

EDTECH LEADERSHIP SURVEY REPORT

2021





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Introduction

As in prior years, CoSN's annual survey gathers data on the responsibilities of U.S. K-12 IT Leaders, the nature of their digital ecosystems, and their educational technology challenges. This year, IT Leaders faced unique challenges due to the pandemic. As a result, pandemic-related questions, such as the use of video conferencing and parental engagement strategies, were added to this year's survey. Responses to these questions, along with the year-over-year changes in some of the standard questions, provide deeper insight into the current realities of IT Leaders. These insights into the state of K-12 technology, infrastructure, and leadership help to inform decisions made by districts, policymakers, and CoSN. Last year, CoSN began a member-only survey of perspectives on how the pandemic is changing IT leadership, and new data will be collected in early summer 2021. CoSN considers survey results in making resource development decisions. Existing resources include:

- [The Digital Leap Success Matrix](#) — An outline of the practices needed to be a successful digital school system
- [Peer Reviews](#) — A rigorous process for assessing a school system's digital readiness, based on CoSN's Digital Leap Success Matrix
- [The Digital Equity Toolkit](#) — A guide to closing the Homework Gap and ensuring digital equity, including our new Student Home Connectivity research
- [Interoperability Toolkit](#) — Resources to help districts increase the interoperability of their academic and operational systems
- [Protecting Privacy Resources](#) — A range of resources to help districts build and improve their privacy programs, including an in-depth guide to key federal student data privacy laws, as well as the Trusted Learning Environment Seal
- [Cybersecurity Resources](#) — A suite of resources defining risks and providing strategies for addressing cybersecurity challenges

- EmpowerED Superintendent Toolkit — Created in partnership with AASA, the toolkit provides leadership strategies based on imperatives for technology leadership and action steps for strengthening the technology leadership team
- Driving K-12 Innovation — A series of annual reports on emerging technologies to transform learning which identify top Hurdles, Accelerators, and Tech Enablers

In addition to these public resources, CoSN provides members with extensive member-only resources, such as the ASBO/CoSN Toolkit for collaboration between the school business official and CTO. Plus, CoSN issues Exclusive Briefs providing guidance on key emerging topics, such as addressing screen time concerns, as well as EdTechNext reports on emerging technologies like AI in education.

The full breadth of CoSN resources are available online. Note: Many of the resources are available to non-members as well as members, but you must create a CoSN account to download them.

Key Findings

Efforts to expand broadband access outside of school have increased dramatically. In 2020, almost half (49%) of respondents did not provide off-campus services, compared to just 5% in 2021, meaning 95% of respondents are providing off-campus services of some kind. The most popular strategy for increasing broadband access outside of school is the deployment of district-owned hotspots, with 70%; this compares to just 17% the prior year. Nearly a third (30%) work with their communities to provide Wi-Fi hotspots compared to 19% in 2020, and more than a quarter (27%) provide home access via free or subsidized programs to low-income families, more than doubling the prior year's rate of 10%. Even the use of "other" strategies increased year-over-year—8% this year versus 3% in 2020.

Concerns about digital equity have increased. When asked if their concerns regarding students' home access to devices and the internet for remote learning have increased since the pandemic, the overwhelming majority (97%) of respondents said yes. For the first time since CoSN started this survey, respondents highlighted digital equity as a top concern and ranked it as their third most pressing concern. During the pandemic, the "homework gap"—which put students with lack of access at a significant disadvantage—became an "everything gap" that completely denied those students any access to instruction or resources provided online.

Specific cybersecurity risks are generally underestimated even though cybersecurity and the privacy/security of student data are the top two technology priorities. For the second straight year, cybersecurity has ranked as the top priority for school district IT Leaders, with privacy and security of student data as number two. Yet when asked about perceived risks, the vast majority (84%) don't rate any threats as high risk. Phishing was the incident type perceived as the greatest threat, with 45% rating it medium/high or high risk. Of that 45%, however, only 16% consider phishing a high-risk cyber threat. Lower perception of actual risks may also explain why the majority (59%) of districts do not have a cybersecurity plan.

Districts are providing many new services. The overwhelming majority (97%) of districts provided new services specifically designed to address

pandemic issues. Almost three-quarters (74%) conducted contact tracing, 67% provided cleaning services for devices, and 51% tested temperatures of students and faculty. While a majority (53%) provided remote counseling to address students' Social and Emotional Learning (SEL) needs, less than a quarter (23%) provided counseling for teachers. About a third (34%) provided telehealth options and 29% offered COVID testing.

Parental engagement has changed during the pandemic. The overwhelming majority (95%) of districts have changed how they engage with parents during the pandemic, including increasing the frequency of communication, expanding the number of communication channels used, enhancing an existing parent portal, and providing more opportunities for two-way parent/teacher communication. A reflection of the degree to which districts have relied on parents to help with instruction during the pandemic, 61% provided parents tips on how to use technology and 33% provided actual teaching tips.

Department silos identified as a bigger challenge. IT Leaders have identified the same top three challenges for many years. Budget constraints consistently tops the list, followed by lack of access to PD and the existence of silos. This year, the existence of silos in the school system moved up in rank to the number two slot from number three. Silos make it difficult to work across functional areas. Yet breaking down silos is precisely what was needed during the pandemic in order to be flexible and effective. As expressed by one respondent, *“The biggest lesson learning over the past year is that schools cannot work in silos anymore.”*

A majority of districts have achieved FCC's long-term bandwidth goals at school. For the first time, a majority (61%) of respondents reported access to 1 Gbps per 1,000 students in all their schools—up from just under 50% last year. The percentage of districts that haven't achieved the FCC long-term goal for any of their schools has shrunk from 38% in 2019 to 21% this year. While these results indicate progress around at-school connectivity, it is important to keep in mind that these targets were set back in 2014. They did not anticipate the broadband needs of 2020-2021 school year.

Slow internet connections are the top challenges to remote teaching and learning. While families' inability to access the internet was cited as a top challenge, it ranked third after problems with connections that were too slow for livestreaming (ranked number one) and connections that were too slow for multiple users (ranked second). These rankings show that access to the internet is not a reliable assessment of a student's access to digital resources or remote instruction. Fast download/upload speeds are more indicative.

Virtually all districts faced challenges with video conferencing. The overwhelming majority (94%) of districts faced challenges with video conferencing as they pivoted to remote teaching and learning during the pandemic. The top challenge, with 66%, was bandwidth. Security breaches followed with 43% and then privacy with 38%. About a fifth (21%) had issues with software installation with almost same percentage (22%) having other challenges not specified on the survey.

Districts struggled to provide remote support. Remote instruction required districts to also provide technical support to students and families. However, most IT departments (61%) were not prepared to do so. The strain this extra responsibility put on staffing was highlighted in many of the comments in the open-ended section of the survey, such as, *"what we were not prepared for were the non-stop help desk calls for the entire time we were shut down."*

IT Leadership is overwhelmingly white and mostly male. IT Leadership in K-12 is "whiter" than either K-12 Educators or IT management in other industry segments, with 92% identifying as White. Men continue to be over-represented, comprising a large majority (72%) of IT Leaders.

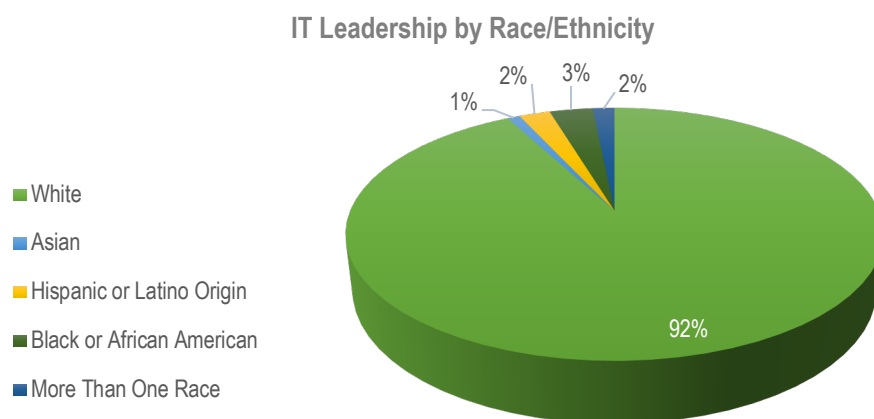
IT Leader Profiles

The male-to-female ratio has been consistent over the past three years—roughly 3-to-1. In 2021, the large majority (72%) of IT Leaders are male with women holding less than a third (28%) of the positions.

TABLE: IT Leadership Segmented by Female/Male

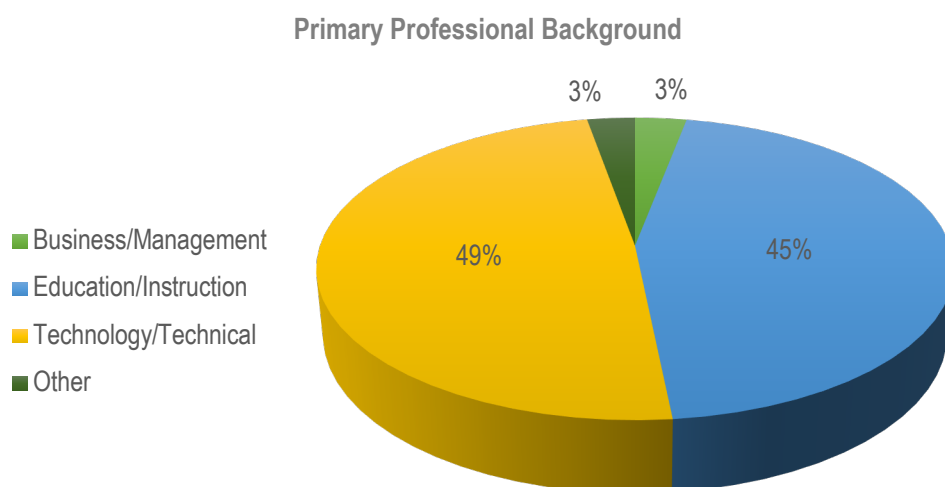
	2019	2020	2021
Female	28%	25%	28%
Male	72%	75%	72%

Also unchanged is the lack of racial and ethnic diversity of IT Leaders. Overwhelmingly White (92%), IT Leadership in K-12 is “whiter” than either K-12 Educators or IT Management in other industry segments.¹

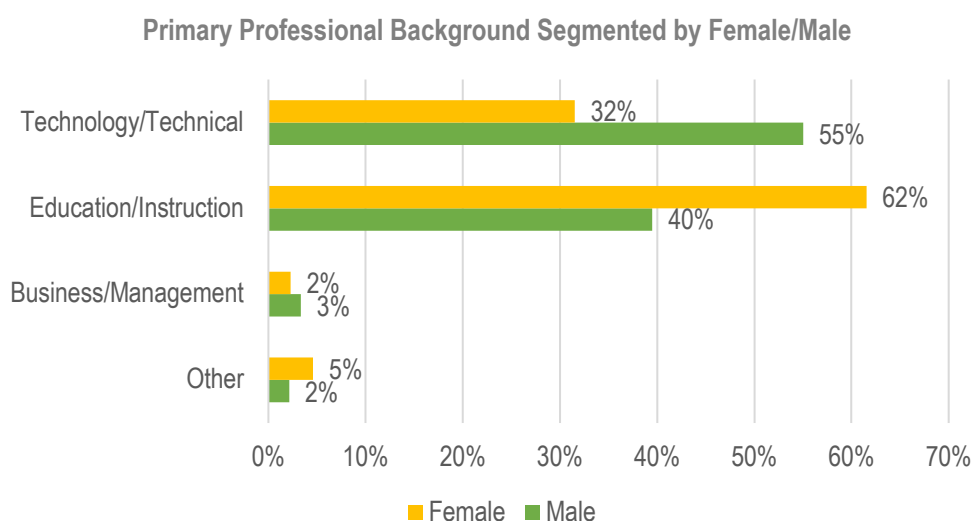


IT Leaders come to their positions from two main paths—Technology/Technical (49%) and Education/Instruction (45%). Those with primarily a business/management background comprise 3% with the remaining 3% coming from undefined other backgrounds. This breakdown remains consistent regardless of metro status. The slight preponderance of IT Leaders coming from a Technology background exists in rural, town, suburban, and urban districts.

