Changes That Will Last

Technology is the driving factor in the lasting impacts the pandemic is having on education.

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K-12 Expanding Services in Response to Pandemic

BY DIAN SCHAFFHAUSER

IN THE LAST YEAR, TO HELP ITS COMMUNITY OF students, families, teachers and staff through the pandemic, K-12 districts began offering new services. Those included contract tracing, remote counseling and more. A recent survey by the **Consortium for School Networking (CoSN)** found that nearly three-quarters of school systems (74%) have conducted contact tracing; two-thirds (67%) have provided cleaning services for devices; and half (51%) have tested temperatures. Nearly a third (29%) have provided COVID testing.

The "**Ed Tech Leadership Survey Report**" found that while a majority of schools (53%) offered remote counseling to their students, less than half as many (23%) also offered it to teachers. Some 34% provided telehealth options.

Most districts have also updated their family outreach strategies. Two-thirds (63%) have boosted their frequency of communication, and more than half (52%) have increased the number of outreach channels. Some districts (32%) have enhanced how they use their existing parent portal; and some (37%) have adopted more two-way communication between parents and teachers.

In spite of the emphasis on home schooling during the pandemic, just 61% reported providing families with tips on how to use technology; and 33% offered teaching tips. However, a quarter of districts said they offered "more detailed information" about curriculum and a similar number (27%) tried to provide greater detail about their children's performance.

The survey also asked respondents what systems they have been using to measure the effectiveness of their remote instruction efforts. Eight in 10 (81%) said they have systems to track attendance; two-thirds (65%) could measure participation; and six in 10 could monitor "equitable access." Fewer than half can measure engagement (43%) or the details needed to perform contact tracing (44%).

On the assessment front, a light majority (52%) tracked summative assessments in an enterprise system while a smaller share (42%) did the same with formative assessments. Another 35% said their schools use formative testing but don't have an enterprise system for reporting or monitoring results. A third (33%) used an enterprise system to track interim assessments.

In spite of the emphasis on home schooling during the pandemic, just 61% reported providing families with tips on how to use technology.

Flexibility was a theme in many of the responses generated by the CoSN survey. As one participant told the organization, "Many of the needs that we actually had to respond to were not the ones that we had anticipated."

This year's CoSN survey and report were conducted with the support of CDW•G and the Ed-Fi Alliance, and in partnership with AASA, The School Superintendents Association, MDR and Forecast5 Analytics. The report is openly available through the CoSN website. The survey collected information from 390 participants between November 12, 2020 and April 1, 2021.

The complete report is openly available on the **CoSN website**.

Dian Schaffhauser *is a senior contributing editor for 1105 Media's education publications THE Journal, Campus Technology and Spaces4Learning.*
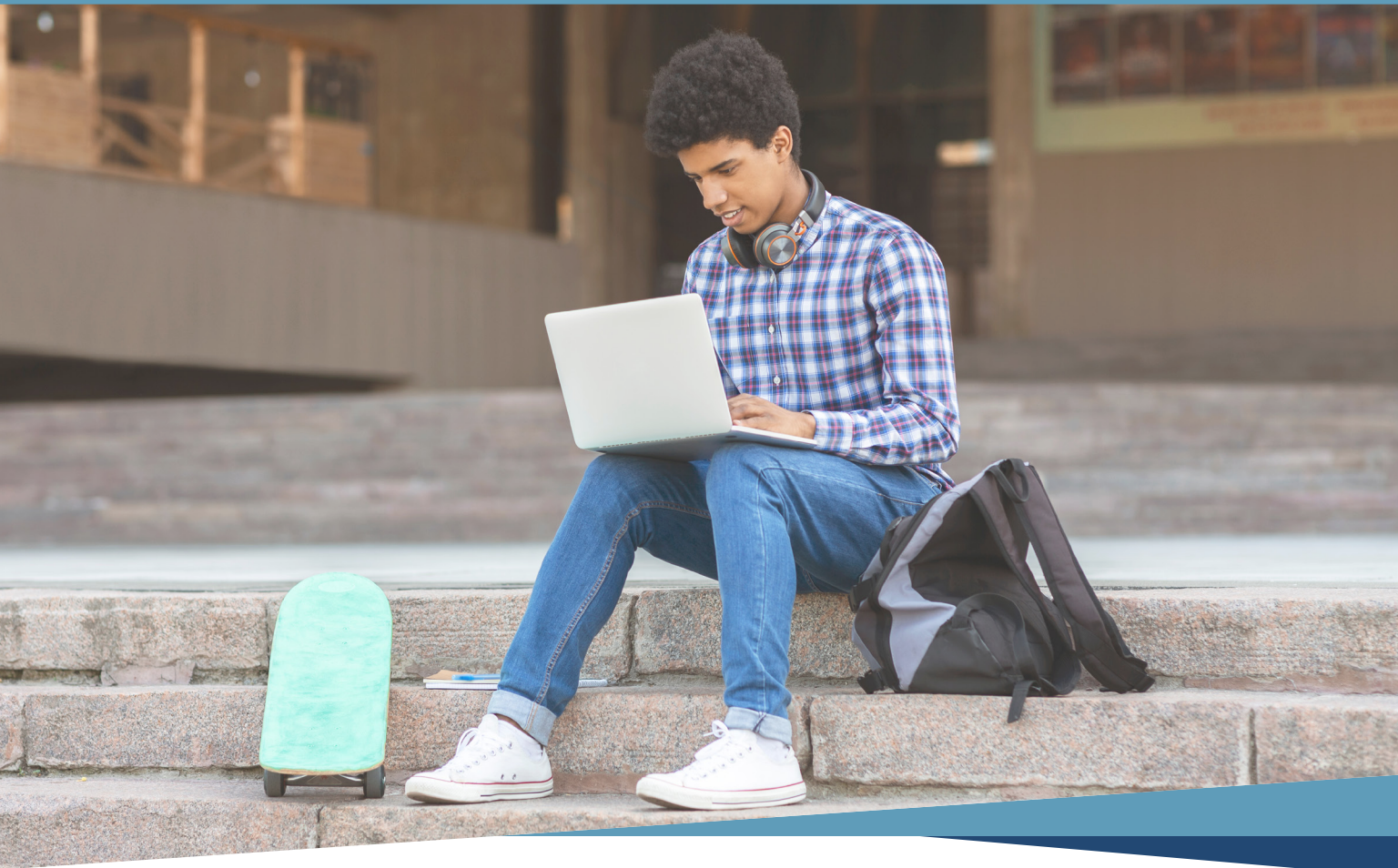
Broadband and Digital Equity Top Concerns Among IT Leaders

