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DIGITAL ACCESS SURVEY: PERCEPTIONS OF PARENTS IN THE K-12 SCHOOLS OF WESTCHESTER COUNTY, NEW YORK

ANALYSIS REPORT

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Executive Summary

Digital access, skills and knowledge are key aspects in today's K-12 learning environment. The Coronavirus Disease 2019 (COVID-19) pandemic affected both students and families as their daily use of technology increased during this time, and it exacerbated the pre-pandemic digital divide. Digital divide negatively affects families of low income and families of color (Chakravorti, 2021; Domina et al., 2021; Dolcini et al., 2021) influencing their opportunities to benefit from modern technology. The increased reliability on technology in various aspects of daily lives brings forward the importance of not only addressing the inequalities that exist in the modern digital age but taking action to bridge the digital divide.

This study examines digital access among families in Westchester County, NY using an original survey administered between February 10th and April 15th 2022. Digital access is broadly defined in this study to capture student and family access to electronic devices, internet options, digital literacy, digital communication, and experiences with remote learning.

Overall, participants expressed that technology does not frequently cause stress for their household but about a third of parents feel that technology has made their child's learning more difficult. Results show that participants of LatinX descent, low income, and less educational attainment, and those whose primary language is Spanish are less likely to have access to their own devices and possess household internet access. These participants are also less comfortable with general digital literacy tasks as well as online school tools. The majority of participants spend over $50 a month on internet access. Most respondents were unaware of the government internet affordability programs and an overwhelming amount conveyed that they would like to receive more information on those programs. Over 70% of participants indicated that their school has provided either very or somewhat specific information on remote learning options and most respondents expressed confidence in their digital access to accommodate remote learning. In terms of communication, participants frequently communicate with their child's teacher but rarely communicate with the school nurse, guidance counselor, parent teacher association, or other families in their child's school.

The findings of this report contribute to the practice, education policy and literature by identifying families' digital needs as to determine best ways to provide services in order to improve upon digital access and digital literacy so that both children and their families are well-equipped to communicate online, participate in online activities, access resources, and feel confident in their own digital efficacy.

Digital Access and Digital Divide

The concept of digital divide has evolved throughout recent decades due to the fact that modern technology has advanced, creating more opportunities and uses of devices, internet, and software applications. Digital access and digital literacy are the two aspects that encompass the digital divide and the focus of bridging the divide has transitioned into placing a greater emphasis on digital knowledge and skills. The concept of digital divide gained popularity in the 1990s when researchers and policymakers began discussing the disparities in opportunities to access Information and Communication Technologies (ICTs) and the ability to use various online activities to benefit from the opportunities that modern technology offers (Nielsen, 2006; van Dijk, 2020). While access to technology was the main focus in the 1990s in the early 2000s, the National Telecommunication and Information Administration changed its framework on the digital divide to focus on digital inclusion - which recognized the underlying social conditions that determine ICT access and engagement (Pendell et al., 2013). In 2001, the University of California Los Angeles (UCLA) surveyed over 2000 households across the United States and found that education and income were attributed to who was online along with the length of time online, indicating that people with higher education attainment and higher annual earnings are both more likely to use the internet and had a longer history of using the internet compared to their less affluent counterparts (The UCLA Internet Report, 2001).

People of different socioeconomic (SES) levels have disparate opportunities to participate in a technologically evolving world and this gap negatively affects those of low SES background and people of color in their ability to be socially included (Dolcini et al, 2021; Warschauer, 2012). In 2003, Pew Research Center reported that White Americans had greater internet access than African-Americans and Hispanics (Pew Research, 2003). Dolcini et al. (2021) used the current population survey to examine changes in internet access from 2015 to 2017 for youth ages 14-17 and found that, while internet usage increased nationally, disparities among people of different SES levels and different racial and ethnic identities stayed the same. The same study notes that low income Black and Hispanic youth were least likely to have internet access in their homes.

Advances in technology are often created for use by those already skilled at navigating it, which brings forward the concern that advances in technology that require higher skill levels will even further negatively affect those that do not have the fundamental access requirements and experience to keep pace with the evolving technical world (Valu, 2021). UCLA's survey responses showed that participants with internet experience spent more time on professional tasks such as work and news while inexperienced users spent their time on leisurely activities such as chat rooms (The UCLA Internet Report, 2001), indicating that there is a usage and skill difference between new and experienced users.

Although the digital divide is not a new phenomenon, the Covid-19 pandemic brought attention to it because of the greater dependence on technology in the daily lives of individuals. Many adults began working from home and at one point, all school age children took part in remote learning. This meant that in order to fully participate in learning from home, families needed to have device access, internet access, and the ability to use necessary software and applications to perform school and work-related tasks. Parents played a greater role in their child's learning requiring them to embark on their own online learning experience.

Despite schools' effort to provide students with devices such as Chromebooks or tablets to be able to learn from home, many student households did not possess reliable or high-speed internet access. Domina et al. (2021) used data from 10,000 parents of elementary school students from a Southeastern public school district which established that although the district provided computers and internet access to students, 17% of respondents lived in households without high-speed internet access. Socioeconomic and racial differences create disparities for those that do and do not have internet access. Ali et al. (2021) reported on results of a Common-Sense Media study from 2020 that it was likely 15-16 million K-12 public school students did not have the technology necessary to partake in remote learning with Black, Latinx, and Native American students make up 55% of that population even though they represent 40% of total students. They also found that about 50% of students without the necessary technology were from families that make less than $50,000 a year (Ali et al., 2021). Additionally, an Education Trust poll presented that only 50% of low-income families and 42% families of color had the digital resources at home to participate in remote learning (Kuhfeld et al., 2020). Black and Hispanic households were less likely than white ones to have reliable home internet connection but more likely than white students to learn remotely rather than in person (Sheasley, 2021) even more intensifying inequalities between different individuals.

Current efforts to extend digital access for under-represented/marginalized groups include the federal *Affordable Connectivity Program* which provides income-eligible households with a discount on broadband service and connected devices. This program replaced the Emergency Broadband Benefit Program that was adopted at the end of 2020 and implemented in 2021 to help eligible low-income households with access to broadband service and certain connected devices, and participating providers to receive a reimbursement for the discounts they gave to users (Federal Communications Commission, online).

Methodology

The Westchester County Digital Access Survey consisted of 31 questions and was offered to residents both in English and Spanish, which is particularly important as the county has a significant population of LatinX descent. The survey was designed primarily by using closed-ended questions, in order to provide quantifiable data – that is, data that can be counted (for example, the number of residents who feel safe in the community). However, the survey included one open-ended question to allow participants to share more in-depth, responses.