¹ <https://www.bls.gov/cps/cpsaat11.htm>



Differences emerge when segmenting professional backgrounds according to sex. The majority (62%) of female IT Leaders come to their position with an Instruction background whereas a majority (55%) of male IT Leaders have a background in technology.

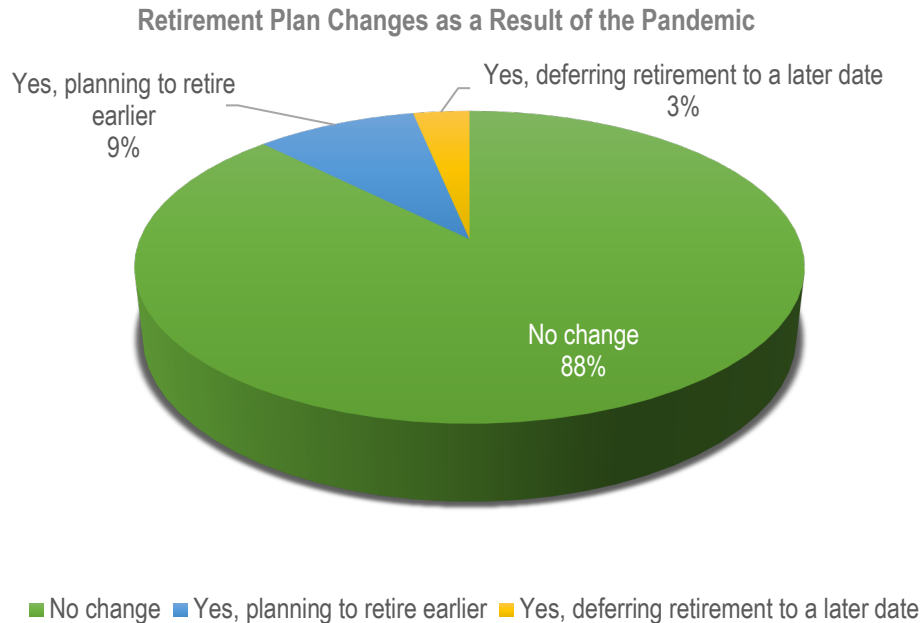


There has been much media coverage about the pandemic's impact on teachers' decision to retire earlier than planned.² The pandemic is also affecting the retirement decisions of IT Leaders with 9% reporting the pandemic is causing them to plan to retire earlier. Combined with the high

² <https://time.com/5864158/coronavirus-teachers-school/>

turnover rate of superintendents³, the loss of experienced personnel in K-12 is a worrisome trend. On the positive side, 3% of IT Leaders decided to defer their retirement to a later date as a result of the pandemic and the vast majority (88%) have not made any changes to their retirement plans.

Staffing



A majority of respondents reported insufficient staffing for three of the IT functions asked about: integrating technology into the classroom (55%), providing remote support to students and families (61%), and providing instructional support around classroom use (65%). The poor staffing ratings for both instructional support and technology integration are similar to prior years. They have repeatedly received the worst staffing assessments. Remote support was a new answer option added to the survey this year. It is not a surprise that it has debuted as one of least adequately staffed, as prior to the pandemic it was not a major IT function. The strain this extra responsibility put on staffing was highlighted in many in the comments of the open-ended section of the survey:

“We went from having one district network to support to having 20,000+ networks to support. We were surprised by the number of people who did not know how to connect a device to their home network, to a printer, etc.”

³ <https://www.nytimes.com/2021/04/28/us/school-superintendent-burnout-covid.html#:~:text=Dan%20Domenech%2C%20the%20executive%20director,board%20members%20over%20reopening%20schools.>

“We were prepared with devices, hotspots, video training on how to use them and our online systems in a timely manner—what we were not prepared for were the non-stop help desk calls for the entire time we were shut down.”

“Our ticketing system is cumbersome with high ticket volumes. We are not designed for remote support.”

“While students have internet and devices not all have parents who can help with the technology.”

“While money was spent on TECHNOLOGY: hardware, access, resources, there were NO MONIES dedicated to the EXTRA support that was needed for staff, students and families.” (emphasis in the original)

On a much more positive note, 76% expressed staffing was “adequate” for installing and maintaining applications—the best staffing rating. The remaining functions were rated adequate by a majority of respondents—maintaining network systems adequately (73%), meeting department’s yearly objectives (70%), effectively supporting needs of school/district (63%), providing remote support to teachers and administrators (61%), plan and implement new technology (59%), and support device cleansing protocols (53%). Note that the notion of adequate staffing can fluctuate, as one respondent pointed out, *“depending on what we are dealing with at the time.”*

TABLE: Staffing Levels by IT Function

IT Function	Understaffed	Adequate	Overstaffed
Provide instructional support around classroom use	65%	35%	1%
Provide remote support to students and families	61%	39%	0%
Integrate technology into the classroom	55%	44%	1%
Support device cleansing protocols	47%	53%	0%
Plan and implement new technology	40%	59%	1%
Provide remote support to teachers and other educators/administrators	38%	61%	1%
Effectively support the needs of the district/school	36%	63%	1%
Meet your department's yearly objectives	29%	70%	1%
Maintain network systems adequately	26%	73%	1%
Install and maintain applications	23%	76%	1%

Devices

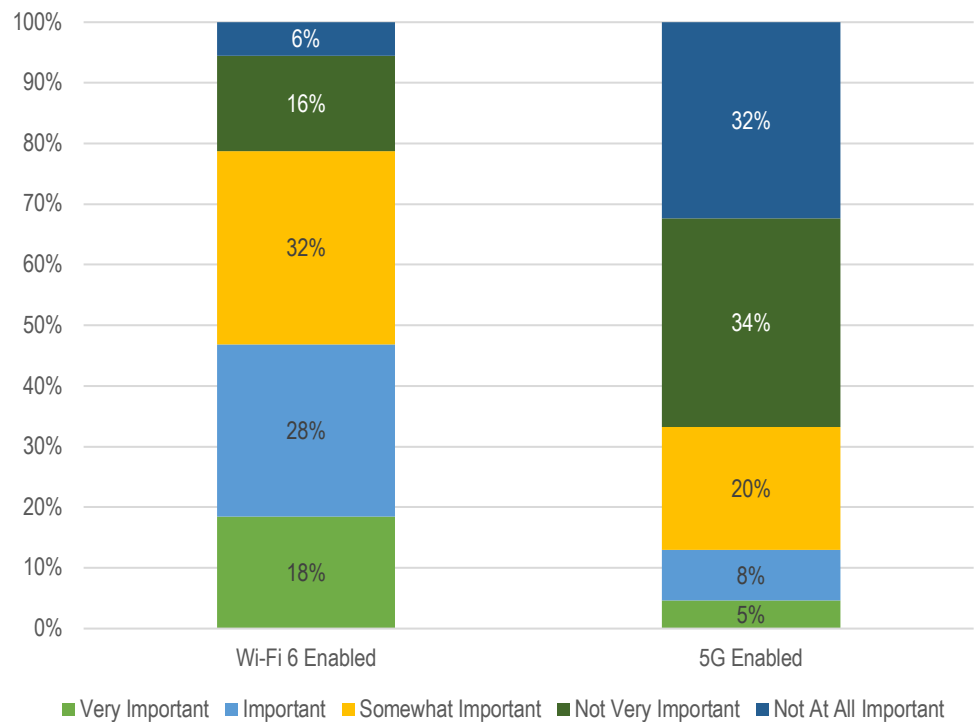
Year-over-year results show increases in the total number of devices districts need to support. One third (33%) reported supporting more than 7,500 devices in 2020. This year almost half (49%) of districts do so—an amazing growth in device support.

TABLE: Number of Devices Supported by Districts

Total Number of Devices	2020	2021
0-1,000	15%	6%
1,001 – 3,000	31%	20%
3,001-7,500	21%	25%
7,501+	33%	49%

Increasingly there will be devices that will support both standards but IT Leaders expressed a clear preference for Wi-Fi 6 over 5G when making purchasing decisions. Forty-six percent (46%) of respondents rated Wi-Fi 6 as important or very important. This preference swells to 78% if the Wi-Fi 6 ratings of “somewhat important” are included. This compares to the low degree of importance given to 5G-capable devices, with only a third (33%) giving 5G any importance and only 13% rating it important or very important. The focus on fast and robust Wi-Fi is not a surprise. Schools need to support ever-increasing demands for bandwidth and an increasing number of devices, which might include other smart devices on their network such as their HVAC systems. As school systems look to upgrade their networks to the most current standard, it makes sense to only add or refresh with devices that will be able to fully benefit.

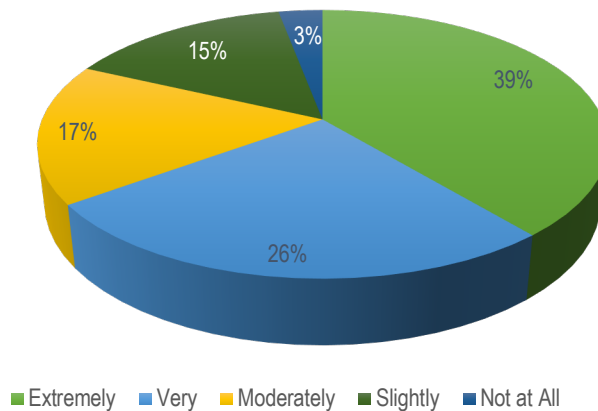
Importance of Wi-Fi 6 compared to 5G



Equity

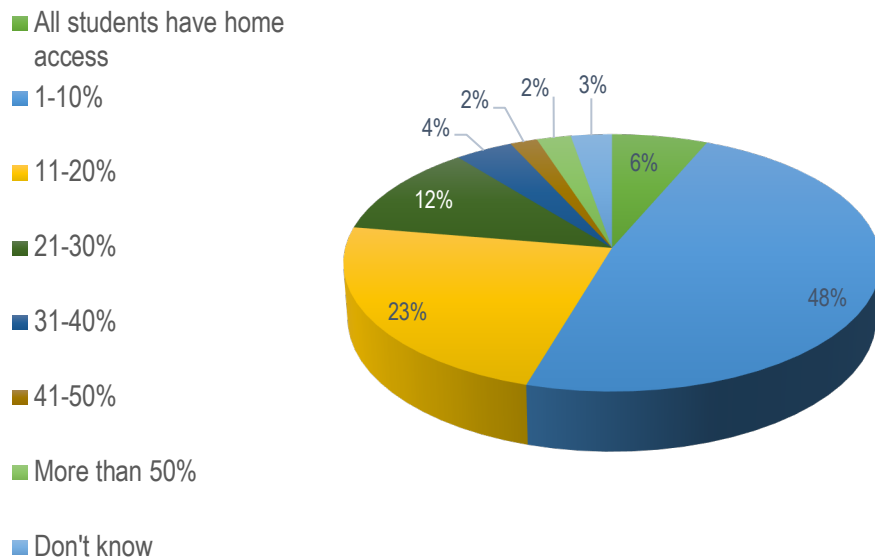
Equity is a persistent concern for IT Leaders. When asked if their concerns regarding students' home access to devices and the internet for remote learning increased since the pandemic, the overwhelming majority (97%) of respondents said yes. A majority (65%) had significant increases in concern, which includes 39% who rated their increased level of concern as extreme. Eighteen percent (18%) said their increase in concern was slight or none. For some district leaders, home access may not be an issue and no significant rise in concern resulted when their districts had to shift to remote learning. For others, it may be their concern was already at the highest levels.