BY DIAN SCHAFFHAUSER

DELIVERY OF BROADBAND OFF-CAMPUS HAS nearly doubled in K-12 between 2020 and 2021. While 49% of schools didn't provide off-campus services in 2020, just 5% are still in that position. The most popular delivery method, by far, is the deployment of district-run hotspots. Seven in 10 schools use that approach, compared to 17% in the prior year. Three in 10 districts work with their local communities to provide WiFi hotspots, a practice that was adopted by only 19% in 2020. And more than a quarter (27%) provide home access through free and subsidized programs, compared to 10% the previous year.

Those findings surfaced in the latest "**Ed Tech Leadership Survey Report**," undertaken by **the Consortium for School Networking (CoSN)**. The survey collected information from 390 members between November 12, 2020 and April 1, 2021. CoSN noted that a disproportionate share of responses – 50% – came from suburban districts, although they actually account for less than a quarter (23%) of districts. Urban districts made up 19% of responses and account for 6% of schools; rural districts accounted for 18% of responses, while making up 53% of the total number of districts.

The survey found that concerns about digital equity are on the rise. Nearly every respondent said he or she

Most of the network traffic generated by remote learning was dedicated to video (whether synchronous or asynchronous). And nearly every district (94%) said it faced challenges with video conferencing. While the top hurdle was bandwidth, mentioned by 66% of respondents, security breaches also posed difficulties for 43%, as did privacy (38%).

had heightened worries about students' home access to devices and the internet, to support remote learning. In fact, for the first time in the history of the survey, digital equity was cited as a top concern, ranking third after challenges related to home internet connections that were too slow for multiple users and connections that were too slow for livestreaming.

On a positive note, the last year has seen a boon in schools meeting the Federal Communications Commission's long-term broadband goal of 1 Gbps per 1,000 students – an aspiration that was first set in 2014. Currently, nearly two-thirds of districts (61%) have met the goal, compared to 49% in 2020 and 36% in 2019.

However, while those results may show progress, the target has moved in the intervening years. "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," the report noted.

More than a third of respondents said they'd need to upgrade components of their IT infrastructure to support the FCC goal. For 37%, that would mean new firewall technology; and for 35% it would be other internet infrastructure components. More than half of districts (57%) said they'd need new gateway routers and/or new content filters, either in the short-term or long-term, while

54% would require an upgrade to DMZ switching.

Most of the network traffic generated by remote learning was dedicated to video (whether synchronous or asynchronous). And nearly every district (94%) said it faced challenges with video conferencing. While the top hurdle was bandwidth, mentioned by 66% of respondents, security breaches also posed difficulties for 43%, as did privacy (38%).

Recently, CoSN **updated the objectives for student home bandwidth**. While the old goal was 25 Mbps download and 3Mbps upload per household, the new goal is at least 25 Mbps for download and 12 Mbps for upload per student.

"Digital equity has rightly become a top concern during the pandemic, with cybersecurity continuing to be at the forefront of priorities of school system IT leaders," said Keith Krueger, CEO of CoSN, in a statement. "Our annual survey allows CoSN to identify key trends like these so that we can better serve our members, inform policymakers and assist school districts in their digital transformations."

The complete report is openly available on the **CoSN website**.

Dian Schaffhauser is a senior contributing editor for 1105 Media's education publications THE Journal, Campus Technology and Spaces4Learning.

Flexible IT Infrastructure for an Evolving Education Environment

BY CHIP GEORGE

AS EDUCATION INSTITUTIONS aim to become more flexible to meet modern demands, teachers will continue operating under hybrid learning models – making the need for disruption-free virtual lessons and network access all the more critical. To best accommodate these needs, investing in a flexible IT infrastructure that can support remote-learning, especially as our country undergoes one of the most pivotal time periods in history, will be an important factor.

