely access public libraries at higher rates than Hispanics and African Americans. White and Hispanic respondents reported that they learn computer and Internet skills from family members at higher rates than African American and Asian respondents. Additionally, White and Asian respondents agreed at higher rates than other respondents that they know enough to help guide their children or grandchildren in setting educational goals and career paths.

FIGURE 16 HOMEWORK, ACCESS, AND SKILLS DIVIDED BY RACE

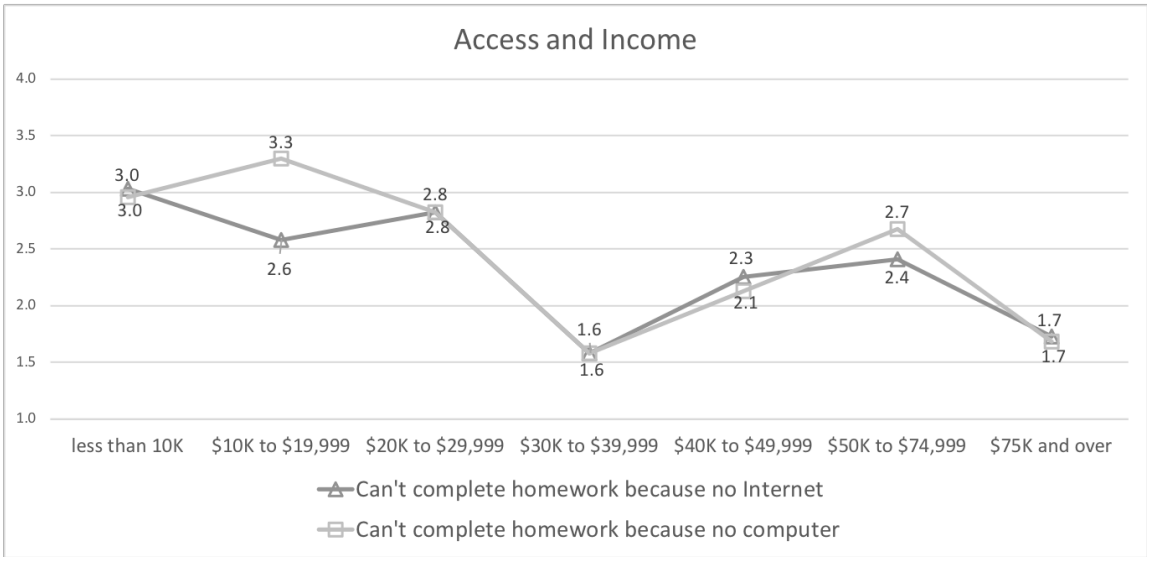


Major differences among the homework related items were found based on income. Respondents who reported making less than $10K in 2017 were more prone to “Strongly Agree” or “Agree” that they feel their children or grandchildren cannot complete their homework because they do not have access to the Internet. An analysis of variance (ANOVA)[11] was conducted to compare homework gap differences among income levels. The analysis compared how the answers to four homework gap-related questions differed according to income level. The questions in the survey asked whether the respondents felt their children could not finish their homework because of: 1) no access to the Internet, 2) no access to computers, 3) lack of computer skills to help their children/grandchildren, and 4) whether their children/grandchildren had enough skills to complete their homework on their own. The results show significant variance among different income levels across all homework gap items.[12] Figure 17 and Figure 18 plot the mean scores of the four questions for different income levels.

[11] An Analysis of Variance (ANOVA) is a statistical test that allows comparisons between the means of three or more groups of data to establish whether there is significant difference between them.