Increased concerns about lack of at-home devices and internet for students during remote learning



Only 6% of respondents work in districts where all their students have broadband access at home. However, only 2% indicated that the majority of their students don't have access. Districts that have a tenth or less of students lacking home broadband account for almost half (48%) of responses and those with 11- 20% of students without home broadband account for the next largest plurality with 23%. So, roughly speaking, most schools have most of their students able to learn remotely using home broadband. But "most" is still a terrible situation. It means thousands of students are left without equitable access to education, of which IT Leaders are keenly aware—as indicated by their level of increased concern about home access. As one respondent explained, *"We hit the ground running. Then realized that we have a lot of equity issues with technology at home, mainly broadband. It affects a small portion of a population but that is irrelevant."*

Percentage of students without broadband access at home



The top challenge districts face related to students' access to technology at home was connections that are too slow for multiple users in the household. Ranked second were connections that are too slow for livestreaming. These top-ranked challenges indicate that just getting access to the internet is insufficient to address the problems around digital equity. As expressed by one respondent:

"Connecting students is not enough...we must ensure there is sufficient throughput experienced by each student."

However, ensuring basic access is still a major issue. Students' inability to access the internet at home ranked as the third top challenge.

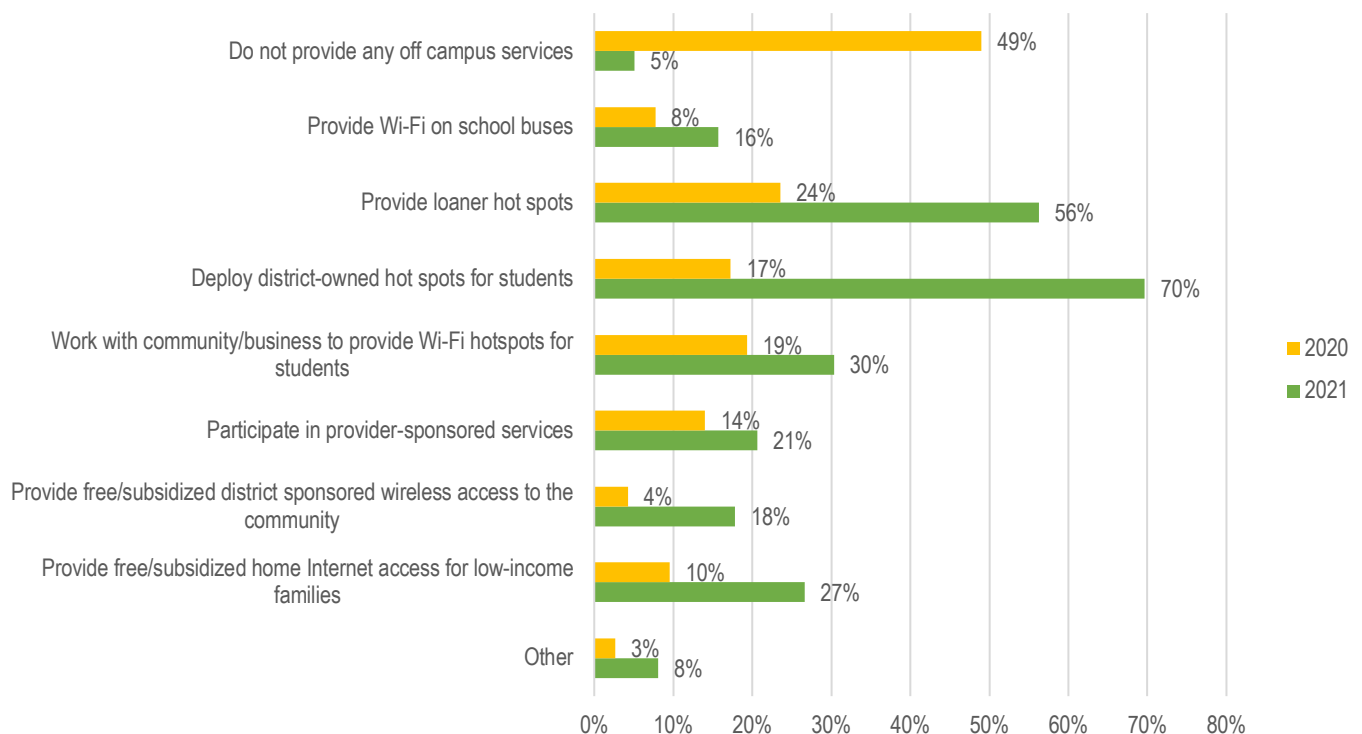
TABLE: Challenges related to students' access to technology at home

Rank	Challenge
#1	Students' internet connection is too slow for multiple users at once
#2	Students' internet connection is too slow for livestreaming
#3	Families can't access internet at home

Compared with the prior year, there have been significant increases in the percentage of districts using strategies for providing broadband access outside of school. Due to the remote learning necessitated by the pandemic,

this is not surprising. In 2020 almost half (49%) of respondents did not provide off-campus services, compared to just 5% this year, meaning 95% of respondents are providing off-campus services of some kind. Every strategy specified on the survey showed increased use year-over-year. The most popular strategy for increasing broadband access outside of school is the deployment of district-owned hot spots. With 70%, this compares to just 17% the prior year. Nearly a third (30%) work with their communities to provide Wi-Fi hotspots compared to 19% in 2020, and more than a quarter (27%) provide home access via free or subsidized programs to low-income families, more than doubling the prior year's rate of 10%. Even the use of "other" strategies increased year-over-year—8% this year versus 3% the prior year.

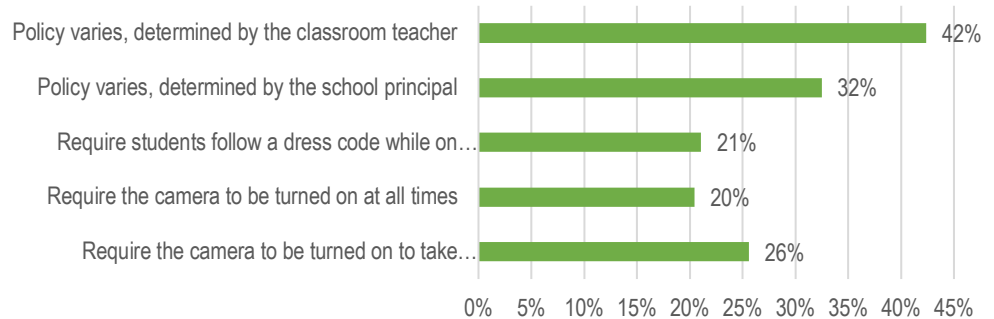
Strategies for Increasing Broadband Access Outside of School



For 74% of districts, the use of remote video is determined at the local level. Teachers make the decisions in 42% of districts and principals in another 32%. Equity issues are involved with camera use, but more than a quarter (26%) of respondents have policies requiring cameras to be turned on for attendance. A fifth (20%) require the camera to be turned on at all times and

21% employ one of the more controversial policies — requiring students to follow a dress code while on camera. In addition to the equity issue such policies introduce, instructing students on what they can wear in their own homes has been criticized by some as misguided. Instead of creating a sense of normalcy, such policies can create an additional stressor for both student and parents during an already stressful time.

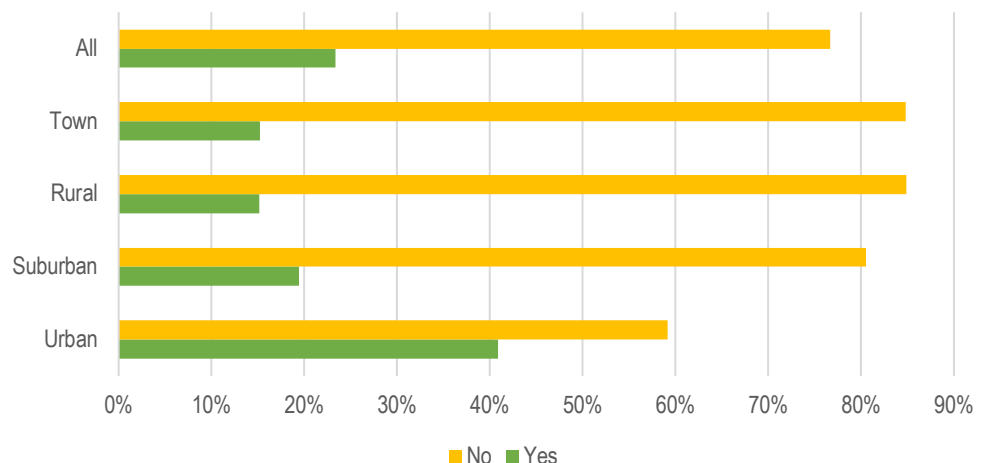
Top Remote Learning Video Policies



Cybersecurity

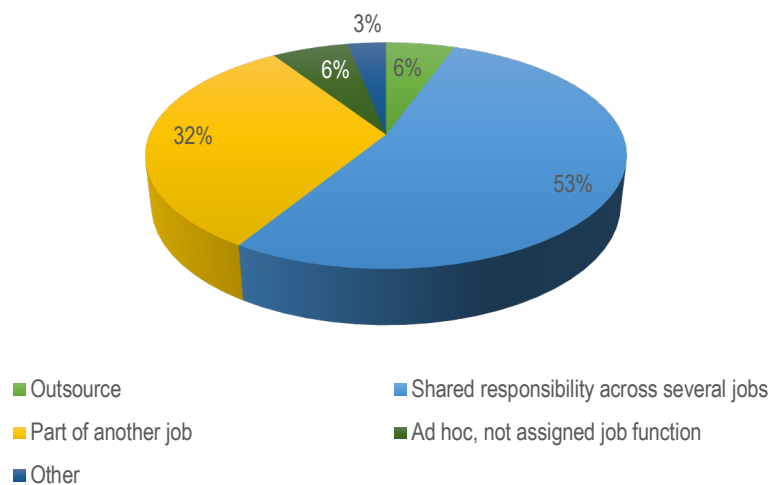
Over three-quarters (77%) of districts do not have a full-time employee dedicated to network security. This is a slight improvement over last year when only one in every five districts had an FTE dedicated to network security. Urban districts are most likely to have a dedicated position with 41% agreeing. Suburban districts are half as likely, with 19%. Towns and rural districts are least likely to have a dedicated FTE for network security, each with 15%.