Cost-Efficient Solutions to Tackle Academic Resilience

Due to declining enrollment rates and increasing costs driven by COVID, schools are facing **tight budget restrictions for the 2021-2022 academic year**. Knowing this, IT departments should look toward cost-effective solutions that will support their remote workforce and students. A hybrid and multicloud environment, built on hyperconverged infrastructure (HCI), is a proven model. It allows organizations to benefit from lower costs and the increased security of private cloud, for predictable workloads, while giving the flexibility to burst onto public cloud resources as needed. This allows institutions to more closely monitor IT infrastructure spending while gaining the flexibility necessary to quickly adapt.

At the start of the pandemic, school districts like **Millard Public Schools** in Nebraska were tasked

with upgrading their IT infrastructure, simplifying operations and strengthening their business continuity plan to support distance learning for their 24,000 students. However, as a public school district, they needed to act with financial probity. Investing in HCI allowed the district to create a consistent and outstanding educational experience for students while providing ways to maximize investment. For example, instead of operating dedicated labs and buying hundreds of high-end workstations for students learning CAD, they now run virtual desktops on low-end laptops. Students can remotely access fully functional high-powered graphics, with limited financial investment needed.

Security Threats Remain and Must be Identified

In 2019 alone, 89 U.S. universities, colleges and school districts were victims of ransomware attacks, followed by at least 30 in the first five months of 2020. With the increase in the possibility of both outside and inside threats, schools and districts must be able to detect and mitigate unusual behavior within their networks such as failed authentications, unforeseen increases in network traffic, or large volumes of file uploads. Technologies

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that provide role-based access control, identity and access management, and multifactor authentication to allow only authorized users into programs and restrict them to certain activities will enable a stronger security posture. A unified hybrid and multicloud environment will also provide the necessary end-to-end visibility, and enable common security policies.

In addition to identity and behavioral analysis, microsegmentation to divide networks and application components into isolated segments can help minimize the degree of damage. Microsegmenting your virtual infrastructure is a method of creating zones to isolate attacks and stop them from spreading. When combined, these solutions can help companies detect and contain threats more quickly. In the event of an attack, microsegmentation can help limit the spread to a specific segment rather than to the entire organization.

Should a ransomware attack occur and result in loss of information, educational organizations should have a data and disaster recovery plan in place. Investment in **Disaster Recovery-as-a-Service** (DRaaS) technologies, along with securing data and creating real-time copies of the data that's stored within their network, allows for a quick response to limit any disruption to students' daily learning and intellectual property.

Digital Transformation Efforts Increase Remote Communications

Each organization bases their IT investments on a unique set of criteria, but seamless communication has become a core, universal need for the education sector. The recently released **annual Enterprise Cloud Index** (ECI) shows that nearly half (47%) of education respondents cited providing "adequate communications channels" among educators and their students as a top challenge.

As the possibility of hybrid education continues, investing in agile technologies will foster a seamless transition from a traditional environment to a virtual one. Though the future of education has yet to become clear, responses from the ECI found more respondents than average mentioned digital transformation (54%) and making the organization more agile (49%) as priorities as a result of COVID-19. With the ability to respond to changes quickly, IT teams can more easily leverage programs to accommodate the evolving needs of the student community.

For example, they must be agile enough to put hybrid learning processes into place on-demand. A scalable, **Desktop-as-a-Service (DaaS)** solution, like what Texas' **Klein Independent School District** implemented, provides students and teachers with a secure platform where they can access their application and data, regardless of location. Additionally, the onboarding process onto individual laptops takes minutes, instead of hours for each user.

Enabling teachers and students with the tools needed to support interactive, remote lessons is not only essential for institutions to continue serving their communities – but to ensure that students have the same academic experience as the generations before them. IT plays a crucial role in these evolving student and teacher experiences, and educational IT teams must invest in flexible, cost-effective solutions to support all aspects of the educational environment.

Chip George is VP of Public Sector Sales, Nutanix.

Forever Changed: Education Predictions for 2021 and Beyond

BY DIAN SCHAFFHAUSER

THE PANDEMIC ERA HAS PACKED A WALLOP unlike any other period in living memory. The pain is still with us – and will continue to be for a long time. But the upcoming school year an opportunity for us to renew our hope and energy. How will that play out for K-12 education, especially in the area of technology? We turned to a number of education leaders to find out what they expect – or look forward to. Here's what they told us.

Teachers Will Become Massive Social Media Influencers

Teachers will be subject-matter experts who other teachers feature in video mixtapes and that parents will follow to support their students. Expect teachers to go live in Twitch-style "going live" environments. What can we expect in video?

- Low-stakes feedback will be everyone's focus in live video. A quarter of live video classes will be gamified, and half of all time spent on live videos will be round-robin style check-ins.

- Recorded video will move onto the main stage. We're seeing that two-thirds of teacher video is recorded, which allows teachers to manage the one-to-many ratio.

- Video lessons will become serialized and broken down into predictable chunks. The maximum length student videos should be tracks by grade level: one minute for first graders, 12 minutes for seniors.

- Camera-off will be OK for students; audio-off will be OK for teachers. Teachers will learn that it's OK for students to have their cameras off. The goal is building a connection and getting them to engage in the lesson. Teachers will focus on going beyond speaking presence and creating lots of movement and visuals in their videos.

- The wall of text will come down. We'll see heavier use of images in videos for retention and accessibility. This is key for English Language Learners, special education students and kids with attention difficulties.