Once the survey questionnaire was designed, it was pilot tested by Westchester Children Association's community partners. Prior to the start of data collection, the Pace University Institutional Review Board issued an approval to conduct the research study. The digital access survey was then distributed to the Westchester County parents using both internet and in-person modes (combined, this is known as a mixed-mode survey). Both survey modes in this survey use self-administered questionnaires, which residents fill out on their own without the assistance of an interviewer. Using both internet and in-person modes also helps with a better participant representation by including the voices of those who don't have access to an electronic device.

The online survey was posted to the Westchester Children Association's (WCA) website, shared with its community partners, and conducted via Qualtrics, a leading online survey platform, in partnership with Pace University. The in-person survey was conducted at the location of several WCA community partners. The survey was administered between February 10th and April 15th.

Survey Dissemination

To reach parents and guardians of numerous school districts in Westchester County, NY we identified organizations in each district that directly serve families as parents and guardians of school aged children was the population of interest. The online survey link was communicated to a network of community partners in the County which included libraries, youth bureaus, family medical centers and local community organizations whom shared the survey with families they work with.

WCA and its partners disseminated the survey both online and in hard copy. For the online version, the strategies included sharing the survey link in newsletters, text messages to contact lists, including the link on websites and postings on social media. Fliers with QR codes that directed participants to both the English and Spanish survey were also utilized and those were distributed to local businesses and organizations that were able to display them. For hard copy survey distribution, surveys were delivered to each location along with a drop box for completed surveys to be placed in. The drop boxes were collected at the survey completion date.

Survey Responses

The survey received 511 valid responses from parents and guardians in Westchester County. Seventy-three percent of participants completed the survey in English and 27% completed it in Spanish. The survey reflects a wide variety of demographics. We briefly explain various demographics in this section.

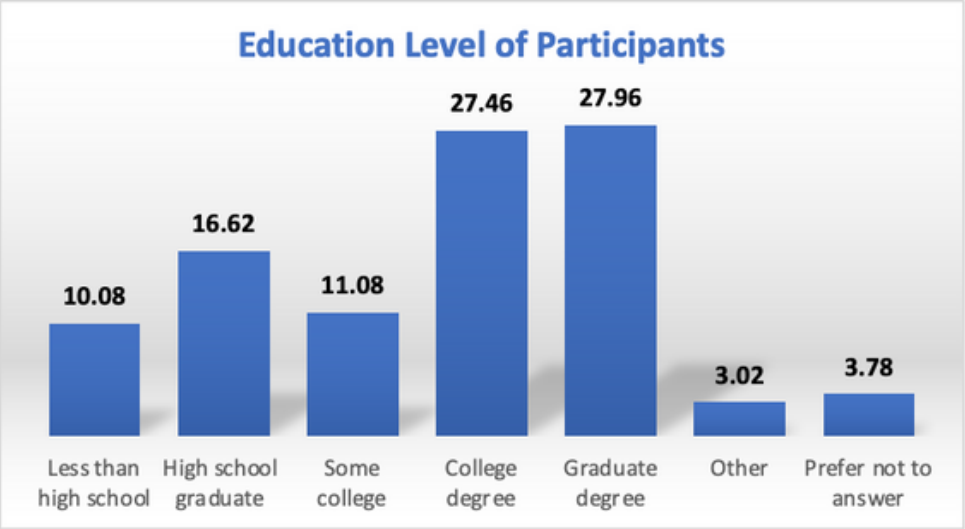
Gender: Approximately 60% of respondents in the survey who provided responses to our gender question identified as females, 18% as males, and 3% as other. Additionally, approximately 19% of survey respondents declined to specify their gender.

Ethnicity: Approximately 39 percent of respondents in the survey identified as Hispanic or LatinX, compared to approximately 40 percent of respondents who did not identify as Hispanic or LatinX. Additionally, approximately 21% of survey respondents declined to specify their ethnicity.

Race: We also asked residents to identify their race. Approximately 42.5% of our respondents indicated they were white or Caucasian, 20.4% identified as Black or African-Americans, 4.2% identified as Asian-Americans, 1.7% identified as American Indian or Alaska Native, and Native Hawaiian or Other Pacific Islander, 17.8% identified as other (with 5% of the respondents in the other category identifying as two or more races), and 13.3% of respondents preferred not to disclose their race.

Education: We also asked respondents to indicate their highest level of education completed. The majority of respondents (nearly 55%) in our survey were college graduates. A full distribution is shown in *graph 1* below.

Graph 1: Education Level of Survey Participants

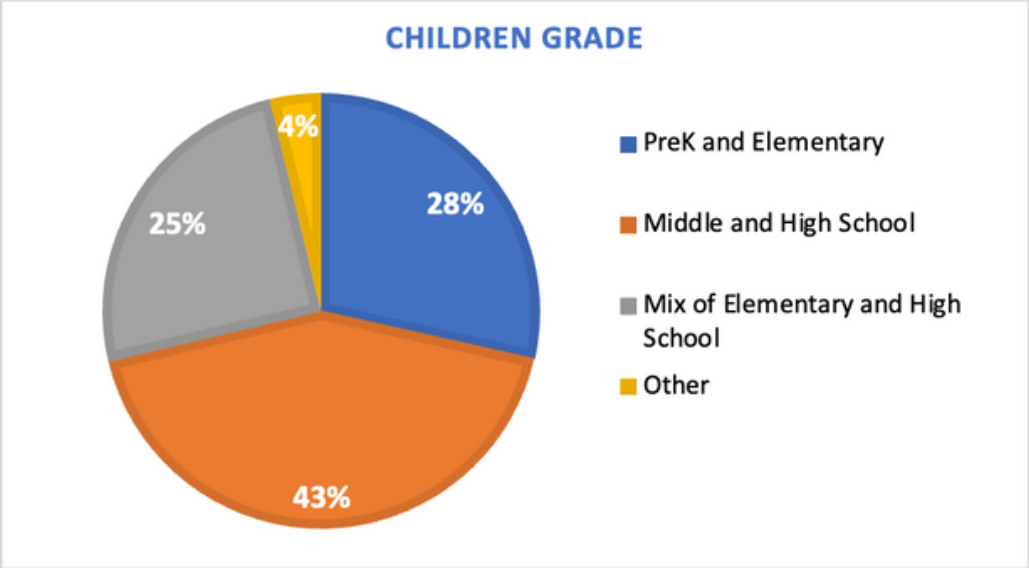


Primary language: Approximately 61% of respondents reported they use English as their primary language, 33% reported using Spanish and 5% reported using other primary language. We also asked participants to specify if they used English as their new language. Approximately 20% of participants indicated they use English as their new language compared to 80% who did not.