% of Districts with Network Security FTE by Metro Status



Districts use a variety of strategies to monitor network security in lieu of a full-time staff position. A majority (53%) spread the responsibility across several jobs. Almost a third (32%) embed network security monitoring into another position. Outsourcing is used by 6% of respondents with another 6% who deal with the responsibility on an ad hoc basis. An ad hoc cybersecurity strategy is arguably the worst approach to adopt, as cyberattacks are increasingly focused on K-12 institutions. The FBI, the U.S. Cybersecurity and Infrastructure Security Agency, *and* the Multi-State Information Sharing and Analysis Center jointly issued an alert in December 2020 that cybercriminals are targeting K-12, “educational leadership, information technology personnel, and security personnel will need to balance this risk when determining their cybersecurity investments.”⁴ While not every school district will be able to afford a dedicated FTE for network security, without a formal strategy for maintaining their network security they put themselves, their students’ data, and staff’s data at risk.

Network Security Monitoring Strategies
(without dedicated person)



The vast majority (74%) of districts require or plan to require staff training in cybersecurity practices. Half of districts (50%) require training for all their staff and another 18% are planning to do. Very small percentages of districts either require or plan to require only teachers to be trained (3%) or only require or plan to require administrator and support staff to be trained (2%).

⁴ <https://us-cert.cisa.gov/ncas/alerts/aa20-345a>

Training just one stakeholder group is not sufficient, as all staff are vulnerable to attacks that can endanger the network and/or put personally identifiable information (PII) at risk. The lack of any training is the worst-case scenario. As CoSN advises:

*" TRAIN, TRAIN, TRAIN! Make sure everyone knows security awareness is their job and who to talk to if they make a mistake."*⁵

TABLE: Training on Cybersecurity Practices

Trainees	Percentage
Required for All Staff	50%
Plan to require for All Staff	18%
Required for Teachers only	2%
Plan to require for Teachers only	1%
Required for Administrators and Support Staff only	1%
Plan to require training for Administrators & Support Staff only	1%
Do not require training	26%

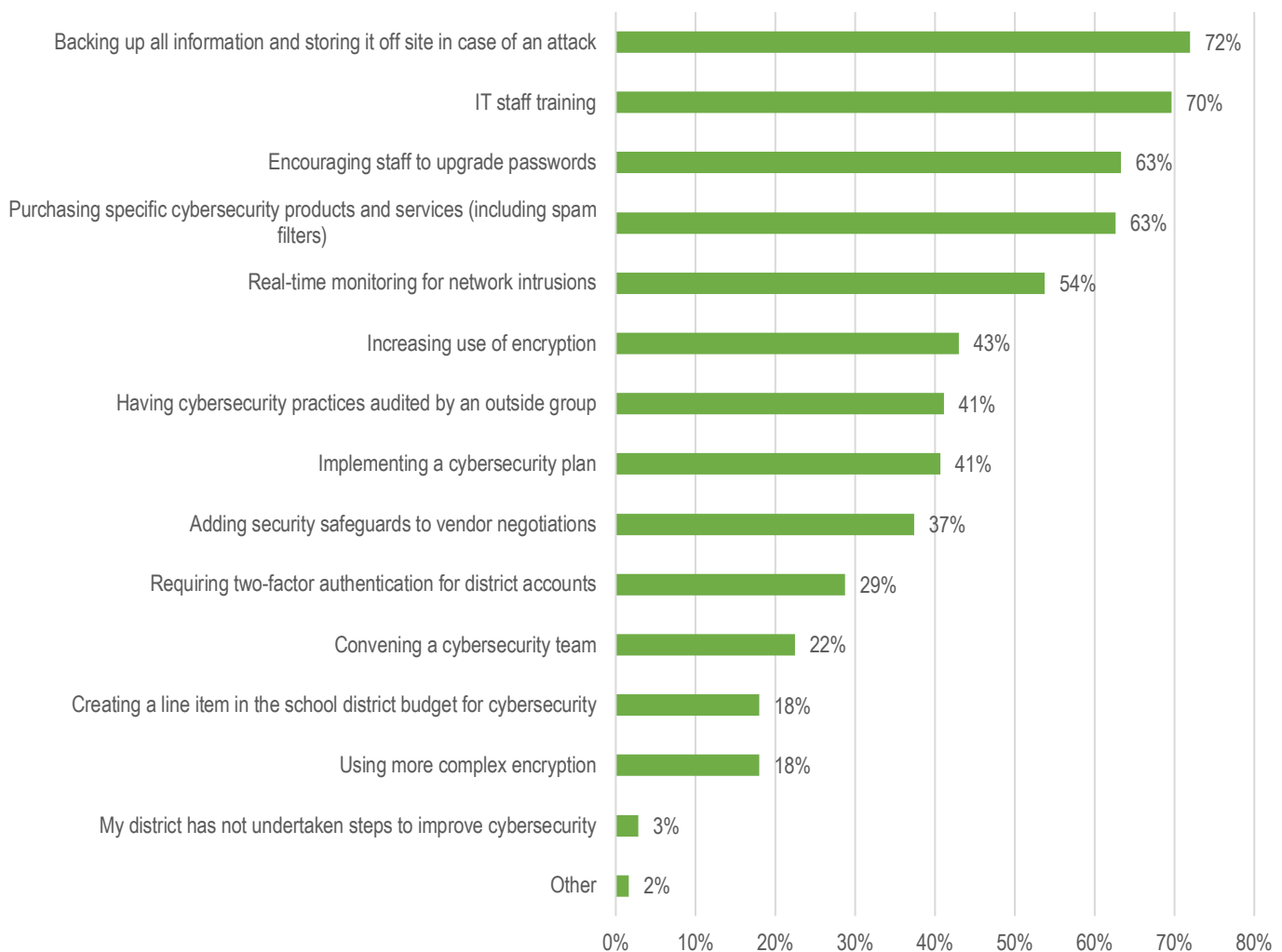
In addition to general staff training, there are other methods districts use to improve cybersecurity. Back-up and off-site storage are the most common practice, with 72%. Regularly performed, routinely tested, and centrally managed, off-site back-ups are essential to avoid significant operational disruption and monetary expenditure after a ransomware attack. However, solid back-up practices won't prevent the attacks themselves. In attempts to do that, multiple practices need to be undertaken. Training IT staff, which would be more technical in nature than that for teachers and administrations, is used by 70% of respondents. While some argue that passwords may become a thing of the past,⁶ it is best practice to have strong, unique passwords and 63% of respondents encourage their staff to regularly upgrade passwords. Another 63% has purchased cybersecurity software to help thwart attacks. A majority (54%) monitor for intrusions in real-time. A large plurality of districts has increased their use of encryption (43%). Cybersecurity audits and the implementation of a cybersecurity plan are next on the list, each with 41%. These two practices are considered key factors in assessing a district's operational readiness in a digital environment. More than a third (37%) address cybersecurity in their vendor negotiations. Note

⁵ "Getting Started with Cybersecurity," <https://cosn.org/cybersecurity>

⁶ <https://www.zdnet.com/article/microsoft-2020-was-the-year-we-almost-said-goodbye-to-passwords/>

that while many of the practices might be difficult, complicated, and/or expensive to execute, working with EdTech providers to improve security is low hanging fruit all districts can reach. The results of the remaining responses to the question on cybersecurity practices are: requiring two-factor authentication (29%), convening a cybersecurity team (22%), creating a budget line for cybersecurity (18%), and increasing encryption complexity (18%). Thankfully, the least common response to the survey question, with 3%, was “My district has not undertaken steps to improve cybersecurity.”

Practices to Improve Cybersecurity

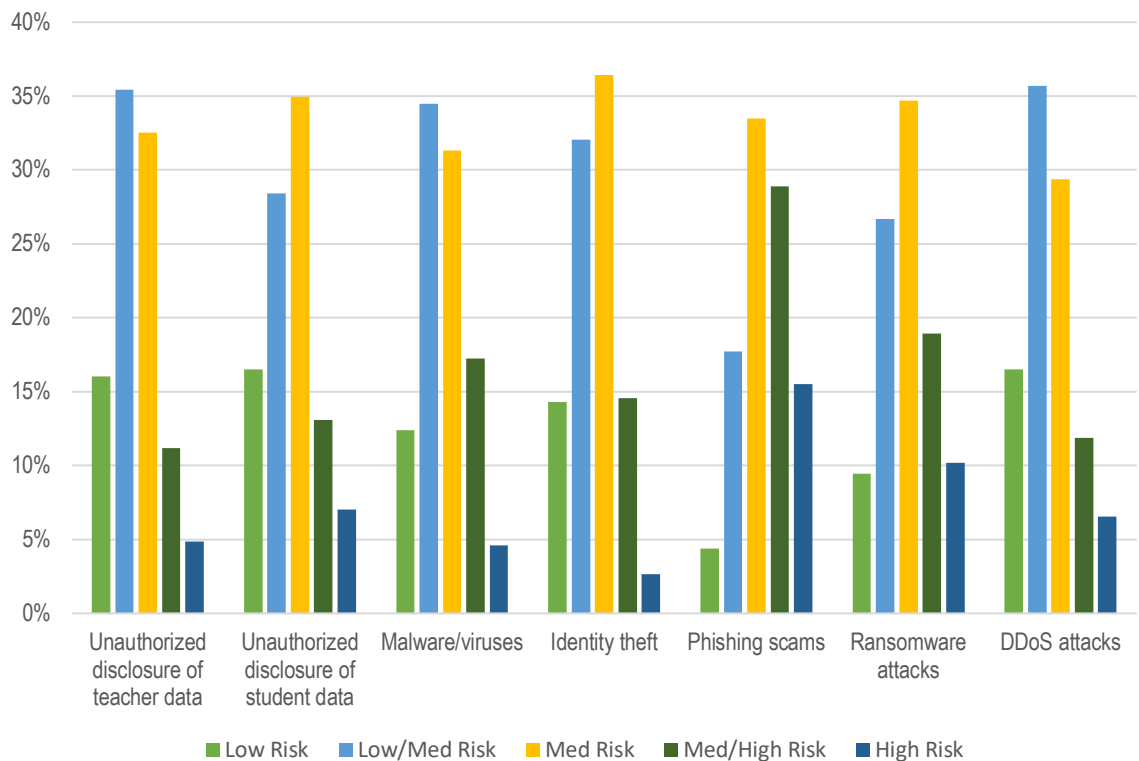


The year 2020 had a “record-breaking” number of cybersecurity incidents which resulted in “school closures, millions of dollars of stolen taxpayer dollars, and student data breaches directly linked to identity theft and credit fraud.”⁷ Yet cybersecurity threats are generally underestimated by district IT Leaders. The vast majority (84%) don’t rate any cybersecurity threat as high risk. Roughly a third of all respondents perceived a medium risk for every threat type—from 29% for DDoS attacks up to 36% for identity theft. Not a single incident type received a high risk rating by a majority. The incident type considered the greatest threat was phishing, with 45% rating it either medium/high or high risk, including only 16% rating it a high risk. Across all sectors, phishing scams are on the rise. According to the FBI, the number of reported phishing complaints *doubled* from 2019 to 2020 and is by far the number one internet crime type.⁸ The reality is that all networks and their users are at high risk for phishing scams. And as phishing scams can be the point of entry for virtually all other incident types, everyone needs to be on high alert. Given that the FBI, MS_ISCA, and CISA jointly stated that K-12 is the most targeted public sector for ransomware, it is surprising that district IT Leaders do not rate this risk higher.