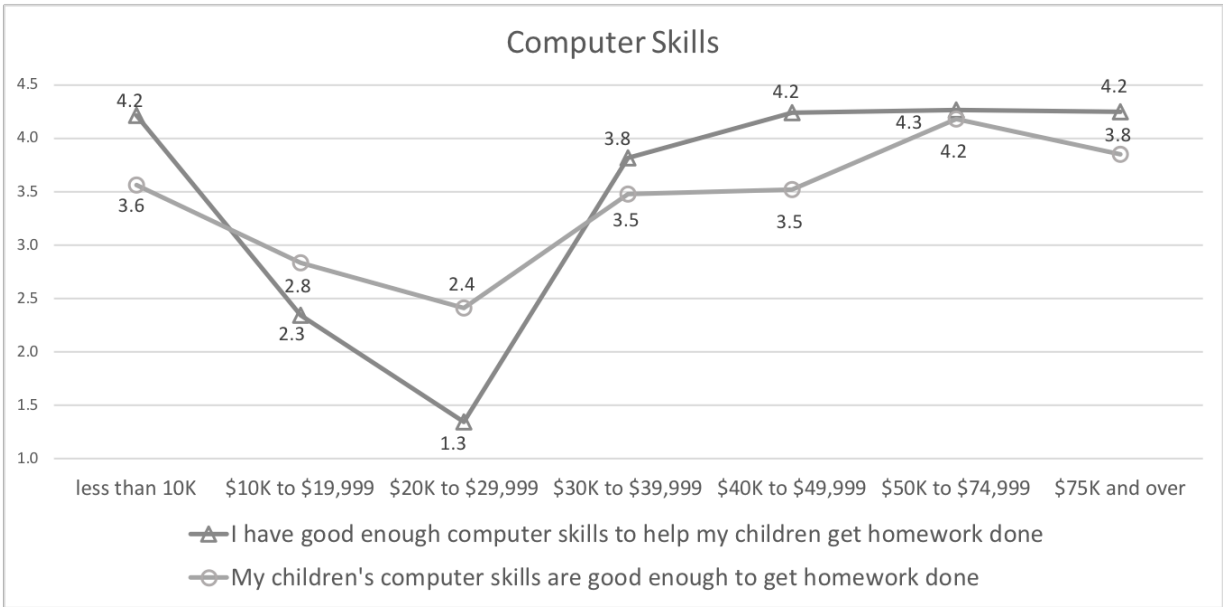
[12] Full SPSS result table of the analysis available in the Appendix.

FIGURE 17 MEAN PLOT OF HOMEWORK ACCESS AND INCOME



Respondents with higher income feel less disadvantaged in terms of access to the Internet and computers when it comes to their children's completion of homework. Respondents with an income of $30K to $39K reported the least concern over Internet connection, computer availability, and ability to complete homework among all income groups. In addition to access issues, Figure 18 depicts respondents' perception of their and their children's computer skills. While there is an increasing trend across populations that earn more than $30K, respondents in the most economically disadvantaged population (i.e. income less than $10K) are more confident of their computer skills than those who earn $10K to $30K.

FIGURE 18 MEAN PLOT OF COMPUTER SKILLS AND INCOME



To further investigate the differences across income groups, a Tukey HSD post-hoc analysis on the ANOVA results was conducted.[13] The results indicate significant differences when respondents were asked if they feel that their children or grandchildren cannot complete their homework because they do not have access to computers. Respondents who claimed to earn less than $10K and between $10K and $19K were more likely to "Strongly Agree" or "Agree" with the statement than those who earned $40K to $74K and $75K or more. When it comes to respondents' perceptions of their own skills to help children or grandchildren, the results showed significant differences between those who reported earning between $10K and $30K and all other income groups.

The findings are similar to those reported by the Pew Research Center in 2015 regarding the homework gap. Pew found that a disproportionate number of low-income households as well as African Americans and Hispanics lack high-speed Internet service at home. Among its analysis of Census data, Pew reported that lowest-income households have the lowest home broadband subscription rates. Additionally, about one-third of households whose incomes fall below $50K and with children ages six to 17 do not have a high-speed internet connection at home. [14]

[13] Tukey HSD post-hoc tables are available in the Appendix.

[14] Pew Research Center, April, 20, 2015. The numbers behind the broadband 'homework gap'. https://www.pewresearch.org/fact-tank/2015/04/20/the-numbers-behind-the-broadband-homework-gap/

7. WHERE PEOPLE GET HEALTH INFORMATION

People in Austin use the Internet for various health-related reasons. The survey results show that respondents mainly go online to search for information about health and health maintenance. More than two thirds of the sample browse the Internet for health information, whether it is for themselves or someone else. Respondents also use the Internet to maintain personal health, especially to track health information, diet, and exercise.

In contrast, respondents are less engaged in health-related social interactions online. Although 39% of the sample population exchanged support about health concerns with family or friends using the Internet, less than one-fifth of the sample used the Internet to share health information or participate in relevant online communities. Table 16 also shows that the adoption of wearable health devices is not widespread among respondents.