Type of school: Based on the survey responses, 85% of participants reported they have children in public school, 7% have children in private school, 4% have children that go to other types of schools, and 4% have children that go to a mix of school types.

Children grade: Approximately 43% of participants have children in Middle and/or High School compared to 28% of participants who have children in Pre-K and/or elementary, 25% of participants having children from both lower and upper grades, and 4% of participants who have children in a different age category.

Graph 2: Children Grade of Survey Participants



Quantitative Results

Electronic Devices

Participants reported they have an average of six electronic devices per household, with smartphones being the most common and the Chromebook being the least common devices. *table 1* presents more details about electronic devices.

Table 1: Descriptive Statistics for Electronic Devices per Household

Descriptives	Computer	Tablet	Chromebook	Smartphone	Other	Total
Average	2	2	1	3	2	6
Median	2	2	1	3	1	6
SD	1.59	1.23	1.11	1.58	1.83	4.35
Min	0	0	0	0	0	0
Max	12	7	9	16	6	27

Access to Electronic Devices

- In terms of how participants have access to electronic devices, 58% of participants indicated they own their own devices, 40% indicated they own their devices but also receive devices from their child's school, and 2% of participants reported they have access to devices by different means.

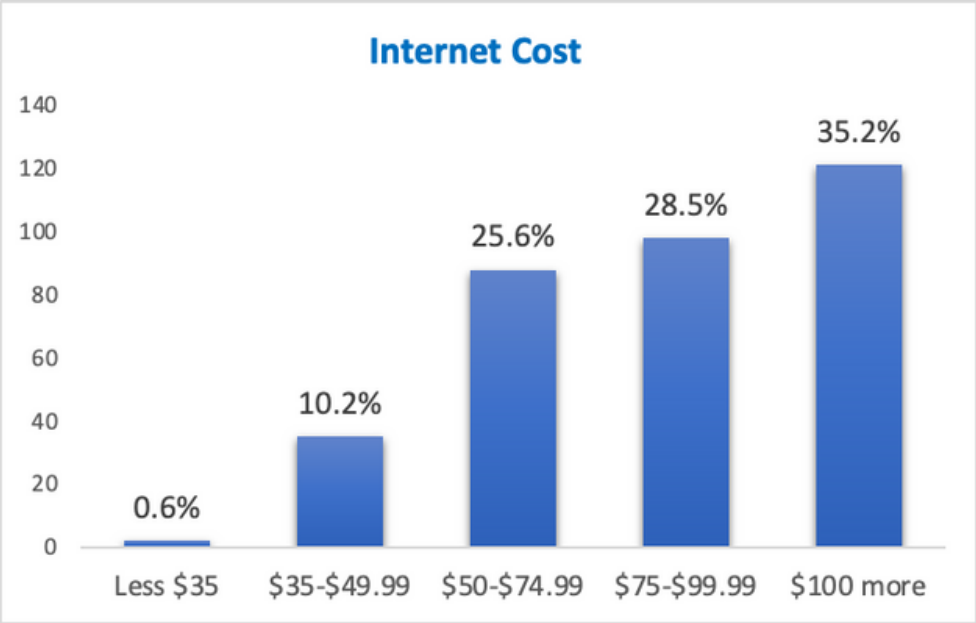
- Ownership of electronic devices varied according to the following demographic characteristics: ethnicity, education, income, and the primary language spoken

    - Participants of LatinX descent are less likely to receive a device from the school
    - Higher educated participants (some college education, college and graduate degrees) are more likely to own their own devices
    - Participants with a higher income are more likely to own their own devices
    - Participants whose primary language is Spanish are less likely to own their devices and more likely to borrow a device from school

Internet Details

- 61% of participants indicated that they have Broadband internet alone, 32% have Broadband along with cellular data, 5% have cellular data alone, and 2% have a different internet type.
- 35% of participants spend $100 or more on internet each month.
- 54% of participants spend between $50 and $99.99 per month on internet access.
- 10% of participants spend between $35 and $49.99 per month on internet access.
- Less than 1% of participants receive financial assistance for internet access.

Graph 3: Internet Cost for Survey Participants



- Internet access varied according to the following demographic characteristics: ethnicity, education, income, and the primary language spoken
  - Participants of LatinX descent (94%) are less likely to have internet access than their counterparts (99%)
  - American-Indians or Alaksa Natives (75%) are less likely to have internet access when compared to the other groups (94%)
  - Higher educated participants (some college education, college and graduate degrees) are more likely to have internet access
  - Participants with a higher income are more likely to own their own devices
  - Participants whose primary language is Spanish (93%) are less likely to have internet access than their counterparts (98%)

- Internet type varied according to the following demographic characteristics: ethnicity and race
  - Participants of LatinX descent (64%) are more likely to have Broadband internet access than their counterparts (57%)
  - Whites (62%) and African-Americans (52%) are more likely to have Broadband internet access when compared with Asian-Americans (40%)

- Internet cost varied, too
  - Participants with a lower education level (high school and less) are less likely to pay more than $75 for internet costs
  - American-Indians or Alaska Natives (33%) are more likely to receive financial assistance for internet when compared to African-Americans (9.2%), whites (1%) and Asian-Americans (0%)
  - Participants with a lower education level (high school and less) are more likely to receive financial assistance for internet.

For participants that do not have internet access in their households, they reported that they receive internet access by the following methods:

- 50% of non-household internet respondents receive internet by going to a location with a hotspot or WIFI hub
- 19% go to an organization that provides internet access
- 6% do not get internet access at all
- 13% use a combination of methods to access the internet and 13% use a different method for internet access outside of their household

When asked how frequently participants run into problems while using the internet,

- Participants were more likely to run into problems less than once a month at 37% or never at 21%
- Participants were least likely to run into internet problems on a daily basis at 10%
- 12% of respondents indicated that they experience internet problems on a weekly basis and 20% experience this on a monthly basis

Internet Affordability

When asked whether they knew about the government internet affordability options,

- 70% of participants did not know about internet affordability options before taking the survey
- 20% somewhat knew the options, and 10% were aware of internet affordability.