⁷ Levin, Douglas A. (2021). “The State of K-12 Cybersecurity: 2020 Year in Review.” EdTech Strategies/K-12 Cybersecurity Resource Center and the K12 Security Information Exchange. Available online at: <https://k12cybersecure.com/year-in-review/>

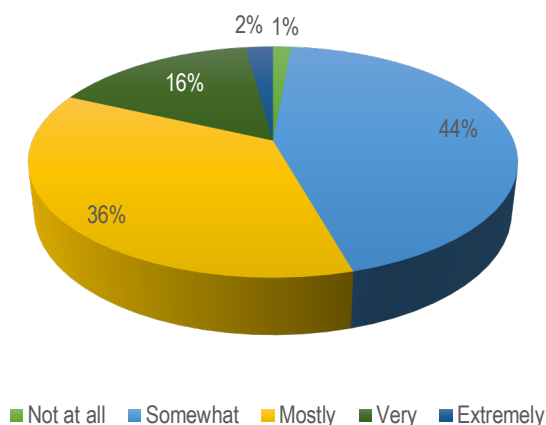
⁸ https://www.ic3.gov/Media/PDF/AnnualReport/2020_IC3Report.pdf

Perceived Risk to Network Security



While respondents indicated relatively low perceptions of risk severity for cybersecurity issues, a majority (54%) of IT Leaders report a relatively high degree of confidence in their ability to address them should they occur. This includes 36% who feel mostly prepared, 16% who feel very prepared, and 2% who feel extremely prepared. Most responses fell into the somewhat prepared category. Not at all prepared comprised 1%.

Prepared to address cybersecurity issues



More districts are purchasing cybersecurity insurance this year. A fifth (20%) of respondents did not purchase insurance in 2020, compared to 12% in 2021. Year-over-year results also suggest an emerging preference for purchasing cybersecurity insurance separately versus as part of a comprehensive policy. Separate policies grew to nearly a third (32%) of purchases compared to 18% the prior year. Although about half (49%) of respondents purchase cybersecurity as part of a comprehensive policy, it reflects a decline from 56% in 2020. This decline is likely due to limitations found in umbrella policies, which tend to provide inadequate coverage for a cybersecurity incident. Purchasing a specific cybersecurity policy with higher limits will provide better coverage. However, in return, cybersecurity insurers may demand greater “cyber hygiene” from the policy holder and stipulate conditions, such as regular phishing security tests or use of multifactor authentication. Districts need to read their insurance plans very carefully. Experts also indicate that given the increased frequency of attacks targeted on K-12, cybersecurity insurance premiums are increasing and some coverage is no longer available.

TABLE: Cybersecurity Insurance

Cybersecurity Insurance Purchases	2020	2021
Do not purchase	20%	12%
Planning to purchase	5%	1%
Purchase as part of an umbrella policy	56%	49%
Purchase as a separate policy	18%	32%

Strategic Planning

Cybersecurity remains the top technology priority for IT Leaders as it has since 2015, when CoSN first conducted this survey. Closely related to cybersecurity is privacy and security of student data, which takes the number two spot on the respondents’ priority list for the second year in a row. Ranking third is digital equity. Digital equity is a persistent concern, and rated one of the top three concerns for the first time this year. During the pandemic, the “homework gap” which put students with lack of access at a significant disadvantage became an “everything gap”—completely denying those students any access to instruction or resources provided online.

TABLE: Top Technology Priorities

Rank	2019	2020	2021
1	Cybersecurity	Cybersecurity	Cybersecurity
2	Cost-Effective/ Smart Budgeting	Privacy & Security of Student Data	Privacy & Security of Student Data
3	Data Driven Instruction & Decision Making	Data Driven Instruction & Decision Making	Digital Equity

When asked to rank their top challenges, the same three issues are consistently cited, albeit this year in a different order. Lack of training and professional development dropped to the number three slot this year. Budget constraints and lack of resources continue to rank as the number one issue facing IT Leaders. As districts modernize their teaching and learning ecosystems, the ecosystems become more complex in terms of devices to manage, systems to maintain, technology to upgrade, and cyber threats to thwart. The pandemic exacerbated all those issues. As expressed by one respondent, *“Technology was vital to the continuation of education but is still not recognized and funded as it should be.”* The problem of silos moved up in rank to the number two slot. Silos make it difficult to work across functional areas. Yet breaking down silos is precisely what was needed during the pandemic in order to be flexible and effective. As one respondent stressed, *“District-wide collaboration and planning among all departments is the key to success.”* For another respondent, it was the key pandemic takeaway—

“The biggest lesson learning over the past year is that schools cannot work in silos anymore. A culture of change is necessary to ensure that EdTech decisions involve IT and Curriculum Leaders.”

TABLE: Top Technology Challenges

Rank	2019	2020	2021
1	Budget Constraints & Lack of Resources	Budget Constraints & Lack of Resources	Budget Constraints & Lack of Resources
2	Relevant Training & PD Unavailable	Relevant Training & PD Unavailable	Existence of Silos in the District
3	Existence of Silos in the District	Existence of Silos in the District	Relevant Training & PD Unavailable

Business Management

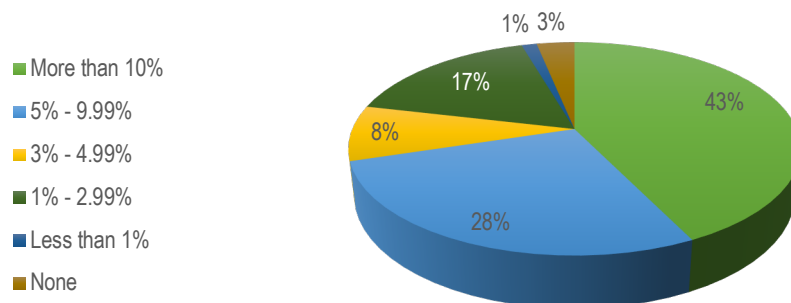
District-level technology budgets (not including salaries/benefits) appear to have increased year-over-year. In 2020, budgets of \$500K or less accounted for 39%. This year, they comprise only 28%. Budgets of \$1,000,001 – \$3,000,000 remain the most common bracket with 27% in 2020 and 30% in 2021. Although budgets over \$6 million account for a small percentage, they show an upward trend as well, from 6% the prior year to 11% this year.

TABLE: Percentage of Respondents by Technology Budget Size

Technology Budget	2020	2021
\$0-\$100,000	9%	4%
\$100,000– \$500,000	30%	24%
\$500,001 – 1,000,000	18%	21%
\$1,000,001 – \$3,000,000	27%	30%
\$3,000,001 – \$6,000,000	10%	10%
\$6,000,001 – \$10,000,000	4%	6%
\$10,000,001+	2%	5%

Forty-three percent (43%) of respondents allot more than 10% of their technology budget for network security. More than a quarter (28%) allocate between 5 and 10% of their budget. With 17%, the next largest segment is districts that allocate between 1 and 2.99%. Districts that budget between 3 and 4.99% account for 8%. One percent (1%) allocate less than 1%. Districts that do not have any monies for security in their tech budget account for 3%. Since digital ecosystems, staffing, and needs vary so widely across districts, there's no benchmark for the "right" budget percentage. However, many of the steps districts need to take to increase cybersecurity, such as next-generation firewalls and endpoint protection, cannot be taken without significant investment.

% of Tech Budget for Network Security



Results to the salary question continue to include a high percentage of “opt-outs.” However, this year that percentage reduced to 16%, compared to 28% in 2019. If the trend continues for more respondents to provide salary information—fewer opt-outs—the more representative the results will be. In the responses provided we do see a trend for increasing salaries. Though there is little change in the lower salary brackets (less than \$100K) from 37% in 2019 to 34% this year, it is going in a positive direction for district tech leaders. Reported salaries over \$100K have increased from about a third (35%) in 2019 to half (50%) in 2021. This includes the over \$130K bracket that shows an increase from 12% to 21% over the three years. Hopefully, the upward salary trend seen in this smaller sample is reflective of the broader landscape.

TABLE: IT Leadership Salaries

Annual Salary	2019	2020	2021
Under \$70K	10%	10%	9%
\$70K-99,999K	27%	25%	25%
\$100K – 129,999K	23%	27%	29%
\$130K – 159,999K	7%	10%	13%
\$160K – 200K	4%	5%	8%
More than \$200K	1%	0%	0%
Did not provide	28%	23%	16%

A

Infrastructure

majority (61%) of districts are now meeting the FCC’s long-term goal of 1 Gbps per 1,000 students in all their schools. This is a notable increase from the prior year’s 49% and a significant increase from 36% in 2019. At the other end of the spectrum, the percentage of districts that haven’t achieved the FCC long-term goal for any of their schools has shrunk from 38% in 2019 to 21% this year. While these results indicate progress, it is important to keep in mind that these targets were set back in 2014. They may fall short of broadband needs of 2021 and especially for those districts that relied on streaming of instruction during the pandemic to connect teachers with their students, as well as student collaboration. In addition, during remote learning there has been considerable attention to the “homework gap”—millions of students lacking connectivity or sufficient bandwidth at home, especially for online learning that involved video conferencing. Recently, CoSN issued a new student home bandwidth goal of at least 25Mbps for downloading

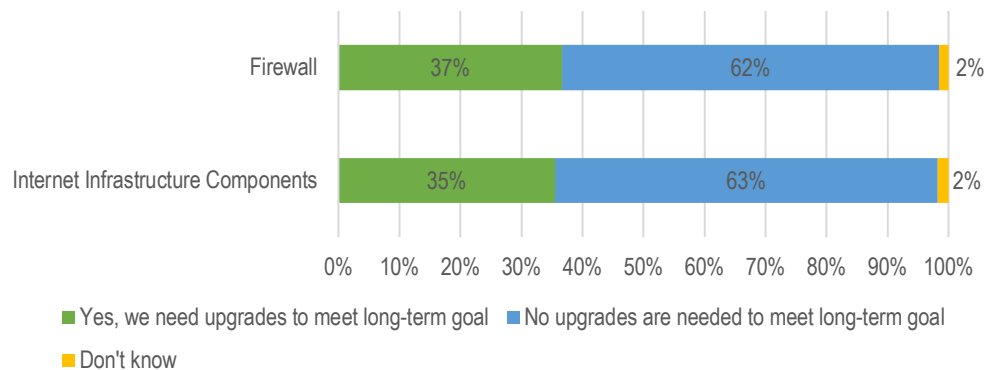
material and 12Mbps for uploading material *per student* to enable learning and engagement.⁹ This compares to the FCC home connectivity goal of 25Mbps/3Mbps *per household*, which is considered insufficient to meet the needs of even one student, let alone the vast majority of students who live with other sibling students and parents sharing bandwidth.