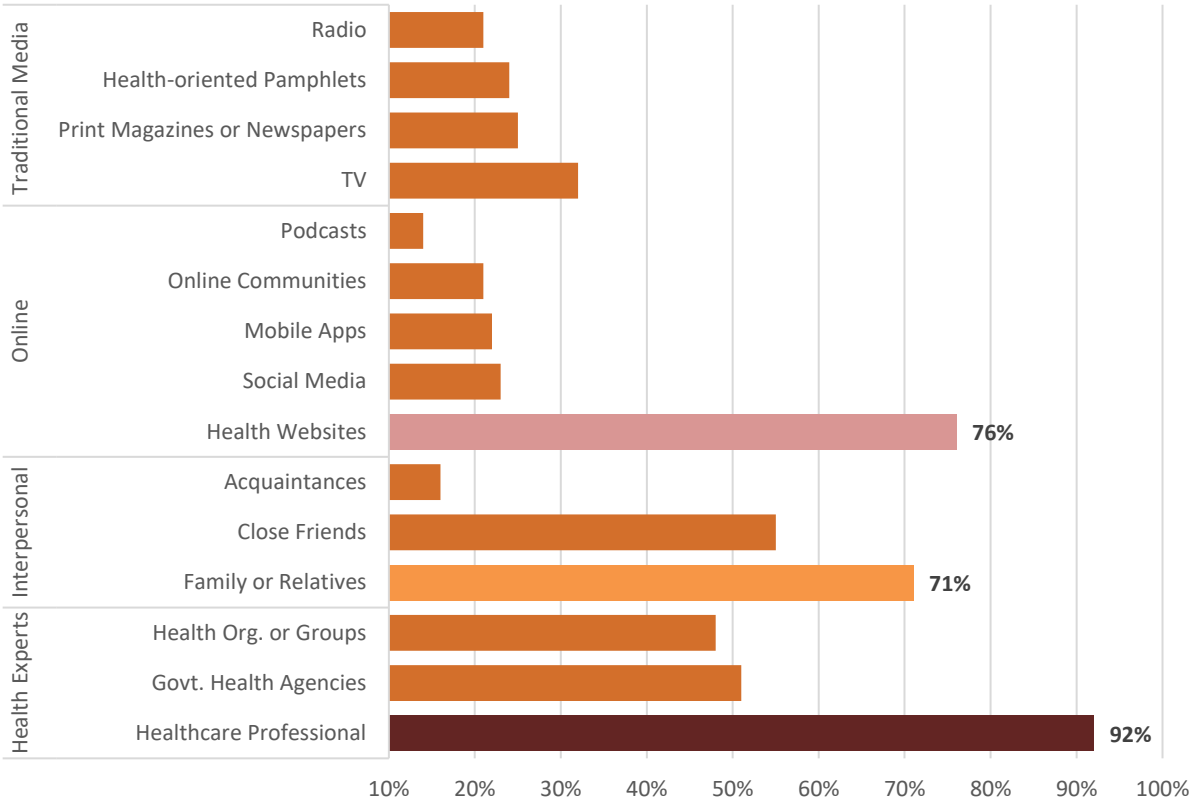
TABLE 17 HEALTH-RELATED ACTIVITIES ON THE INTERNET (% OF *N* = 997)

	Yes	No
Looked for health information for yourself	83.2	16.8
Found health information using a mobile device	69.1	30.9
Accessed health information on health providers' portal or website	68.2	31.8
Looked for health information for someone else	62.7	37.3
Kept track of personal health information	60.6	39.4
Looked for a health care provider	53.4	46.6
Watched a health-related video on YouTube	49.9	50.1
Used a website to help you with a diet, weight, or physical activity	45.2	54.8
Exchanged support about health concerns with family or friends	38.9	61.1
Exchanged emails about health with doctor or nurse	35	65
Worn a health monitor, like a FitBit	27.8	72.2
Shared health information on social media websites	18.3	81.7
Used your mobile device to arrange for transportation to the doctor	12.4	87.6
Participated in a health-related online forum or support group	10.2	89.8

While people have multiple options for receiving health information, respondents reported using three primary health information sources: health care professionals (16%), health websites (13%), and family members or relatives (12%). Almost all of the respondents (92%) answered that they consult with health care professionals for health information, followed by health websites (76%), and family members or relatives (71%). For over half of the sample, the Internet has become a crucial source of health information.