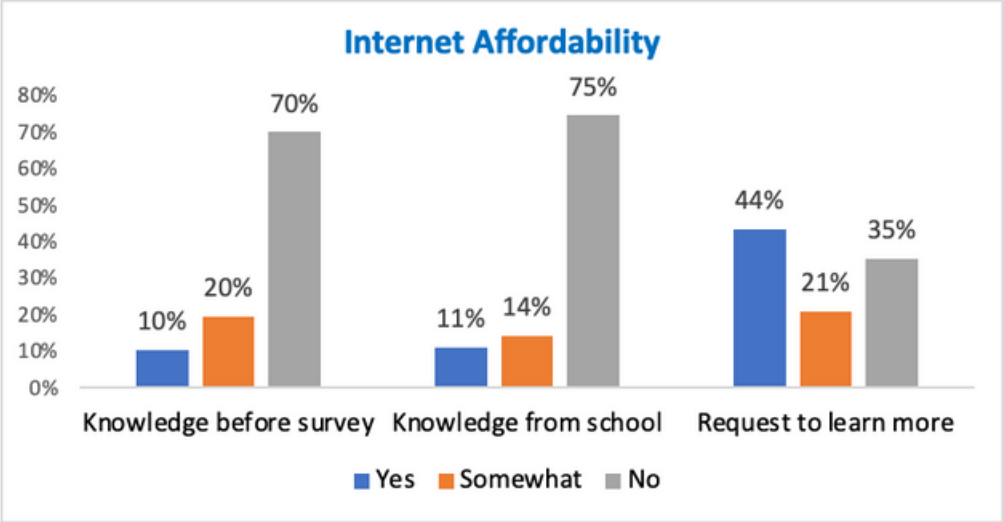
When asked if participants child's school had discussed the internet affordability options with them,

- 75% of respondents indicated that their child's school did not discuss the affordability programs with them
- 14% of respondents indicated they somewhat did, and 11% indicated they did.

When asked if participants would like to learn more about the internet affordability options,

- 44% indicated they wanted to learn more,
- 21% said they somewhat wanted to learn more, and
- 35% did not want to learn more.

Graph 4: Internet Affordability

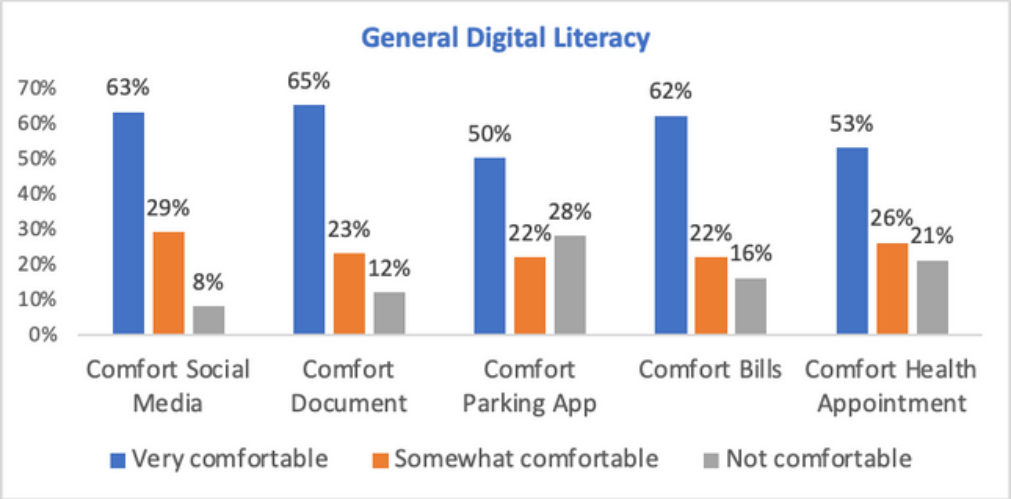


Digital Literacy

Participants were asked how comfortable they were completing general online tasks.

- The majority of respondents were very comfortable with completing the tasks specified in *graph 5*
- The tasks that were presented to be least comfortable were paying for parking using a smartphone at 22% somewhat comfortable and 28% not comfortable along with comfort making an online health appointment at 26% somewhat comfortable and 21% not comfortable.

Graph 5: General Digital Literacy

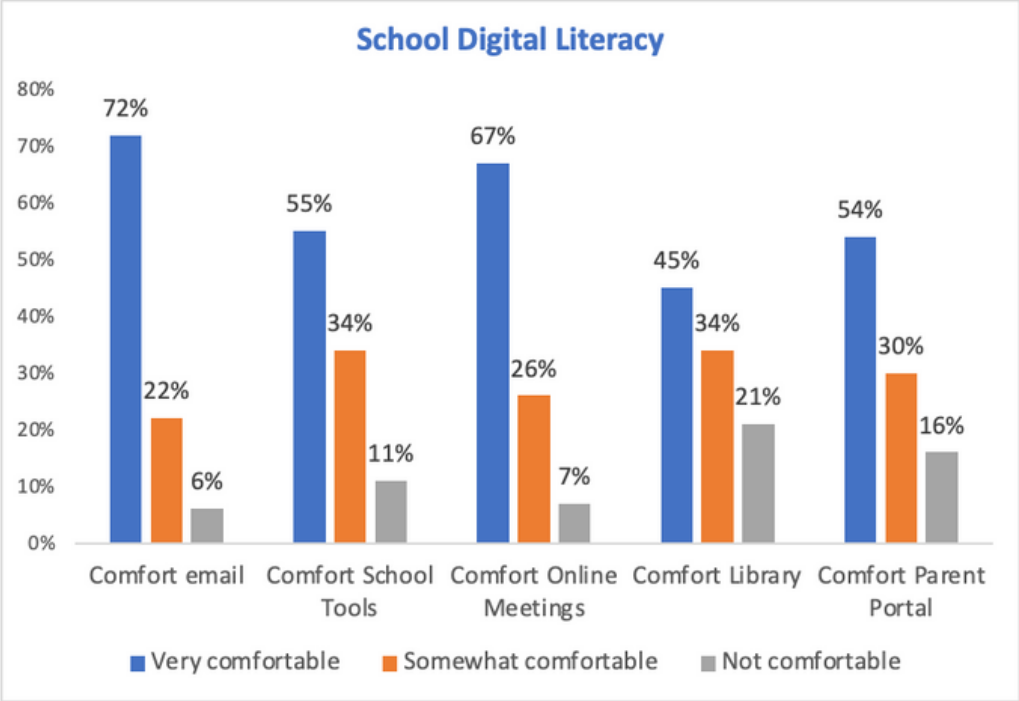


- Participants varied in their comfort with general digital literacy according to the following demographic characteristics: ethnicity, race, education, income and primary language
  - Participants of LatinX origin were less comfortable with all general literacy tools: social media, downloading documents, using parking apps, paying bills online, and scheduling online health appointments
  - African-Americans and Whites were more comfortable with social media than Asian-Americans
  - African-Americans were less comfortable with downloading documents, using parking apps, paying bills online, scheduling online health appointments but not with using social media
  - Participants with a higher education level (those with some college education, college and graduate degrees) are more comfortable with all general literacy tools: social media, downloading documents, using parking apps, paying bills online, and scheduling online health appointments
  - Participants with a higher income are more comfortable with all general literacy tools: social media, downloading documents, using parking apps, paying bills online, and scheduling online health appointments
  - Participants whose primary language is Spanish are less comfortable with all general literacy tools: social media, downloading documents, using parking apps, paying bills online, and scheduling online health appointments.