TABLE: Schools Meeting FCC Long-Term Goal

Percentage of Schools	2019	2020	2021
100%	36%	49%	61%
75-99%	8%	10%	7%
50-74%	7%	3%	7%
25-49%	7%	3%	2%
1-24%	4%	2%	2%
0%	38%	33%	21%

Survey respondents were asked if they needed to upgrade their infrastructure to support the FCC long-term goal. More than third need to upgrade their firewall and their infrastructure components, 37% and 35% respectively.

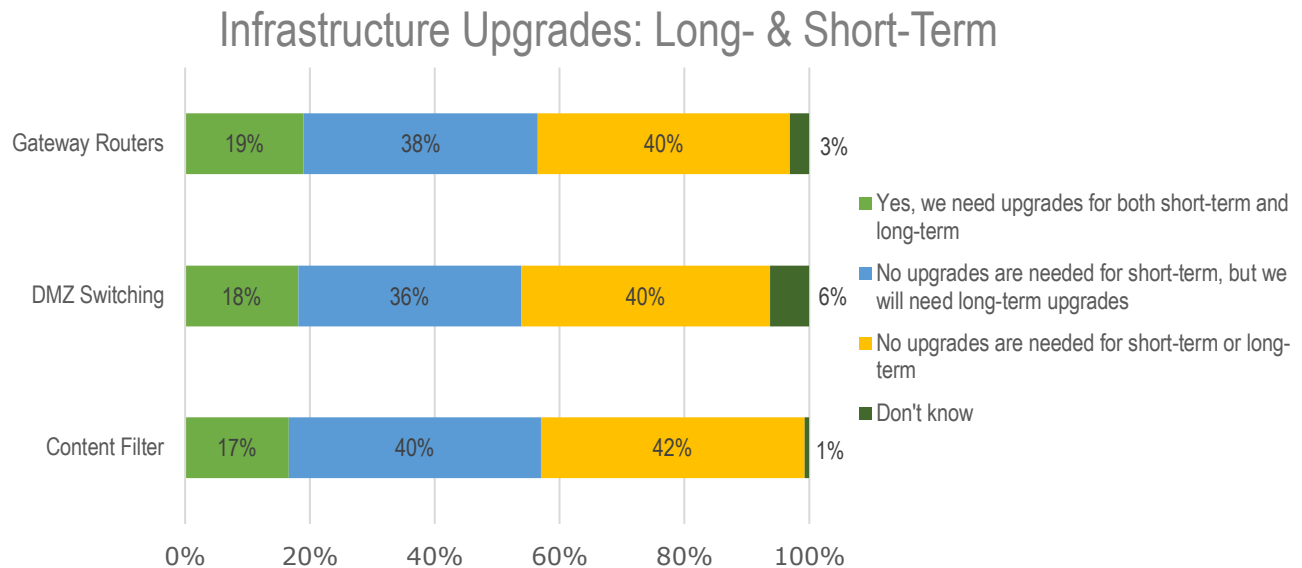
Infrastructure Upgrades



When asked about other infrastructure upgrades to meet FCC goals, the majority need upgrades for the key components to achieve the long-term goal—57% for both gateway routers and content filtering and 54% for DMZ switching. Upgrades to meet the lower targets of the FCC short-term goal (100 Mbps per 1,000 students) are not needed by a large majority of districts.

⁹ "Student Home Connectivity Study," www.cosn.org/digitalequity

To achieve the lower targets 19% need to upgrade gateway routers, 18% for DMZ switching, and 17% for content filters.

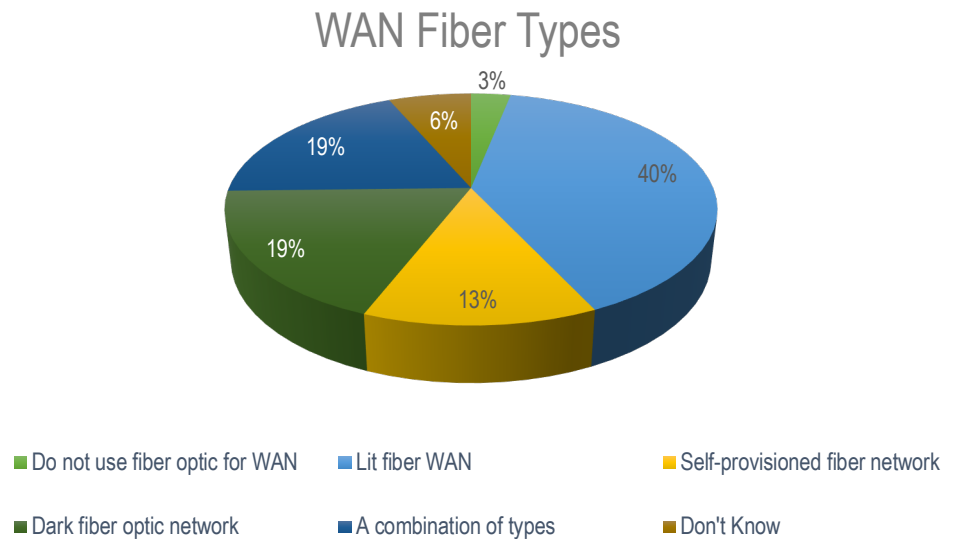


The most typical connection speed between the wireless access point (WAP) and the local area network (LAN) switch is 1 Gbps. Year-over-year, it continues to be the top speed for a majority of respondents. However, it accounts for 66% of respondents this year as compared to 73% the prior year. This decrease is likely because connection speeds greater than 10 Gbps now account for 18% as compared to 11% the prior year. The use of Multiple 1 Gbps have increased from 3% to 7% year-over-year. Use of slower connection speeds (100 Mbps and 10 Mbps) have reduced by more than half year-over-year, accounting for 21% in 2020 and just 9% in 2021.

TABLE: Typical Connection Speed Between WAP and LAN Switch Port

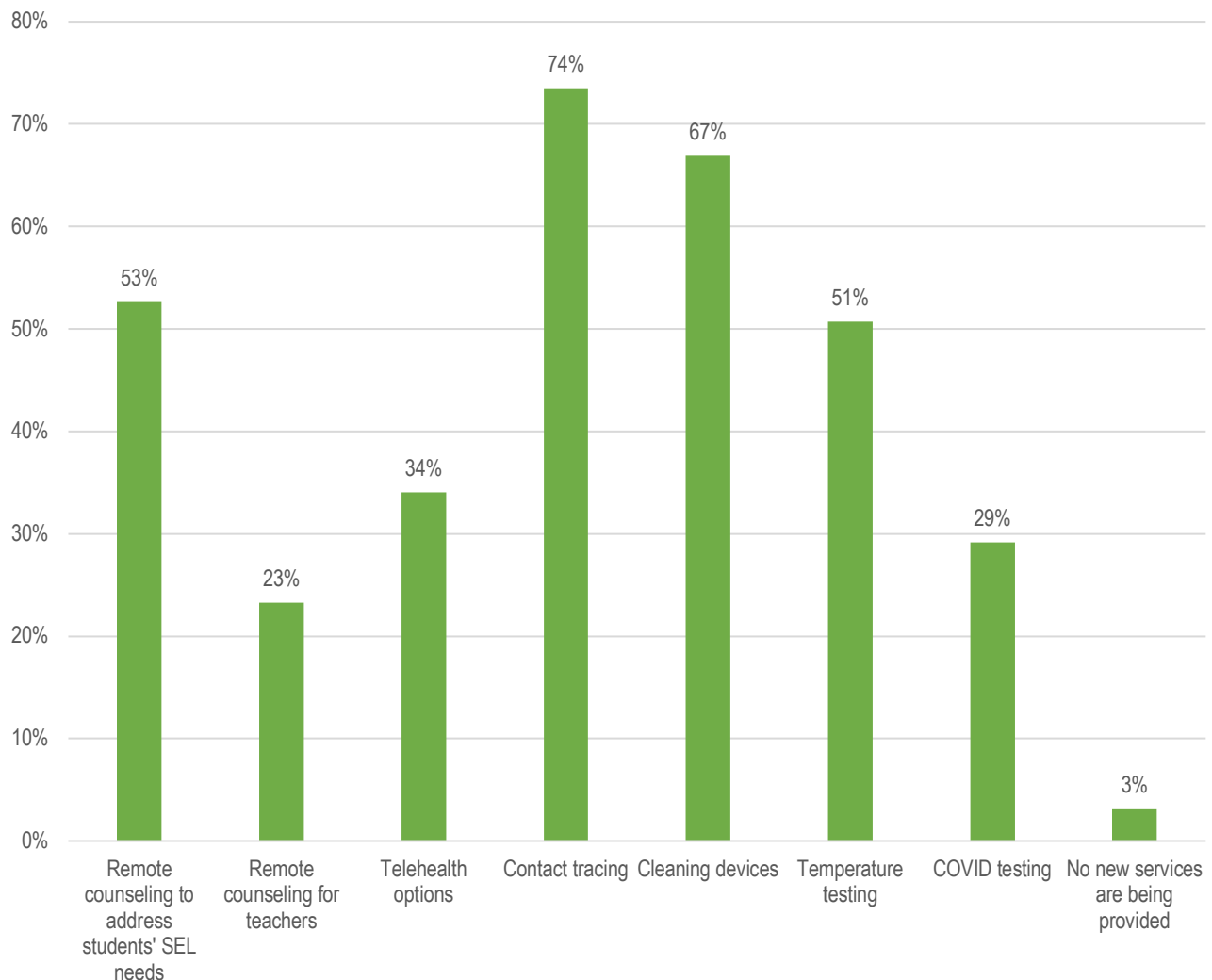
Connection Speeds	2020	2021
Multiple 1 Gbps	3%	7%
More than 10 Gbps	1%	2%
10 Gbps	10%	16%
1 Gbps	73%	66%
100 Mbps	11%	8%
10 Mbps	10%	1%
Other	1%	1%

An overwhelming majority (91%) of respondents use fiber for WAN transport. Lit fiber is the most common fiber type with 40%. A combination types and leased dark fiber are employed at equal rates, each at 19%. Self-provisioned fiber follows with 13%.



Initiatives Not surprisingly, 97% of districts provided new services specifically designed to address pandemic issues. Almost three-quarters (74%) conducted contact tracing, 67% provided cleaning services for devices, and 51% tested temperatures. While a majority (53%) provided remote counseling to address students' SEL needs, less than a quarter (23%) provided counseling for teachers. About a third (34%) provided telehealth options and 29% offered COVID testing.

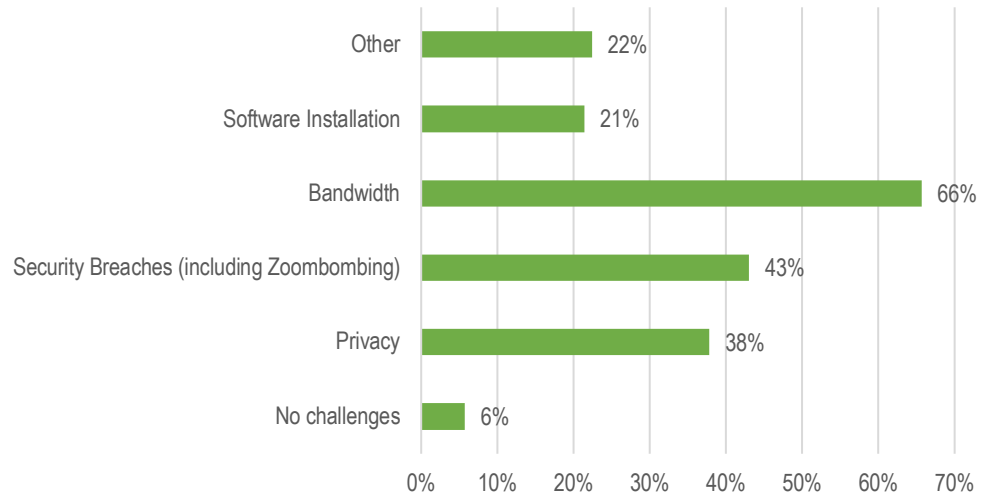
New Services during Pandemic



Video (both synchronous and asynchronous) accounts for the vast majority of network traffic in remote learning.¹⁰ When asked about synchronous video conferencing, the overwhelming majority (94%) of respondents reported challenges as they pivoted to remote teaching and learning during the pandemic. The top challenge, with 66%, was bandwidth. Security breaches follow with 43% and then privacy with 38%. About a fifth (21%) had issues with software installation with almost same percentage (22%) having other challenges not specified on the survey.