Jim Szafranski, CEO, *Prezi*

Data Privacy Concerns Will Draw Greater Interest

Alongside the herculean and mostly successful efforts to connect students and teachers in digital spaces during the pandemic, the past year has also brought stories of zoombombing, proctoring and surveillance overreach, data breaches and inequitable student access to technology and its benefits. These events have shined a light on the privacy concerns related to educational data and technology use.

> Schools and third-party educational technology vendors will need to work to provide greater transparency and engender trust by clearly and regularly communicating when, how and for how long data are used.

In 2021, we anticipate seeing administrators take additional measures to promote student data privacy, including greater attention to data governance and security measures across the kindergarten-to-college continuum. It is essential for these efforts to include actionable data privacy policies and practices that safeguard student data collection, storage, sharing and use and that ensure students have equitable access to the benefits of data and technology.

We also expect a greater interest by students and their families in understanding what data is collected about them, how their data is used, and what their privacy rights are related to that data collection and use. Schools and their third-party educational technology vendors will need to work to provide greater transparency and engender trust by clearly and regularly communicating when, how and for how long data are used. Moreover, schools and vendors should follow through on their promises to protect the data and information that students and families have entrusted to them.

2020 was a challenging year for education, but, if well-applied, the lessons learned can strengthen the protection of student data privacy as we move into 2021.

Carrie Klein, *Senior Fellow, Youth & Education Policy,* *Future of Privacy Forum*

STEM Will Gain Amplified Appreciation

For 2021, we'll begin to see students re-learn how to learn and teach themselves effectively. As students continue to online learn, they will need to focus on how to help adapt to circumstances and be creative in their approaches – which will lead them to a different style of learning than they're used to.

There will also be an amplified appreciation for STEM education and literacy. Whether it's evaluating the science behind the virus, understanding what it takes to bring a vaccine into the world, understanding the tech that enables you to have a remote learning environment or applying technical thinking to any challenge. The only way to ensure that STEM literacy becomes engrained in society is through early education. In the same way we emphasize reading comprehension, we need to introduce STEM concepts early on that build year over year. I believe we'll see an increase in young students getting involved in STEM in the upcoming year.

Erica Fessia, *VP, Global Field Operations,* *FIRST*

Districts Will Grapple with IT Sustainability

There are a considerable number of families who would have never considered virtual learning were it not for the pandemic. They discovered that they enjoyed the experience and would like to continue learning online. Schools will need to continue their virtual learning academies in 2021-2022 and beyond to meet this new demand.

Teachers experimented with a number of new technology tools and resources as they switched to remote learning, and the tools they found success with will continue to be used. More teachers have embraced

learning management systems than ever before, and their use will likely continue. We've also seen some of the gaps and deficits in accessibility of our tools for populations of students, so we are likely going to reevaluate some of the tools we use.

Simultaneously, we're all a little screen-fatigued this year, and we're likely to see less screen time in-person as a result. I definitely see devices taking a back seat to more socially interactive learning, with ed tech more as a resource than the star.

Many schools have been thrust into 1-to-1 programs without the systematic planning that typically precedes these types of initiatives. Schools across the country have poured hundreds of millions of dollars into new devices for students but may not have done

the professional learning or developed the Wi-Fi infrastructure to handle these devices. Schools and policymakers will begin to grapple with sustainability, including purchasing devices, maintaining subscriptions and upgrading school networks to handle the increased device load.

Mark Samberg, *Director of Technology Programs,* *Friday Institute for Educational innovation at North Carolina State University*

Existing Tools Will See Better Use

There is a wealth of resources available to educators that surpass their basic needs for instruction, but teachers lack the time and training to really explore the use of trending tech programs and software. I believe administrators will be prepared to invest in training and support initiatives to maximize use of current programs. From G Suite for Education to Zoom to social media, the possibilities are endless for increasing

student engagement, classroom management and collaboration; but teachers need models for implementing these tools, and administrators should consider setting accountability goals for leveraging tech resources in education.

April Willis, *Director of Operations & Business Development,* *National Virtual Teacher Association*

Ed Tech Seeds Will Take Root and Flourish

Teachers have never faced such acute challenges layered on top of the day-to-day demands of being an educator: These unique circumstances laid bare some critical inequities and cracked the boundaries of traditional education. As we move forward, there is a new level of attention on making sure all kids have access to educational technology, which

> The possibilities are endless for increasing student engagement, classroom management and collaboration; but teachers need models for implementing these tools, and administrators should consider setting accountability goals for leveraging tech resources in education.

will, hopefully, bear fruit. In terms of overall use of educational technology, it seems likely that teachers will continue to use some of the tools they adopted during distance learning.

As for the tools themselves, 2021 should be a year of pushing the envelope both in terms of equity and innovation: We've seen how tools can rise to the top when they serve a specific need – even tools not designed specifically for education, like Zoom. Perhaps this wider-ranging field will stay open for exploration. Also, it feels possible that ed tech companies can renew a focus on programs that go beyond rote learning and encourage critical thinking, creativity, student-led experiences and relevance that helps students see how learning core concepts is meaningful for them and not just a means to getting a grade.

Within that framework there has to be continued attention on representation, inclusion and access in the world of ed tech. We hope developers will maintain

vigilance around ensuring all student audiences can see themselves in ed tech and use it effectively with fewer obstacles. Ultimately, there is optimism that through shifting ground we stumbled across this year, some exciting seeds will take root, and flourish.