Participants were asked how comfortable they were using online school tools.

- The majority of respondents were very comfortable with completing the tasks.
- The tasks that were presented to be least comfortable were:
  - accessing library resources online at 34% somewhat comfortable and 21% not comfortable
  - using their child's schools parent portal at 30% somewhat comfortable and 16% not comfortable.

Graph 6: Participant Literacy with School Tools



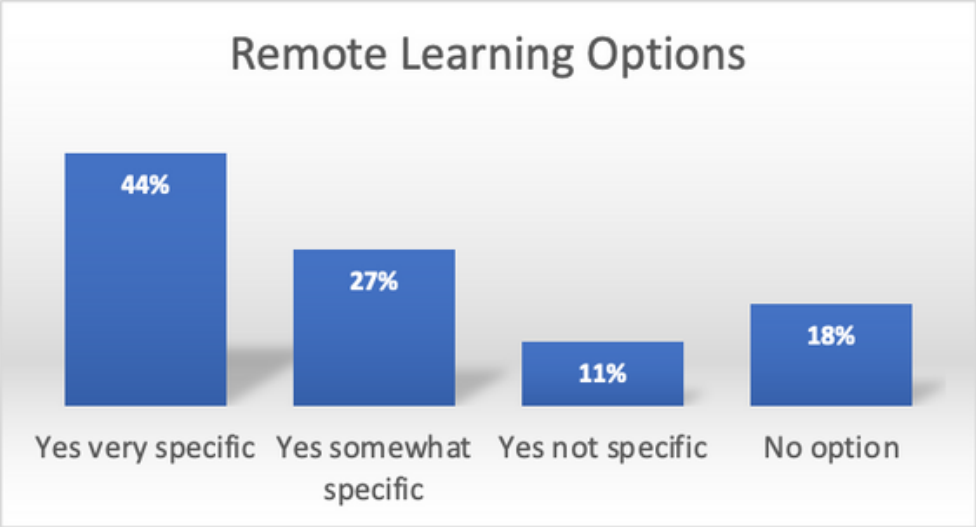
- Participants varied in their comfort with general digital literacy according to the following demographic characteristics: ethnicity, race, education, income and primary language
  - Participants of LatinX origin were less comfortable with all school digital tools: email, online meetings, school tools, library resources, and parent portal
  - Asian-Americans and Whites were more comfortable with email, library resources, parent portal than African-Americans
  - Asian-Americans were less comfortable with online meetings but more comfortable with school tools when compared to whites and African-Americans
  - Participants with a higher education level (those with some college education, college and graduate degrees) are more comfortable with all school digital tools: email, online meetings, school tools, library resources, parent portal
  - Participants with a higher income are more comfortable with all school digital tools: email, online meetings, school tools, library resources, parent portal
  - Participants whose primary language is Spanish are less comfortable with all school digital tools: email, online meetings, school tools, library resources, parent portal

Remote Learning

Participants were asked if their school provided information on remote learning options.

- The majority of respondents (71%) were provided remote learning options and the instructions were either very or somewhat specific as specified in *graph 7*
- 11% of participants responded that they were provided a remote learning option but the instructions were not specific
- 18% indicated that their child's school did not provide them with a remote learning option

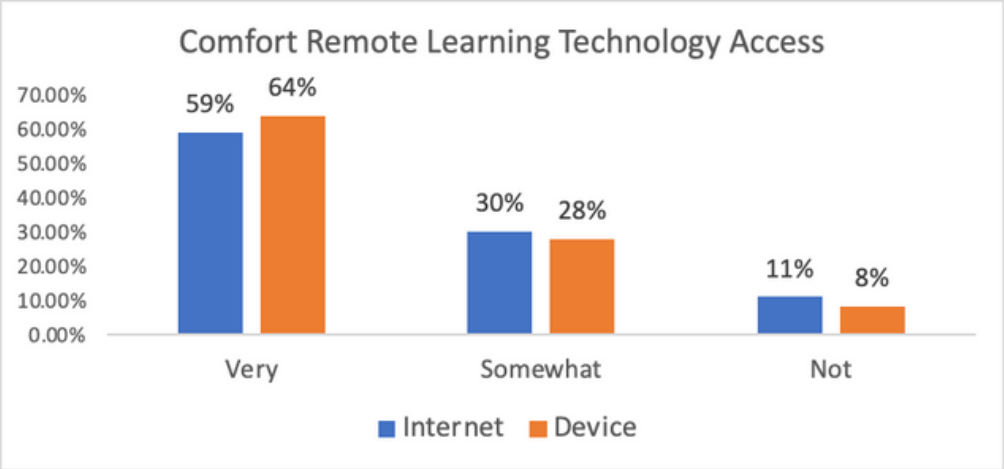
Graph 7: Remote Learning Options



Participants were asked if their child's school had to move to remote learning, would they be comfortable in their internet access and device access to accommodate that.

- The majority of respondents were very comfortable that they would have both the internet and device access to accommodate remote learning as presented in *graph 8*
- Respondents who answered that they would be somewhat comfortable were slightly more comfortable with internet access at 30% compared to device access at 28%
- About 20% of participants were not comfortable with their access to internet and devices to accommodate remote learning

Graph 8: Comfort Remote Learning Technology Access



Communication

Participants were asked how often school personnel communicated with them.

- Respondents were most likely to communicate with teachers once a marking period at 40% followed by weekly at 27%
- In terms of communication with their school's principal, respondents were most likely to communicate with them once a marking period at 49%
- 46% of respondents indicated they never communicate with their school's PTA at 46%
- Additionally, 51% of participants respond that they never communicate with the school nurse and 46% of participants respond that they never communicate with the school's guidance counselor
- The largest percentage of participants responded that they never communicate with other families in their child's school at 55%

Table 2: Frequency of School Communication

Communication Frequency	Teachers	Principal	PTA	Nurse	Guidance Counselor	Other school families
Weekly	27%	10%	11%	4%	9%	21%
Monthly	19%	23%	19%	11%	12%	11%
Once a marking period	40%	49%	24%	34%	33%	13%
Never	14%	18%	46%	51%	46%	55%

Participants were also asked how their child's school currently communicates with them and how they would prefer their child's school communicate with them.