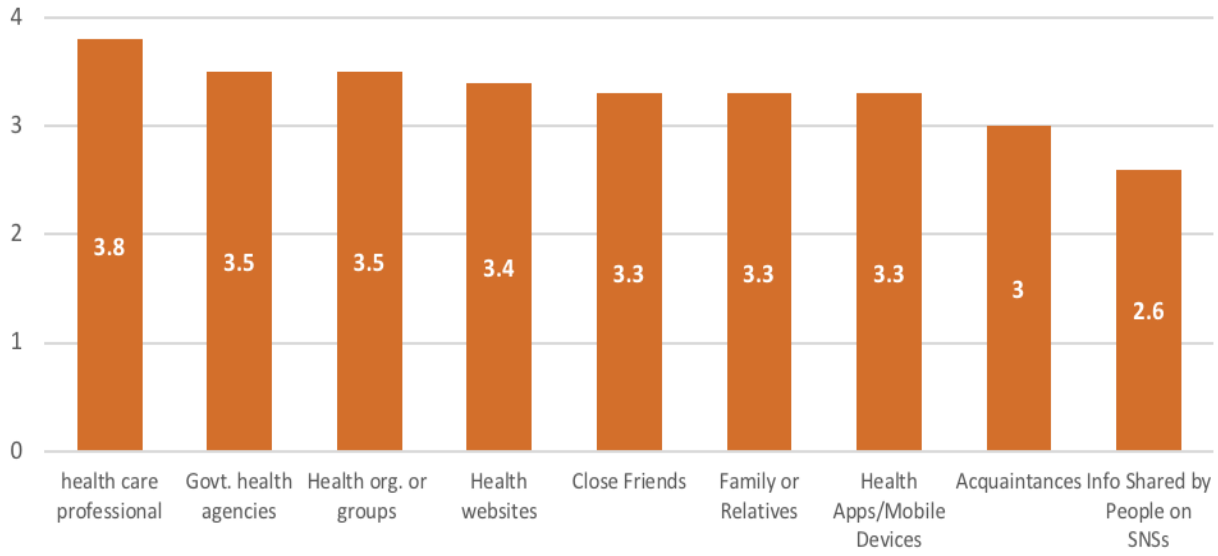
Apart from health websites, respondents' usage of social media, mobile applications, and online communities were also considered. As Figure 19 shows, respondents infrequently use traditional media sources, such as radio, print magazines or newspapers, and television, to find health information.

FIGURE 19 SOURCES FOR HEALTH INFORMATION (% OF *N* = 997)



The survey also asked how much respondents trust health and medical information based on source. As Figure 18 demonstrates, not only are health care professionals the most frequently used source for health information, but they are also considered the most trustworthy with a mean score of 3.8, on a scale of 1-4, where 1 is "Not at all," and 4 is "A lot." Other expert sources, including government health agencies, the Center for Disease Control and Prevention (CDC), and health organizations or groups (e.g., the American Cancer Society and American Lung Association or other), ranked second at 3.5. The least trusted are acquaintances (3) and information shared on social media (2.6).

FIGURE 20 TRUST IN HEALTH INFORMATION SOURCES - MEAN SCORE OF TRUST*



1=Not at all, 2=Little, 3=Some, 4=A lot

Table 17 shows that the extent of trust in health information sources more or less varies by demographic characteristics. While government health agencies are the most trustful source of health information, it is less trusted by African Americans (75%), men (84%), the elderly (65 and older, 75%), high school graduates (69%), and respondents in the $10K to $19K income group, in comparison to respective demographic counterparts.

The pattern of respondents' trust of information on health websites or health applications on mobile devices is somewhat similar. Although health websites are more trusted than health applications, both sources are more trusted by Asian respondents and less trusted by Hispanic respondents. The youngest (18 to 24) and oldest groups (65 and older) of respondents trust the information on health websites and health applications the least. Health websites and applications are most trusted by respondents in the 35 to 54 age group.

Trust for health websites or applications is lower among respondents with less educational attainment than more highly educated respondents, except for respondents who did not obtain a high school diploma. Regarding gender, male respondents have lower trust in health applications than female respondents.

The information shared by people on social media is least trusted across all demographic groups. White and Asian respondents tend to trust health information on social media less than Hispanic and African American respondents. Age and educational attainment also affect the level of trust that respondents

have for health information that they find on social media. Similar to health websites and applications, respondents in the youngest (18 to 34) and oldest (65 and older) groups report lower trust in social media than other age groups. Respondents with lower levels of educational attainment express greater trust in social media information than respondents with higher levels of educational attainment (61%).