Christine Elgersma, Senior Editor of Social Media and Learning Resources, Common Sense Education

Connectivity Will Become as Important as Textbooks

If we really think equal access to a high-quality K-12 education in this country is a right, not a privilege, we need to start investing in the technological infrastructure needed to bridge the digital divide. We have the technology. We just need to start using it. For example, we can immediately equip idle school buses with multiple Wi-Fi access points, and drive them to areas where students need broadband connectivity. As a longer-term solution, we can help school districts build private CBRS cellular networks that allow them to deliver internet service to most, if not all, of the students in their communities. Finally, in areas where it's feasible, fiber networks can continue to expand to serve more of our communities in need.

No one would say it is fair – let alone smart for our nation's economic growth – for some of our K-12 students to have math, science or other textbooks, while other students go without. I predict that in 2021 our nation will finally realize that connectivity is becoming as important to students' education as their textbooks, and that we make sure that no student finds themselves without it ever again.

Erik Heinrich, Education IT leader, CommScope and Former Director of Technology Infrastructure, San Francisco Unified School District

Web Conferencing Will Blend Classroom/At-home Learning

Two big issues that will be addressed in the coming year are access and accessibility. With some students at home and others in the classroom, it will be important that all students receive the same experience and quality. Addressing this gap will require innovative new features and solutions from video communications services. Those tools that deliver on a high-quality, accessible experience will be poised to succeed. One example: Large-screen monitors that connect to web conferencing systems; everything written on the panel populates on the web software as an annotation, allowing the in-class and remote students to have the same view. Students can also use the annotation tool in their web conferencing program to share their work with in-class students, ensuring everyone sees the same thing.

Accessibility also means making sure students have access to the same resources, whether they are attending in-person, remotely or some combination of the two.

Anne Keehn, Global Education Lead, Zoom

Seat Time Will Make Way for Purpose-driven Learning

Now that learning from home has become the norm for millions of families, it may be time for educators to shift their perspective to the future of learning – rather than scrambling to return to the traditional model of the past. As educators across the country reimagine what school looks like for their students moving forward, I implore them to focus on one core concept: flexibility. As schools incorporate more online learning into their models, tracking seat-time and attendance should be traded in for an environment where students are able to "do school"

> Two big issues that will be addressed in the coming year are access and accessibility. With some students at home and others in the classroom, it is important that all students receive the same experience and quality.

when it works best for them and reap the benefits: independence, confidence and genuine engagement with course material.

Students and parents should consider enrolling in an accredited online K-12 school with proven experience in distance education. Many of these schools know that the definition of "school" no longer needs to be seven hours in the classroom, five days per week. With an online education, students trade "sit-and-get" learning for an asynchronous, mastery-based model that drives engagement and purpose-driven learning.

Megan O'Reilly Palevich, Head of School, Laurel Springs School

Tech Will Help Teachers Gain Insight into Student Needs

What is needed most now are technologies that help educators better understand student wellbeing as well as the specific ways in which students learn. We'll see more interest and discussion around the incorporation of technologies that provide educators with passive analytics. These analytics are gathered without teachers having to do anything to get insight into student learning behaviors. We'll see an uptick in social and emotional

technology that helps provide support to students. This is extremely important now given what students have gone through as a result of the pandemic and will only increase in importance over the coming years.

Martin McKay, *Founder and CEO,* *Texthelp*

Parent-Educator Collaboration Will Be Strengthened by Necessity

As we sift through the consequences of the pandemic for our children, educators and education researchers are going to be learning lessons about our school system for years to come. One truth has already been made clear: learning doesn't just happen in the classroom. Although this has always been true, never before have we been confronted with the importance of school/home communication. Parents were forced to engage with and oversee the learning process to an unprecedented extent. Teachers experienced the home environment and the struggles that parents had juggling jobs, children and life – not just thanks to Zoom but also because many teachers themselves were parents going through the exact same thing.

Looking to the future, I'm hopeful that we will have the wisdom to continue to build upon the partnerships

that were forged during this difficult time as teachers and parents worked in greater unity on behalf of their students and children. When parents understand the curriculum and the expectations for their children, they are empowered to more fully engage and support that process, and they derive greater satisfaction from doing so. When the school better understands the dreams parents have for their children and the circumstances in the home, they can better support the individual needs of each child and gain deeper trust and engagement from the parents.

> Sensory interaction and spatial positioning tech will enable teachers to engage remotely, allowing them to interact with 3D models in real-time through sensory devices. Beyond that, the education space will accelerate the adoption of virtual reality (VR) in the classroom.

To the extent we take advantage of this hard-won empathy moving forward, we will be well on our way towards building a stronger and more equitable schooling system.

Benjamin Heuston, *CEO,* *Waterford.org*

Students Will See More Immersive Tech and Esports

With hybrid learning becoming more of the norm in education, we will see an increase in the use of voice and computer vision for customized, immersive experiences that reflect students' individual goals, strengths and weaknesses. Additionally, sensory interaction and spatial positioning tech will enable teachers to engage remotely, allowing them to interact with 3D models in real-time through sensory devices.