- The majority of respondents both currently communicate with their child's school with a combination of online platforms with no printed communication at 42% and prefer this method at 41%
- The other forms of current and preferred communication were relatively evenly split at around 20%

Table 3: Form of Communication

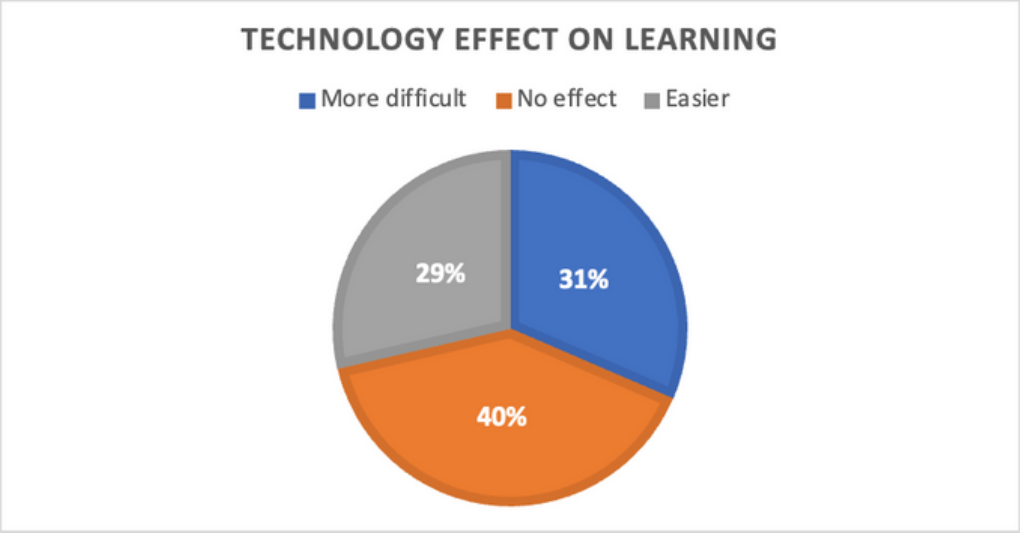
Communication	Telephone	Email	Combination print	Combination no print
Current	17%	22%	19%	42%
Preferred	19%	20%	20%	41%

Effects of Technology on Learning and Stress

Participants were asked how technology affected their child's learning.

- The majority of respondents indicated that technology has not affected their child's learning at 40% as specified in *graph 9*
- 31% of respondents answered that technology has made their child's learning harder while a slightly less percentage of respondents answered that technology has made their child's learning easier at 29%

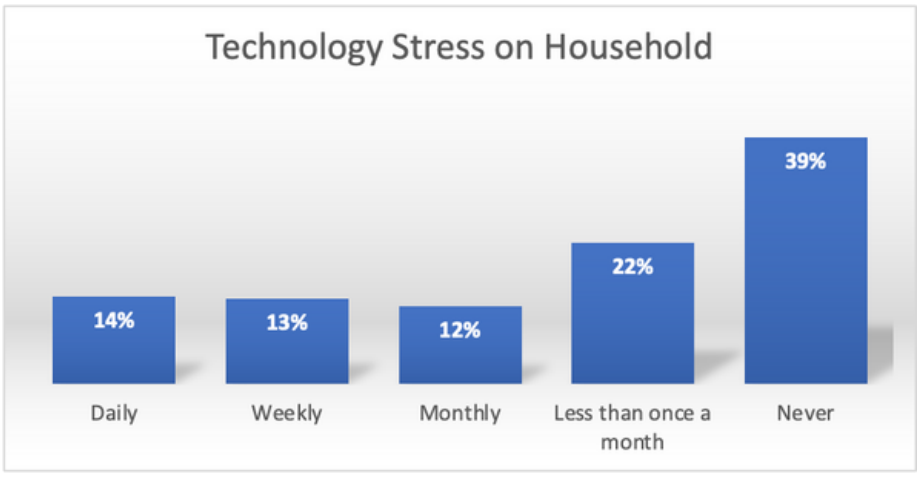
Graph 9: Technology Effect on Learning



Participants were asked how often technology access causes stress for their household.

- 39% of participants responded that technology access never causes stress for their household as specified in *graph 10*
- 22% of responses indicated that technology access causes stress for their household less than once a month
- 14% of participants are stressed by technology access on a daily basis followed by 13% on a weekly basis and 12% on a monthly basis

Graph 10: Technology Stress on Household



Computer Training

Participants were asked how they would like to receive free computer training.

- The largest percentage of participants (34%) responded that would like to receive free computer training by a combination of in person and virtual formats
- 32% of participants responded that they would prefer to receive computer training in person
- 30% of responses indicated that they would prefer virtual computer training followed by 4% who would prefer a different form of computer training

Conclusion

This report examined digital access resources, needs and literacy for parents and guardians in Westchester County, NY through an original survey administered during the winter and early spring of 2022. Respondents were asked questions on details of their device and internet access, comfort with online general and school tasks, online communication, and how technology has affected their household.

Overall, this research report indicated that families with lower income levels, less education, and those having an under-represented ethnical and racial background (e.g. LatinX and American-Indians or Alaksa Natives) were less likely to own or receive an electronic device from school, and are less likely to have internet access when compared to their counterparts. On average, participants reported they had six electronic devices per household, with smartphones being the most common and the Chromebook being the least common devices. Moreover, this report found that participants whose primary language is Spanish were less likely to own their devices and more likely to borrow a device from school.

Findings suggested that more than half (54%) of participants spent between $50 and $99.99 per month on internet access. In terms of internet cost, this report found that American-Indians or Alaska Natives are two times more likely to receive financial assistance for internet when compared to African-Americans and three times more likely to receive financial assistance for internet when compared to whites and Asian-Americans. Additionally, participants with a lower education level (high school and less) are less likely to pay more than $75 a month for internet services.