¹⁰ Ibid.

Challenges with Video Conference for Teaching & Learning



Although digital instructional materials have been available since the last century, the degree to which they are used, as compared to print, has been relatively low. The necessity of online instruction this year appears to have caused a significant uptake in use of digital instructional materials. The percentage of respondents reporting that the majority of their materials are digital almost doubled since 2020, from 34% to 64% this year. This includes a year-over-year zero to 8% increase of districts reporting 91-100% of the instructional materials used were digital.

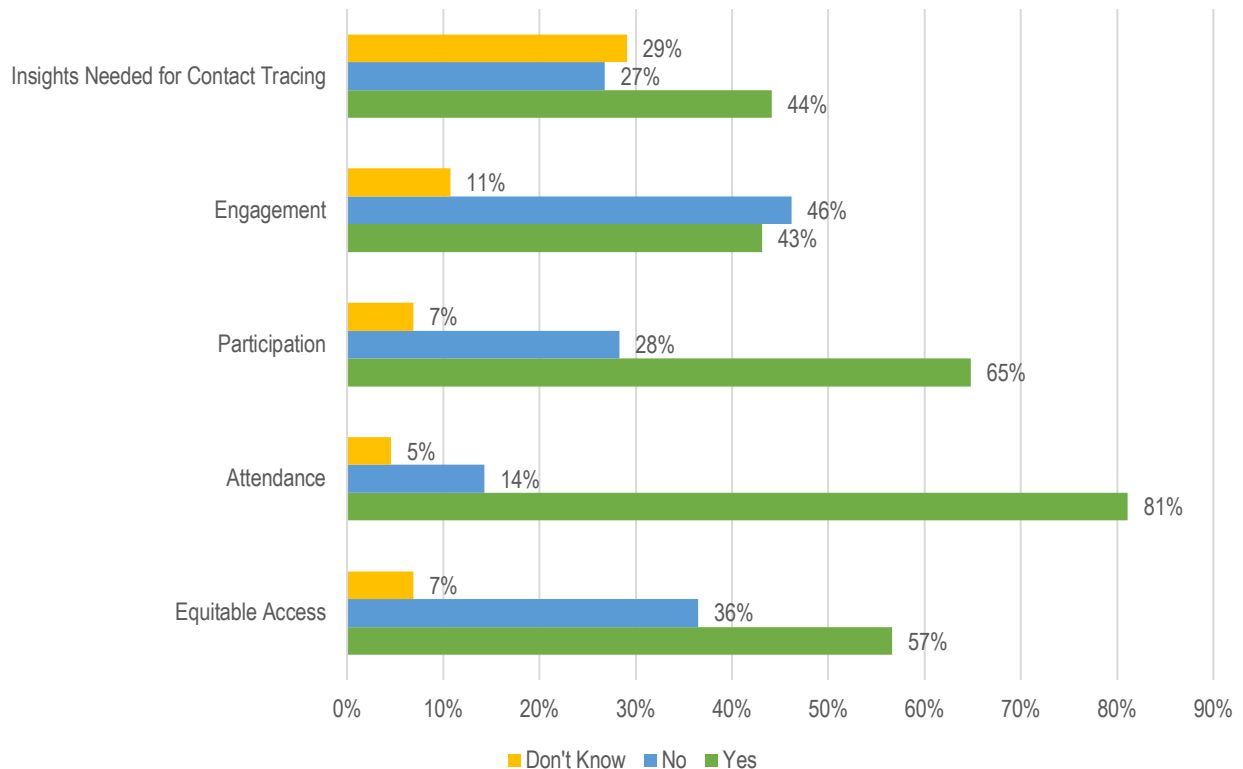
TABLE: Digital Instructional Materials

% of instructional Materials in digital format	2020	2021
1-10%	6%	1%
11-25%	15%	6%
26-50%	45%	29%
51-75%	24%	32%
76-90%	10%	24%
91-100%	0%	8%

When asked about proxies used for measuring remote learning, the vast majority (81%) of respondents have systems that adequately track attendance. And a majority can measure participation (65%) and equitable

access (57%). Less are able to measure engagement (43%) or insights needed for contact tracing (44%)

Adequate Systems Support for Measuring Remote Learning



When asked about how their district was using assessment data during the pandemic, the majority (52%) are tracking summative assessments in an enterprise system while 42% use enterprise systems to track formative assessments. A third (33%) use an enterprise system to track interim assessments. Thirty-five percent (35%) use formative assessment but don't use an enterprise system to report on them. However, one respondent questioned the very value of the data captured in enterprise systems due to the absence of "common rubrics" and "common grading practices" across the K-12 spectrum:

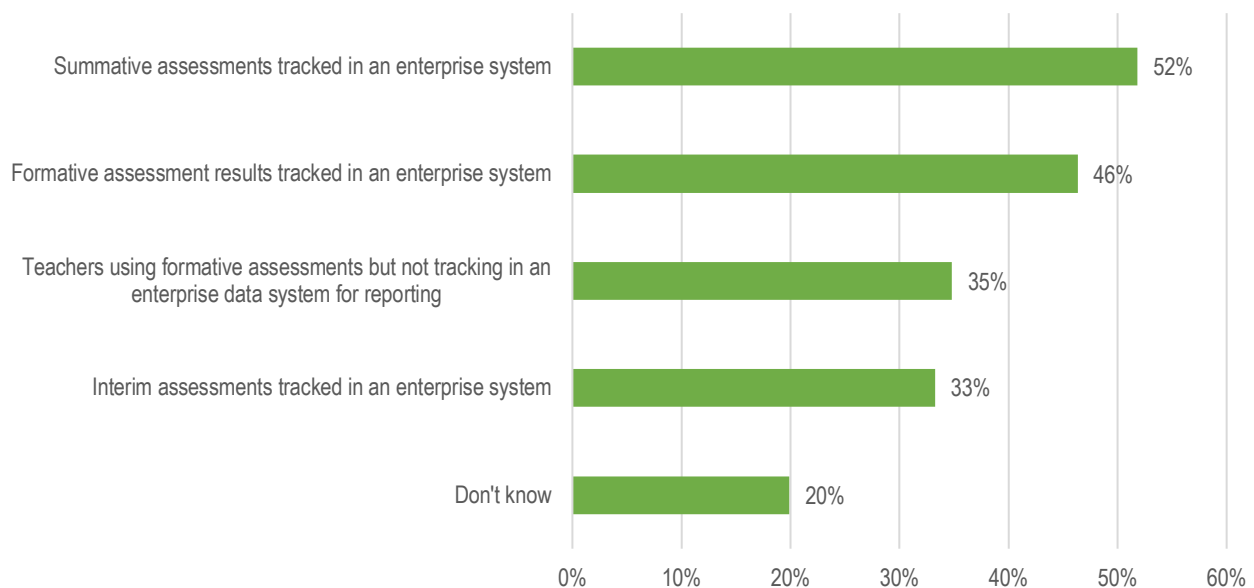
"The disparate practices create meaningless data regarding performance."

While the value of traditional assessments, especially those done during a pandemic can be debated, it is worth pointing out that the pandemic hasn't stopped students from learning. The knowledge they have gained extends beyond the standards for the traditional school curriculum:

*"Students are learning how to reset the rhythms and structures of their days. They are learning different patterns and modes of communication. They may be taking on different roles in their homes and learning how to complete new tasks, engage in new games and develop or sustain new and different activities."*¹¹

Dr. Rachael Gabriel
Associate Professor of Literacy Education
University of Connecticut

Assessment Data During Pandemic



Single sign-on is by far the most fully implemented interoperability initiative with 47% compared with the second most fully implemented—data interoperability—with 15%. However, the rates are much closer when combined with the percentages of districts reporting partial implementation. Single sign-on expands to 93% and data interoperability to 81%. Data dashboards and content interoperability have been fully implemented to an equal degree, each at 13%. However, content interoperability takes the lead

¹¹ <https://www.washingtonpost.com/education/2020/05/19/can-we-stop-telling-corona-kids-how-little-they-are-learning/>

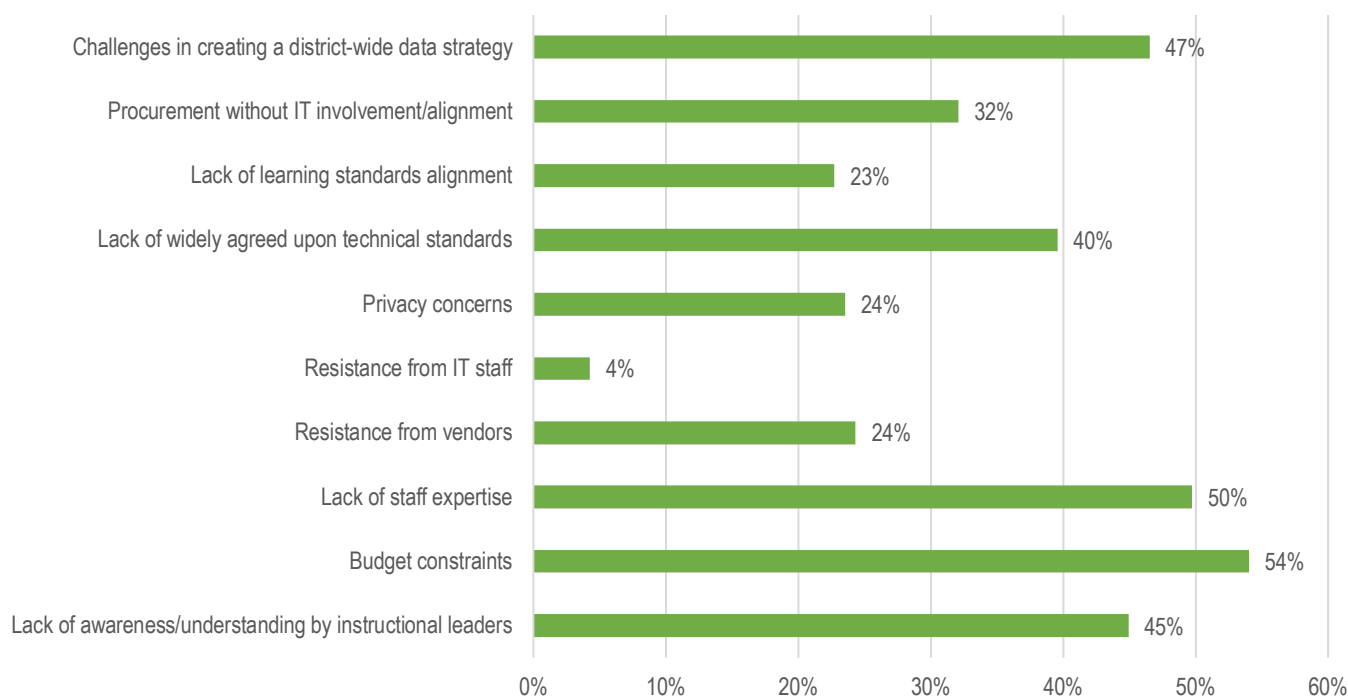
with its 74% fully or partially implemented rate. Data dashboards with 67% fully or partially implemented is the initiative that has been executed the least. Due to the complexity of combining various data sets from disparate sources, it is likely that data dashboard implementation will continue to lag until greater interoperability is achieved across systems via the other initiatives.