Beyond that, the education space will accelerate the adoption of virtual reality (VR) in the classroom. VR is an incredibly powerful tool for engaging students in distance learning and immersing them in unforgettable educational experiences, such as virtual field trips.

Lastly, esports in education will continue to grow in popularity. Research has shown the role of esports for

the enhancement of STEM skills, the development of soft skills such as collaboration, problem-solving and leadership and its promotion of social inclusion and diversity. This will only grow more pervasive in 2021 as more schools start to implement dedicated esports programs, both virtual and in-person – when allowed.

Rich Henderson, Director of Global Education Solutions, Lenovo

Augmented and Virtual Reality Will Lead to Better Comprehension

The challenges of maintaining a student's attention and ensuring they're comprehending complex subjects grow significantly in a remote learning setting. In order to keep students engaged, online lessons will likely become more interactive with the help of augmented reality and virtual reality curriculum integration. Having students not just see but experience the subject under study will help them more fully comprehend the concepts. Use of this technology gives instructors the option to explain more challenging and complicated concepts. These

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technology-based learning experiences will enhance comprehension of important concepts, for example, by allowing students to virtually travel to space for physics lessons or be in a rainforest to collect samples for a biology course.

Also, the days where the only assessment paths to check for understanding – boring and tedious pen-and-paper tests – will soon be gone. The significance of learning outcomes is increasingly becoming more and more important, which is why formative assessment solutions are being adopted. These rely on presentation, projects, activities, and more to check on the students' progress. These various methods deliver the goals of the curriculum in a more dynamic project-based manner, which benefits all the students. With these adaptive techniques and modern methods,

cookie-cutter methods that barely produce results and only add undue stress to the students will soon be a thing of the past.

Patrick Quinn, Parenting expert, Brainly

Schools and Parents Will Invest More in Tutoring

I predict that parents and schools in the U.S. will invest more in tutoring, mirroring the trend of parents overseas (in Asia) investing as much as 15% of their income to give their children an academic advantage. I believe we'll see more districts offering online tutoring services to students, and students will see the value in taking responsibility for their academic success.

Myles Hunter, Co-Founder and CEO, TutorMe

Early Learners Will Return to Hands-on

Developmentally appropriate learning for young children means concrete experiences with hands-on manipulatives, social-emotional development through engagement with peers, and – of course – less screen time. As the pandemic lifts in 2021, and educators have a chance to re-focus on what works best for each age group, early childhood education will re-center on these important benefits of hands-on learning for young children. In ed tech, a focus on in-person learning will mean choosing tools that support these proven learning styles for young children.

Standards for computer science education have been steadily expanding into pre-K–5, and this move will continue in 2021. Robotics – especially screen-free robotics – will see a resurgence in the early childhood classroom, as robots provide a concrete, hands-on foundation to build upon for early learning.

Jason Innes, Director of curriculum, training and product management, KinderLab Robotics

Ed Tech Will Tackle Academic Needs at Multiple Levels of Performance

Achievement gaps have been a perennial concern, and many have feared that the "COVID-19 Slide" would exacerbate them. The last month has brought the release of a series of reports documenting the nature of the slide which has, indeed, made a bad situation worse. Even a cursory survey of the research reveals that: 1) achievement gaps are huge; 2) COVID-19 learning loss made them worse; and 3) we generally don't do a great job closing them. Gagne (2005) analyzed Iowa Test of Basic Skills (ITBS) data and

found the shocking reality that **"the achievement gap widens by about 145% between grades 1 and 9."** Let that one sink in.

2021 will likely be a year where the ability to respond to wide and varied instructional needs on the part of students will be paramount. Schools will be looking for technology that makes this doable at scale. Instruction and assessment resources integrated across multiple providers through single sign-on and full reporting will be the desire.

Gene Kerns, Chief Academic Officer, *Renaissance* and Former teacher and adjunct faculty member

First Responders Will Get AI Help

Artificial intelligence will make inroads in the emergency notification space. AI has the ability to help manage the barrage of information coming in via phone, text, and social media that bombard first responders during an emergency event. It can segment communities based on their responses or other factors such as their current location to deliver messages that

are contextual and relevant to people based on their specific situation. For example, if there is a potential threat in a specific area of campus, modern emergency mass notification systems can quickly deliver detailed evacuation instructions to those in buildings that are immediately impacted, while alerting those in other locations around campus to stay away from the endangered area until the situation is clear.

The coronavirus hasn't stifled gun violence – despite the fact that many Americans are largely sheltering at home, the total number of gun deaths in 2020 is at 38,000 and counting, surpassing previous years by wide margins before we've even reached December.

Heading into next year, major advancements in technology that syncs with existing surveillance camera systems will see wider adoption among education organizations. Modern recognition software enables mass notifications to be sent as soon as a gun is visible, providing administrators with advance warning before a shot is fired. Once a firearm is validated, the administrator can inform all relevant stakeholders by initiating pre-defined safety protocols, an extremely valuable capability in situations where every second matters.

Dave Fraser, CEO, *Omnilert*

K-12 Will See More High-Profile School Breaches

2019 was a historically challenging year for school district cybersecurity-wise. Dozens of school districts were compromised by ransomware, while others were scammed out of millions of dollars by criminals. To add insult to injury, ed tech vendors were also implicated in massive student data breaches. Thanks in part to COVID, 2020 looks to have been an even worse year for school

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districts. Indeed, with the embrace of technology for use in the classroom and district operations, school districts have introduced a host of new digital threats and vulnerabilities to their day-to-day operations, including to student safety and well-being.