TABLE 18 DEMOGRAPHIC BREAKOUT BY TRUST IN HEALTH INFORMATION SOURCES (%*)

		Government Health agencies	Health Websites	Health Apps	Shared on Social Media
Race					
	White (non-Hispanic)	86.1	66	55.4	10.6
	Hispanic	89	61.6	49.3	30.4
	African American	75	60.8	52.1	42.5
	Asian	95.6	81.9	74.6	14.9
	Other	85.8	75	62.5	25
Gender					
	Male	84.1	63.7	47.3	22
	Female	90.3	67.3	62	18
Age					
	18-24	100	30.6	30.6	6.3
	25-34	82.7	66	60.8	11.1
	35-44	90.5	73.6	65.5	24.1
	45-54	89.5	86.7	62.9	40
	55-64	81	74.7	55.6	24.5
	65 and older	74.5	54.7	38.9	19.6
Education					
	Less than HS	90	83.3	59.7	60.5
	High School	68.5	49.6	38	22
	Some college	84.7	60	51.9	12.8
	College degree	92.7	69.1	62.2	13.3
	Some graduate school	93.6	68.2	58.8	9.9
Income					
	Less than 10K	82.4	82.3	64.7	26.5
	$10K-$19,999	74.4	69.6	66.7	44.3
	$20K-$29,999	88.4	67.6	39.6	7.2
	$30K-$39,999	91.7	71.7	77.5	17.8
	$40K-$49,999	94	72.3	61.5	13.8
	$50K-$74,999	90.8	62.6	47.3	30.9
	$75K and over	86.8	64.7	56.2	11.5

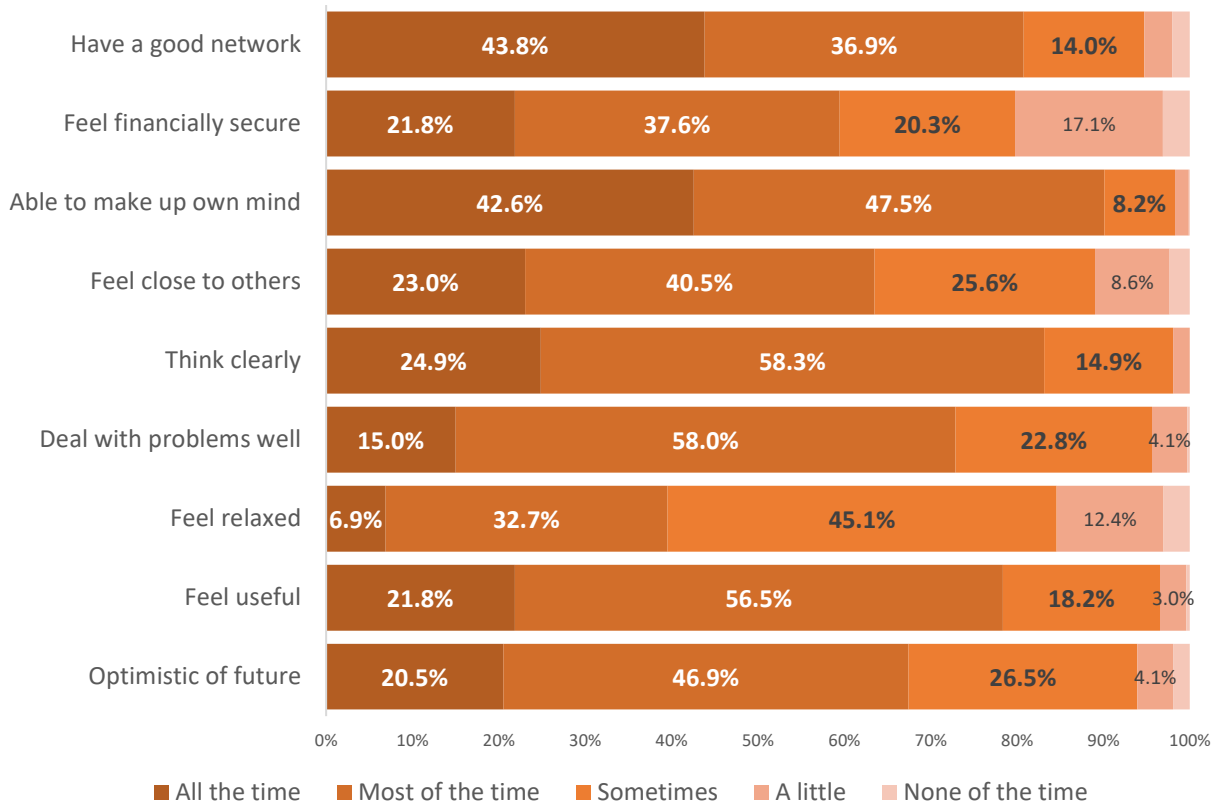
**** % of trust "some" or "a lot"***

8. WELL-BEING AND COMPUTER / INTERNET ACCESS

The survey also measured individuals' perceived level of well-being using nine questions that are frequently used in academic research to assess Internet usage and personal well-being. In order to test the viability of these items as an index, a reliability test using Cronbach's α was conducted. This test examines how well the items selected correlate with each other; thus, reliably measuring the same concept. The well-being items showed a high level of reliability as an index (Cronbach's $\alpha = .825$[15]). Figure 21 provides basic descriptive statistics of the well-being measurement items. Using these questions, a composite index of well-being was generated by calculating an average of the measurement items for further analysis.