This report also found that survey participants were, in general, comfortable with completing online tasks, with the least comfortable ones being paying for parking using a smartphone and making an online health appointment. However, some variations exist based on different groups of respondents. Specifically:

- Participants of LatinX origin were less comfortable with all general literacy tools: social media, downloading documents, using parking apps, paying bills online, and scheduling online health appointments;
- African-Americans were less comfortable with downloading documents, using parking apps, paying bills online, scheduling online health appointments but not with using social media;
- African-Americans and Whites were more comfortable with social media than Asian-Americans.

In general, survey participants communicated they were comfortable with using online school tools, with the least comfortable tasks being accessing online library resources online and using their child's schools parent portal.

Similar trends emerged for participants of different racial/ethnic backgrounds in terms of school digital literacy:

- Participants of LatinX origin were less comfortable with all school digital tools: email, online meetings, school tools, library resources, and parent portal;
- Asian-Americans and Whites were more comfortable with email, library resources, parent portal than African-Americans;
- Asian-Americans were less comfortable with online meetings but more comfortable with school tools when compared to whites and African-Americans.

These findings seem to suggest that in Westchester County there is a digital divide among parents of different SES and racial/ethnic backgrounds in terms of access to electronic devices and internet services. This divide is more pronounced for some (e.g. LatinX and American-Indians or Alaksa Natives) but not all under-represented ethnic/racial groups in Westchester County. Additionally, the general and school digital literacy also varies based on different SES and racial/ethnic groups, with participants of LatinX origin having the least digital literacy skills.

The results of this report show that improvements should be made in making online access and affordability options known in every Westchester County school district. Local community organizations should partner with school districts in the county to determine what type of online access and literacy is needed and how to best provide services to meet the characteristics of those individuals. A needs assessment could be conducted if not enough information is available in terms of community needs. Based on this report's findings school districts could consider placing a greater emphasis on providing tailored resources and opportunities for different constituent groups, and encourage an active parent teacher association that presents diverse and inclusive educational activities. Additionally, structured communication between the variety of school personnel and parents should be consistent and in multiple online formats to ensure that individuals with different online capabilities are reached.

The divide in digital access and literacy is not closing any time soon. Although there have been improvements in the number of individuals online, there is still an uneven playing field in how technology is being used and gratification that comes from it. Resources should be allocated to support those on the underserved side of the divide so that, as technology advances, they are prepared to advance with it.

Recommendations

Based on this study's findings the following recommendations are proposed:

- School districts in Westchester County should provide different digital access resources based on family SES and racial/ethnic background as digital access needs seem to vary based on the above-mentioned characteristics. Special attention should be given to students and parents of LatinX origin as this group seem to lag behind in terms of access to electronic devices, internet services and digital literacy skills.

- Schools are in an opportune setting to assist adults in the school community as they work with their children on a daily basis. This method of digital literacy training has proved to be successful in Texas through a partnership between University of Texas San Antonio and Los Arboles elementary school in 2011 to provide Hispanic students and their families classes that promote technology uses for both learning and teaching (Machado-Casas, Sánchez, and Ek, 2014). In San Jose California, schools provided services such as digital literacy training for parents, affordable home broadband internet access, and peer technology support and received overwhelming support from schools and grant funders (Andrew and Wright McPeak, 2020). As parents have a more hands on role in their child's learning amid remote learning, the ability to understand and utilize the new forms of communication and learning platforms is of value.

- School personnel should emphasize the importance of consistency when communicating with families and provide opportunities for families to communicate with one another online. Communication is critical for social inclusion as well as increasing social capital and communication of student needs both formally in schools and informally between families both contribute to student engagement (Domina et al, 2021).

- The government internet affordability programs need to be promoted in low income and vulnerable communities. Resources should be allocated for targeted outreach to families that are on the underserved side of the digital divide and are at risk of falling even further behind in being technologically proficient and confident. Schools should do their part when it comes to providing families with the options that are available in terms of technology especially as communication has become reliant on online platforms.

- Healthcare providers should consider streamlining their online health appointment process to meet the abilities of new online users. They should also consider providing support in teaching families how to access health information online so that their patients become confident in their healthcare and lifestyle decisions. The Covid-19 pandemic resulted in the dependance on broadband internet for telehealth visits and scheduling as well as staying informed on health-related information (Benda et al, 2020) and this reliance on technology negatively affects the health of vulnerable communities.

Appendix

Participants by school district

District	Percentage
Ardsley	1.1%
Bedford	5.8%
Blind Brook	7.9%
Chappaqua	0.9%
Croton Harmon	1.1%
Dobbs Ferry	0.4%
Eastchester	0.6%
Edgemont	0.2%
Elmsford	0.9%
Greenburgh	3.2%
Harrison	1.5%
Hastings On Hudson	0.2%
Irvington	0.2%
Katonah Lewisboro	1.1%
Lakeland	0.9%
Mamaroneck	3.6%
Mount Pleasant	0.4%
Mount Vernon	5.6%
New Rochelle	2.8%
North Salem	0.4%
Ossining	8.2%
Peekskill	1.3%
Pelham	0.2%
Pleasantville	0.2%
Port Chester Rye	8.4%
Rye	2.6%
Rye Neck	0.4%
Scarsdale	0.4%
Somers	0.6%
Tarrytown	3.2%
Tuckahoe	1.5%
Valhalla	1.1%
White Plains	7.3%
Yonkers	23.4%
Yorktown	2.4%

Participants by source

Source	Response %
WCA	20%
PTA	14%
Social	5%
Campaign for Kids	44%
Hard copy	16%
Library	1%

Survey Questions

Q1 Which Westchester County school district are you located in?

Q2 What type of school does your child(ren) attend? *(Check all that apply)*

- ☐ Public school
- ☐ Private school
- ☐ Homeschool (before the pandemic)
- ☐ Other (specify)

Q3 How many school-aged children do you have in your household?

Q4 What grade level is your child(ren) in? *(Check all that apply)*

- ☐ Pre-K
- ☐ Kindergarten to 2nd
- ☐ 3rd to 5th
- ☐ Middle school (6th to 8th)
- ☐ High school (9th to 12th)
- ☐ Other (specify)

Q5 How many adults live in your household including yourself?

Q6 How many electronic devices do you have in your household?