While recent K-12 cyber incident trends are already cause for concern, 2021 will likely up the ante yet again. With cyber criminals increasingly targeting school districts, there is every reason to believe that over the course of 2021 there will be more and more high-profile breaches and compromises of school district and vendor information technology systems than in past years.

The silver lining is that help is finally on the way. In

late 2020, a new information sharing and analysis center (ISAC) launched – the first national, nonprofit dedicated solely to supporting school district cybersecurity defenses. Coupled with increasing interest from state and federal policymakers seeking to help cash-strapped school districts better manage the cyber risks they are facing, 2021 may be the year that we can start to turn the tide on this disturbing trend.

*Doug Levin, National Director, **K12 SIX** and Founder and President **EdTech Strategies** and **K-12 Cybersecurity Resource Center***

Attackers Will Capitalize on Distance Learning

As remote education continues into 2021, we'll see adversaries take advantage and capitalize on an industry that is ripe for attack. The reality is distance learning technology is not configured to be secure. With little to no funding, schools will be unable to lock down their technology and attackers will jump on the opportunity to create digital footprints for young children that previously had privacy protections put in place by their parents. This

> Post COVID-19, education institutions will have to adjust to the "new normal" — one that is not 100 percent remote or 100 percent analog, but one that takes the best of both worlds to deliver a superior education experience for students.

exposure will have lasting implications on the emotional, financial and digital well-being of the next generation.

*Gianna Price, Xacta Solutions Architect, **Telos***

Automation Will Drive a Wave of Spear Phishing

Spear phishing is an attack technique that involves highly targeted and convincing malicious emails that include specific and accurate details about a particular individual or role at a company. Historically, spear fishing is a high-investment and potentially high-return activity for hackers that has required manual and time-consuming processes. That will change in 2021. Cyber criminals have already started to create tools that can automate the manual aspects of spear phishing. By combining such tools with programs that scan data

from social media networks and company websites, phishers can send thousands of detailed, believable spear phishing emails, with content customized to each victim. This will dramatically increase the volume of spear phishing emails attackers can send at once, which will improve their success rate. On the bright side, these automated, volumetric spear phishing campaigns will likely be less sophisticated and easier to spot than the traditional, manually-generated variety.

Regardless, you should expect a major increase in spear phishing attacks in 2021 due to automation. What's more, bad actors know that anxiety and uncertainty make victims easier to exploit. As society continues to grapple with the impact of COVID-19, global political strife, and general financial insecurity in 2021, we anticipate that many of these automated spear phishing attacks will prey on fears around the pandemic, politics and the economy.

*Threat Lab Research Team, **WatchGuard Technologies***

Chatbots Will Become Critical to Student Engagement

Post COVID-19, education institutions will have to adjust to the "new normal" – one that is not 100% remote or 100% analog, but one that takes the best of both worlds to deliver a superior education experience for students. In the 2021 landscape schools will rely on technology like chatbots and automation more than ever. Once implemented, these tools will help institutions improve teaching models, produce better outcomes for students and ultimately reduce the cost of servicing and teaching students.

*Brad Benz, Managing director of **Benz Capital** and Education Advisor at **Capacity***

5G Will Spawn the Next Tech Revolution

5G is the foundation for the next revolution of technology. We will see a new ecosystem of hardware and software to support this underlying technology, and more 5G-compatible devices in the marketplace as new applications and use cases emerge.

The big prediction for cybersecurity is that everything old is new again. With the 5G ecosystem being built out, we should be prepared to see two big cybersecurity issues: a shared responsibility model for 5G and the security of attached network devices, applications and data, and software applications as a target for adversaries through un-remediated vulnerabilities.

Standalone 5G will be more secure than any

previous network generations. Yet, expanded attack surfaces mean opportunity for new threats as well as proliferation of unpatched existing threats. With 5G, a shared security model, similar to that of the public cloud, is likely to emerge. This should enable enterprises to shift certain functions to carriers and ultimately heighten enterprise security.

From the application perspective, there should be a focus on advanced software engineering practices. This means an increased emphasis on software quality should be a critical part of the pre-deployment development process. Without a critical focus on

software quality, we can expect to see older software vulnerabilities such as cross-site scripting and SQL injection re-emerge as favorite targets for adversaries.

Theresa Lanowitz, *Head of Evangelism,*
AT&T Cybersecurity

Private LTE Will Address Digital Divide…

District IT managers and administrators will further address the digital divide and bring broadband access to all their students and teachers through private LTE networks. By doing so, school districts will be able to provide students and teachers with reliable, lower latency and high-quality connectivity, while simultaneously being able to keep all the data traffic within their own secure IP networks. This will provide enhanced connectivity for students and staff to complete work and assignments at home – bridging the homework gap, as well as ensure a safe virtual learning environment for all – without the possibility of malicious outside network traffic such as Zoom meeting hacks or ransomware.

Ray Sabourin, *Business Development Private Wireless Networks US Enterprise, Nokia*

…and Wi-Fi Strain

Although the K-12 sector was originally an ideal candidate for fixed wireless connectivity, the pandemic has evolved the sector into a larger, more critical wireless connectivity market. District IT teams will look to vendors and broadband solution providers to support other use cases in 2021 that go beyond COVID-19, such as school bus security cameras and indoor internet-of-things to help manage building operations such as temperature and lighting.