[15] Generally, measurement items for an index are considered reliable if Cronbach's α is greater than .8

FIGURE 21 DESCRIPTIVE STATISTIC (%) OF WELL-BEING ITEMS



9. Policy Recommendations from the Survey

Since more Austin residents have home broadband than the U.S. average (95% compared to 65%)[16], one policy concern is to ensure that broadband is affordable for residents. Stakeholders in Austin should explore innovative strategies for making Internet affordable, such as developing public-private partnerships with Internet service providers.

Another concern is that as gentrification pushes residents who tend to be low-income north, east and southeast out of the city, the City of Austin should collaborate with other governmental entities and private companies in the Austin metro area to expand and strengthen Internet infrastructure in areas outside of the central core to ensure that the price of Internet is reasonable for all residents.

[16] Pew Research Center: https://www.pewinternet.org/fact-sheet/internet-broadband/

Fewer Austin residents are smartphone dependent (5%) than people in the U.S. as a whole (20%), but the City should continue to focus efforts to improve and expand app-based services for smartphone users. The survey shows that many residents are completing a variety of tasks using a smartphone, including accessing city services and information. The City should work with health care providers in the region, such as Central Health and Dell Medical School, to ensure that smartphone health apps are developed to meet local needs.

The survey shows that there is a homework gap in Austin. Low-income and African American and Hispanic minority residents perceive that children in their care do not have adequate access to Internet or computers to complete their homework. Smartphone access is not enough to meet this need, so the City should engage both AISD and Austin public libraries to assess whether access places and times for this purpose to Internet and computers is adequate. The City, in partnership with AISD and neighboring school systems, should launch a public campaign to inform parents about sites with Internet and computer access as well offer skills training to families without access, computer devices, or sufficient skills. Government offices, school districts, and public libraries in neighboring regions outside of Austin/Travis County should be included in the public information efforts so that residents who move out of Austin know about local services.

The survey found that Internet nonusers are less aware of various options of places to access the Internet, in comparison to regular Internet users. The City and other stakeholders should launch a public information campaign to disseminate information about the various locations where people can access the Internet and computers, as well as for skills learning, and for consultation on their individual challenges at city sites like DeWitty, Carver Library, Willie Mae Kirk Library, etc. The City should work with metro area partners to improve access, training, and consultation beyond the city limits, where the least advantaged people have had to move. The City can work with neighboring cities and counties to expand public information.

The survey found three distinct groups of skills or capabilities among residents: basic, intermediate, and advanced skills. One was very basic skills, often oriented to smartphones. Another was a set of work or productivity-related skills. A third was advanced skills, such as protecting privacy and creative or expressive skills. A respondent's digital literacy and capabilities increased with income and education. As intermediate and advanced technology skills become more in demand for both personal and professional purposes, residents in Austin need opportunities to develop their technological skills. This is especially true for low-income residents and residents with lower levels of educational attainment. The City should review the training programs that are currently available to residents, identify opportunities to enhance and expand digital literacy and capabilities training programs and analyze how to help more residents with basic skills acquire the more advanced work-related skills that might help them move into higher-paying positions in the local digital, information or creative economy.