	Number of Devices
Desktop/Laptop	
Tablet	
Chromebook	
Smartphone (mobile phone that allows for web browsing and using apps)	
Other (specify)	

Q7 How do you have access to an electronic device? *(Check all that apply)*

- ☐ We own our personal devices
- ☐ We receive them from work
- ☐ We receive them from my child's school
- ☐ We borrow them from family and friends
- ☐ We borrow them from the library
- ☐ We receive them from a government assistance program
- ☐ Other (specify)

Q8 How comfortable are you with achieving the following tasks:

	Very comfortable	Somewhat comfortable	Not comfortable
Sending an email	○	○	○
Using social media (e.g. Facebook, LinkedIn, Twitter)	○	○	○

Downloading a document	○	○	○
Paying for parking using a smartphone app	○	○	○
Paying bills online	○	○	○
Setting up an online health appointment	○	○	○
Using online tools provided by your children's school (e.g. Google Classroom, Suite)	○	○	○
Participating in online meetings (e.g. Zoom)	○	○	○
Accessing library resources online	○	○	○
Accessing the school's parent portal online	○	○	○

Q9 Do you have internet access in your household?

A. Yes
B. No

NOTE: If you answered 'No' to Q9, skip to Q14

Q10 If you have internet access at home, what kind of internet access do you have? *(Check all that apply)*
NOTE: Do not answer this question if you do not have internet access at home.

- ☐ Broadband (Internet provider such as Verizon Fios/DSL or Optimum)
- ☐ Cellular data from a mobile phone
- ☐ Other (specify)
- ☐ I am not sure

Q11 How often does your household run into problems using the internet?

A. On a daily basis
B. On a weekly basis
C. On a monthly basis
D. Less than once a month
E. Never

Q12 If you have internet access at home, approximately how much do you pay per month for internet access? NOTE: Do not answer this question if you do not have internet access at home.

F. Less than $35
G. $35- $49.99
H. $50- $74.99
I. $75- $99.99
J. $100 or more
K. I don't know

Q13 If you have internet access at home, does your household get financial assistance for internet access? (e.g. Emergency Broadband Benefit Program, Affordable Connectivity Program, or income-

based discounts from service providers such as Comcast or Verizon Fios/DSL) NOTE: Do not answer this question if you do not have internet access at home.

A. Yes
B. No
C. I don't know

Q14 If you do not have internet access at home, how do you get internet access? *(Check all that apply)*
NOTE: Do not answer this question if you have internet access at home.

- ☐ At the library
- ☐ At a family member/friend's household
- ☐ Internet hotspot outside of my home (e.g. stores, parks, coffee shops, restaurants)
- ☐ At work
- ☐ WIFI hubs at my child's school
- ☐ Other (specify)
- ☐ I don't get internet access

Q15 The federal government provides internet affordability programs such as the Emergency Broadband Benefit Program and Affordable Connectivity Program which helps qualifying families get affordable access to internet services during the COVID-19 pandemic. More details about the internet affordability programs can be found here: http://www.fcc.gov/broadbandbenefit

	Yes	Somewhat	No
Were you familiar with the internet affordability programs before taking this survey?	○	○	○
Has your child's school discussed the internet affordability programs with your family?	○	○	○
Would you be interested in finding out more about the internet affordability programs?	○	○	○

Q16 If you were going to get free computer training, what is the easiest way for you to get it? *(Check all that apply)*

- ☐ At your child's school
- ☐ At the local library
- ☐ At a local community organization
- ☐ Through virtual meetings (e.g. Zoom)
- ☐ By receiving resources by email
- ☐ By receiving printed resources by mail
- ☐ Other (specify)

Q17 How often does technology access create stress for your household?

A. It causes stress on a daily basis
B. It causes stress on a weekly basis
C. It causes stress on a monthly basis

A. It causes stress less than once a month
B. It does not cause any stress

Q18 How has technology access affected your child's learning?
A. It has made my child's learning more difficult
B. It has not affected my child's learning
C. It has made my child's learning easier

Q19 How does your school primarily communicate with you? *(Check all that apply)*
A. Printed communications (e.g. newsletters)
B. Video calls (e.g. Zoom)
C. Telephone
D. Text messaging
E. Messaging apps
F. Email
G. Social media (e.g. Facebook, LinkedIn, Twitter)
H. Other (specify)

Q20 How do you prefer your school primarily communicate with you? *(Check all that apply)*
A. Printed communications (e.g. newsletters)
B. Video calls (e.g. Zoom)
C. Telephone
D. Text messaging
E. Messaging apps
F. Email
G. Social media (e.g. Facebook, LinkedIn, Twitter)
H. Other (specify)

Q21 How often do you communicate with the following ONLINE? (e.g. Zoom, email, messaging apps/text)

	Weekly	Monthly	Once a marking period	Never
Teachers	○	○	○	○
Principal	○	○	○	○
Parent-teacher association	○	○	○	○
Nurse	○	○	○	○
Guidance counselor	○	○	○	○
Other families in the school	○	○	○	○

Q22 If your child is absent from school due to Covid-19 circumstances, are you provided with specific information on how they can learn remotely?
A. Yes, we are provided with a remote learning option and the instructions are very specific
B. Yes, we are provided with a remote learning option and the instructions are somewhat specific
C. Yes, we are provided with a remote learning option but with no specific instructions
D. No, we are not provided with any remote learning options

Q23 If your school announced that your child had to switch to remote learning, are you comfortable that you would have the technology access at home to accommodate that?

	Very comfortable	Somewhat comfortable	Not comfortable
Internet access at home	○	○	○
Device access at home (e.g. computer, tablet, Chromebook)	○	○	○

A few questions about yourself

Q24 Which of the following best describes your gender identity?

A. Female
B. Male
C. Non-binary
D. Prefer to self-describe
E. Prefer not to answer

Q25 Are you:

A. Hispanic or Latina/x/o
B. Not Hispanic or Latina/x/o

Q26 What is your race? *(Check all that apply)*

- ☐ American Indian or Alaska Native
- ☐ Asian American
- ☐ Black or African American
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White or Caucasian
- ☐ Other (specify)
- ☐ Prefer not to answer

Q27 What is the highest level of education completed by any adult living in the household?

A. Less than high school
B. High school graduate or GED
C. Some college/AA degree/Technical school training
D. College degree
E. Graduate school degree
F. Other (specify)
G. Prefer not to answer

Q28 What is your total combined family income for the past 12 months, before taxes, from all sources (wages, public assistance/benefits, help from relatives, alimony, and so on)? If you don't know your exact income, please estimate.

A. Less than $20,000
B. $20,000-$39,999
C. $40,000-$59,999
D. $60,000-$79,999
E. $80,000-$99,999

A. $100,000-$129,999
B. $130,000-$159,999
C. $160,000-$189,999
D. $190,000 or more
E. I don't know
F. Prefer not to answer

Q29 What is the primary language spoken at home?
A. English
B. Spanish
C. Other (specify)

Q30 Is your child learning English as a new language?
A. Yes
B. No

Q31 Is there anything else you would like to share with us?

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