TABLE: Implementation of Interoperability Initiatives

Interoperability Initiative	Fully Implemented	Partially Implemented	Planning	Not at All	Don't Know
Single Sign-On	47%	46%	4%	3%	0%
Data interoperability	15%	66%	11%	3%	6%
Data Dashboards	13%	54%	22%	6%	5%
Content Interoperability	13%	61%	11%	6%	8%

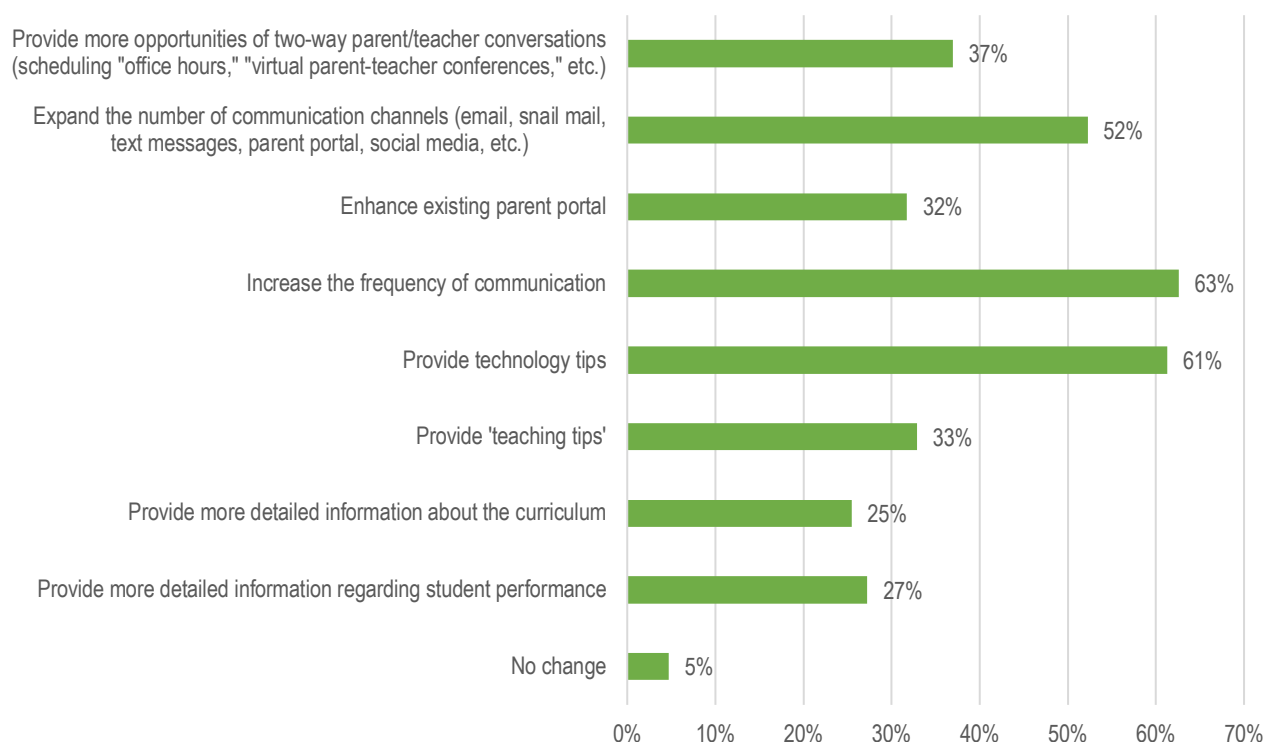
For a majority (54%) of respondents, budget constraints were a barrier to improving data interoperability. Half (50%) cited lack of staff expertise and 47%—likely related to staff expertise—cited the ability to create a district-wide data strategy. The lack of awareness/understanding of instructional leaders was cited by 45% and could also have contributed to the challenge of creating a district-wide strategy. It is curious that the challenge posed by the lack of widely agreed-upon technical standards was not cited by more than 40% of respondents. Standards-based interoperability is by far the fastest and most cost-effective method for achieving interoperable systems. Possible explanations for the response rate may be that the majority of districts have worked around the problem via third-party integrators, have EdTech providers willing to work together to address the challenge, or work in a closed system that requires little interoperability with other systems. Almost a third (32%) of IT Leaders are challenged by their lack of involvement in the procurement process. If more instructional leaders and other district stakeholders understood the impact that the lack of interoperability has on their students, district would not make purchasing decisions without input from their IT department. Less than a quarter of districts reported the other potential barriers as problems—24% privacy concerns, 24% resistance from vendors, and 23% the lack of learning standards alignment.

Barriers to Improving data Interoperability



The overwhelming majority (95%) of districts have changed how they engage with parents during the pandemic. The majority (63%) have increased the frequency of communication, with 52% expanding the number of communication channels used. Almost a third (32%) of districts with an existing parent portal enhanced it, while 37% provided more opportunities for two-way parent/teacher communication. A reflection of the degree to which districts have relied on parents during the pandemic, 61% provided parents tips on how to use technology and 33% provided actual teaching tips. In addition, a quarter (25%) provided more detailed information about the curriculum. Providing more detailed information about their child's performance was undertaken by 27%.

Parental Engagement Changes Due to the Pandemic



Summary

As districts were forced to pivot to remote instruction, even those with mature digital ecosystems and business continuity plans were not fully prepared to meet all the challenges. As one respondent commented, *"It doesn't matter how much you plan for a disaster there is always a scenario that you haven't considered!"* Many districts that had 1:1 programs in place found the devices to be "woefully underpowered" to meet the demands of video streaming and collaboration tools. Many students who had internet access at home did not have access to sufficient download/upload speeds to support remote learning. In addition to the over-arching issue of student access, a myriad of unique challenges were thrust upon IT departments such as providing staff with laptops, parents with tech support, and students with laptop chargers (with charging carts no longer viable). In the words of one IT Leader, *"Many of the needs that we actually had to respond to were not the ones that we had anticipated."* Which likely accounts for so many IT Leaders who stressed the importance of "flexibility" in their comments.

These comments come from a surprising large percentage (66%) of respondents choosing to answer the open-ended question, “What is the biggest lesson(s) learned over the past year?” Not surprisingly, highlighting the vast differences of U.S. districts, IT Leaders provided some answers that could not have been more contradictory:

“Our teachers are not ready for hybrid learning model.”

vs.

“Our teachers are extremely capable and can integrate technology in ways we couldn’t have dreamed possible in such a short period of time.”

and

“We are not anywhere equipped, mentally or equipment-wise to work remotely.”

vs.

“We were resilient and we were more prepared than we imagined.”

So to what degree remote instruction will be integrated when not necessitated by a pandemic will likely vary greatly from district to district. However, the pandemic served to highlight to the broader public what school district leaders have known for years—the enormous disadvantages created by the lack of broadband access. This increased awareness will hopefully translate into actions that will bring connectivity into all homes, removing the disadvantages the lack of internet access places on students and their families. Recent federal funding made available for home connectivity suggests that a common lesson learned, also expressed by IT Leaders on the survey, was also a lesson learned by policymakers:

“That home internet service needs to be a utility that is available to every home in the country.”

About the Survey

Results from this year's survey were compiled from 390 surveys. With the help of our partner MDR, the 46-question survey was deployed on November 12, 2020 and closed on April 1, 2021.¹² Our partner Forecast5 Analytics, Inc., collected more than 40,000 data points and generated the charts and graphs.¹³

Half (50%) of respondents who submitted completed surveys work in suburban districts, followed by urban (19%), rural (18%) and towns (13%). Suburban districts are over-represented, as they account for 23% of districts, however they account for 40% of all enrollments. Rural districts are underrepresented. Though they enroll only 19% of students, rural districts account for more than half (53%) of U.S. districts. Conversely, urban schools account for 30% of enrollments, yet they account for only 6% of schools.

¹² Results have a +/- 4.5 reliability.

¹³ Due to rounding, not all totals within charts equal 100%.



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As a trusted partner to school districts of every size, CDW·G has more than 300 dedicated K-12 account managers, education strategists and learning environment advisers focused on connecting education technology to student achievement. Our team's experienced educators, technology directors and superintendents understand what it's like to stand in your shoes—and are uniquely qualified to partner with you to design, implement and manage your EdTech initiatives.



The Ed-Fi Alliance is a nationwide community of leading educators, technologists, and data advocates connecting student data systems in order to transform education. A not-for-profit organization founded in 2012 by the Michael & Susan Dell Foundation, Ed-Fi aims to boost student achievement by empowering educators with real-time, comprehensive insight into every student. Ed-Fi technologies streamline data management in school districts and states across the country. By allowing schools to integrate data previously siloed within disconnected tools and software—and organizing it through a single, secure data standard—Ed-Fi solves one of the country's most perplexing educational challenges: how to get a complete, accurate view of individual student achievement, so that every student can receive the support they need when they need it most.



AASA, The School Superintendents Association, founded in 1865, is the professional organization for more than 13,000 educational leaders in the United States and throughout the world. AASA advocates for equitable access for all students to the highest quality public education and supports school system leaders.



MDR is a full-service school and community engagement partner. A division of Dun & Bradstreet, MDR is a different kind of integrated marketing services agency that combines rich data with unique digital, creative, and branding capabilities. They have been connecting brands through data and marketing services to educators, youth and parents for 50 years. MDR's database and digital communities, including EdNET, SchoolData, WeAreTeachers, WeAreParents and School Leaders Now enable brands to connect with educators.



Forecast5 Analytics empowers district leaders to harness the power of their data for more informed decision making. Our analytics technology helps you use visual outputs and dashboards to identify both strategic and financial opportunities in the areas of financial performance, compensation, student performance, and enrollment/demographics. More than 2,000 school districts across the country are using Forecast5 tools to maximize their data insights and enhance decision making.

About Survey Report Author:

Paula Maylahn is an education industry consultant with thirty-five years' experience across the K-20 spectrum. She is the project director for CoSN's interoperability initiatives and a contributing author on two books, "The Experts' Guide to the K-12 Market" and "The Experts' Guide to the Postsecondary Market", as well as author of the publication, "Interoperability: Definitions, Expectations, and Implications." Paula is a council member of the Women's Education Project, an executive advisory council member of the Software & Information Industry Association, a former executive council member of the PreK-12 Learning Group of the Association of American Publishers, and former board member of the United Design Guild where she chaired the education council.



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