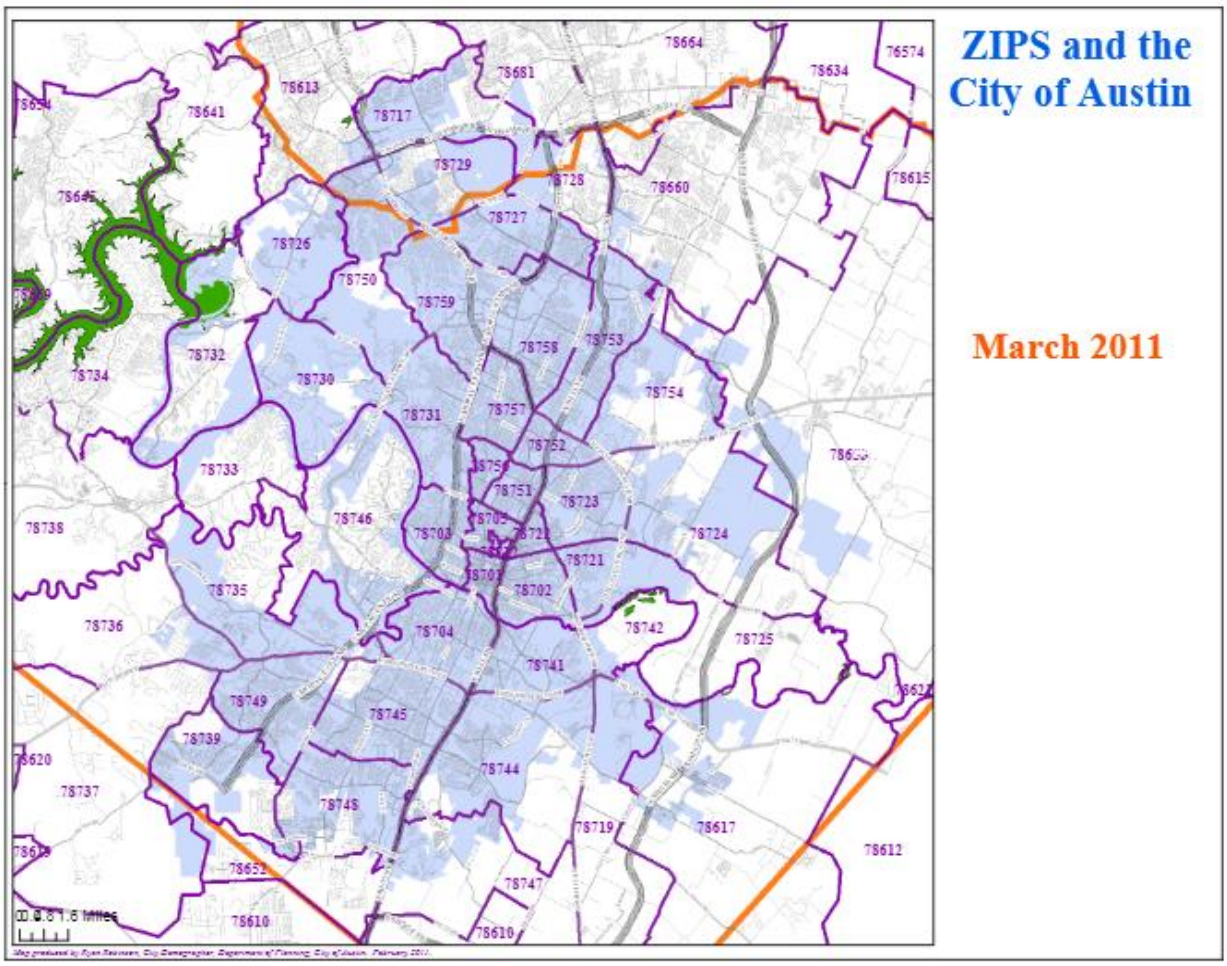
APPENDIX 1: SAMPLED ZIP CODES IN AUSTIN

Sampled Zip Codes in Austin (N=15000). Those with an asterisk (*) were over-sampled to get a better representation of minority groups to tend to respond to surveys at lower rates.

* Denotes zip codes with oversampled addresses

78617*	78736
78701	78739
78702*	78741*
78703	78742*
78704	78744*
78705	78745
78717	78747
78721*	78748
78722	78749
78723*	78750
78724*	78751*
78725	78752*
78726	78753*
78727	78754
78729	78756
78730	78757
78731	78758*
78735	78759

APPENDIX 2: AUSTIN ZIP CODE MAP



APPENDIX 3: RESULT TABLE OF LOGISTIC REGRESSION MODEL ON NONUSER STATUS

TABLE 19 LOGISTIC REGRESSION PREDICTING NONUSER STATUS FROM AGE, GENDER, EDUCATION AND INCOME

Predictor	*β*	SE(*β*)	Wald's χ2	df	eβ (odds ratio)
Age	0.018	0.011	2.598	1	0.996
Gender (0=male, 1=female)	1.128**	.368	9.415	1	1.503
Race (reference: White)					
Hispanic	-0.244	0.545	0.200	1	0.784
African American	1.252*	0.541	5.360	1	3.496
Asian	-16.541	4719.322	0.000	1	0.000
Other	-0.156	2.937	0.003	1	0.856
Education	-1.107***	0.230	23.235	1	0.330
Income	-0.541***	0.092	34.587	1	0.582
Constant	1.088	1.089	.999	1	NA

OVERALL MODEL CHI-SQUARE (8, N = 808) = 177.08, P < .001.

*$p < .05$, ** $p < .01$, *** $p < .001$

** Note: N=808, excluding cases of "do not prefer to answer" or do not provide answer for the survey question asking income level.*

APPENDIX 3: ANOVA AND TUKEY POST-HOC TABLE ON HOMEWORK GAP

TABLE 19 HOMEWORK GAP ANOVA RESULTS

		Sum of Squares	df	Mean Square	F	Sig.
Can't complete homework because no Internet	Between Groups	69.757	7	9.965	6.844	.000
	Within Groups	452.834	311	1.456		
	Total	522.591	318			
Can't complete homework because no computer	Between Groups	136.676	7	19.525	14.208	.000
	Within Groups	446.626	325	1.374		
	Total	583.303	332			
Have good enough computer skills to help children get homework done	Between Groups	357.054	7	51.008	37.129	.000
	Within Groups	469.843	342	1.374		
	Total	826.897	349			
My children's computer skills are good enough to get homework done	Between Groups	128.474	7	18.353	16.310	.000
	Within Groups	362.333	322	1.125		
	Total	490.807	329			

TABLE 20 TUKEY HSD POST-HOC TABLE

Homework Gap Item		Subset for alpha = .05			
Income	**N**	**1**	**2**	**3**	**4**
Can't complete homework because no Internet					
$30K – $39,999	17	1.5810			
$75K and over	115	1.7247	1.7247		
$40K – $49,999	14	2.2533	2.2533	2.2533	
$50K – $74,999	71	2.4130	2.4130	2.4130	
$10K – $19,999	43	2.5808	2.5808	2.5808	
$20K – $29,999	32		2.8212	2.8212	
Less than 10K	17			3.0341	
Can't complete homework because no computer					
$30K – $39,999	17	1.3220			
$75K and over	115	1.5810			
$40K – $49,999	18	1.6855	1.6855		
$50K – $74,999	75	2.1280	2.1280	2.1280	
$20K – $29,999	32		2.6772	2.6772	2.6772
Less than 10K	17			2.8212	2.8212
$10K – $19,999	43			2.9566	2.9566
					3.2978
Have good enough computer skills to help children get homework done					
$20K – $29,999	32	1.3440			
$10K – $19,999	43		2.3465		
$30K – $39,999	17			3.8196	
Less than 10K	17			4.2100	
$40K – $49,999	21			4.2372	
$75K and over	124			4.2456	
$50K – $74,999	79			4.2657	
My children's computer skills are good enough to get homework done					
$20K – $29,999	32	2.4097			
$10K – $19,999	43	2.8323	2.8323		
$30K – $39,999	12		3.4781	3.4781	
$40K – $49,999	14		3.5207	3.5207	
Less than 10K	17		3.5654	3.5654	
$75K and over	117			3.8466	
$50K – $74,999	78			4.1794	

** Note: Columns represent groups with significant differences*

APPENDIX 4: RESULT TABLE OF HIERARCHICAL REGRESSION MODEL ON WELL-BEING

TABLE 21 HIERARCHICAL MULTIPLE REGRESSION MODEL ON WELL-BEING

	MODEL 1 (R^2 = .093)			**MODEL 2 (R^2 = .175)**		
	B	*SE*	β	*B*	*SE*	β
(Constant)	3.446	.108		2.468	.586	
Age	-.003	.012	-.009	-.013	.013	-.039
Gender (Female)	.122	.040	.115**	.152	.039	.144***
Income	.101	.013	.340***	.098	.014	.330***
Education	-.057	.021	-.137**	-.037	.021	-.088
Race						
Hispanic	-.046	.052	-.042	-.020	.050	-.019
African American	.014	.081	.007	-.040	.078	-.020
Asian	-.121	.086	-.054	-.153	.083	-.068
Other	-.105	.195	-.020	-.121	.187	-.023
Internet/Device Access						
Internet Access				.455	.095	.190***
Desktop				.174	.042	.165**
Laptop				-.144	.051	-.121
Cellphone				.623	.590	.038
Smartphone				.032	.118	.011
Tablet				-.169	.048	-.145***
			R^2 Change = .082			

*p < .05; ** p < .01; *** p < .001

Note: Race variable dummy coded with 'White (non-Latino)' group as the reference group; Gender variable dummy coded with 'Male' as the reference group

Appendix 5: The Questionnaire

The questionnaire used to collect this data can be found at:
https://digitalinclusion.bloomfire.com/posts/2921152-the-2017-digital-assessment-project.