In 2021, school districts will look to improve the quality of Wi-Fi connectivity by deploying and using private

> Some students or schools may opt to extend remote and blended learning. Districts will choose tools that provide the flexibility to serve all three learning models, while also investing in professional development for teachers and leaders to implement them with fidelity.

LTE networks within the 3.5 GHz frequency of the Citizens Broadband Radio Service (CBRS) band. By deploying a private network, school districts will be able to offload school assets (i.e., security surveillance cameras, digital record keeping, etc.) from Wi-Fi in order to free up more bandwidth and lower Wi-Fi network latency for use by students and staff. In turn, this will result in a more seamless virtual and in-person learning and teaching experience and increase the efficiency of campus operations.

Daniel Quant, *Vice President of Strategic Development,*
MultiTech

Expectations for Flexibility, Assessment and Integration Will Expand

While we expect a return to the physical classroom in 2021, some students or schools may opt to extend remote and blended learning. Districts will choose tools that provide the flexibility to serve all three learning models, while also investing in professional development for teachers and leaders to implement them with fidelity. Districts will promote more consistency around tools and everyday usage of the learning management

system and other digital tools. Now that 1-to-1 rates are higher than ever, the LMS will gain a more prominent role in the brick-and-mortar classroom, supporting live instructional practice and offering a smoother transition to remote learning if needed.

In order to meet students where they are, teachers will need robust tools and content offerings that make it simpler to identify what students have learned and retained. States and districts will increase investment in full-featured assessment management systems (AMS) with robust formative and tools that offer the actionable data around student mastery of standards that teachers need to close learning gaps and adjust instruction in real time. At the district level, we will see expanded investment in interim assessment and analytics tools as administrators seek insights into learning across all schools, especially in the absence of end-of-level data. To support these assessment efforts, tightly-aligned digital content will continue to be in high demand.

Learning agencies now expect deep integrations and interoperability between their foundational tech systems and supplementary tools. As a result, there will be an increase in partnerships with ed tech vendors that provide integrated solutions for analytics, learning management and assessment, while also maintaining flexibility and openness to connect with the district's existing tools.

Jenn Mitchell, *Director, K-12 Product Marketing*, *Instructure*

Districts Will Gain More Right-Sizing, Hybrid and Connectivity

Looking ahead, districts will have the opportunity to take a step back and evaluate the technology they've acquired during their rapid digital transformations. to enable a cohesive teaching and learning environment for what's next. This could occur in the form of buying software that connects all the various tools they've acquired or implementing stronger end-to-end security measures.

Educators will need to take remote learning and incorporate it into their go forward plans so it continues to be valuable - especially for students who are in need of additional assistance.

Students, parents, teachers and administrators will drive connectivity programs to ensure every student has access to remote education when at home and

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off campus. Public-private partnerships and internet delivery through LTE will cover the last mile to reach students, regardless of if the student is home, at a local recreation center or at the library.

Diane Ashby, *National Education Sales Manager*, *Samsung Electronics America*

Attendance Will Drop, Engagement Will Grow

While 2020 was about remote education, 2021 will focus on hybrid education. For high schools, a big focus is encouraging student engagement and creating an environment where the student is excited to learn. For colleges, it's attracting and retaining students at a time where they may be unsure of attending a big-name university and paying top dollar without the on-campus experience. How can institutions tackle these focuses? Meaningful online solutions.

It's important for educators to have plug-and-play ed tech solutions that are easy to use and integrate well into their curriculum. It will be very important for teachers to see the student learning outcomes from the tools they use. And ultimately, students have to like it. The tools and

solutions that are selected by schools in 2021 will likely stick around with them for the next four or five years.

However, in the future, teachers are not going to require attendance as much as engagement. Instead, teachers are going to find different ways to engage students to the point where you can be at home or you can be there, where you can watch it online or you can come in to work on a group project.

Joe Ferraro, Head of Global Sales, *Labster*

Display Use and Functionality Will Morph

Interactive smartboards will play a large role in the upcoming year by allowing teachers to develop engaging lesson plans where they can directly collaborate with their students – no matter if they are in the classroom or living room. We will also see a rise in integrating software into display technology and offering solutions that provide a seamless experience

when connecting to devices. Flexibility to allow for more engagement is here to stay and will be part of the education system of the future.

From live updates displayed on digital signage at schools to more readily scheduled one-to-one help sessions for students and teachers on virtual meeting platform, there is going to be a higher level of consistent and more engaging communication. Devices such as interactive displays, chrome books and tablets, conferencing capabilities, and monitors are playing a key role in the future of education.

There will be more screens looking to sync up at one time to have students participate in a lesson plan, so having a sophisticated software allows for a seamless lesson plan. Educators will also take advantage of these software solutions for a live classroom functionality,

while also being able to break out in side groups or one-on-one meetings.

Mark Quiroz, Vice President, Marketing, Display Division, *Samsung Electronics America*

The "How" of Teaching Will Forever Change

Maybe more than anything else, the pandemic has shown us the value of face-to-face time with our students. We didn't really know how valuable it was until we lost it. So, when this pandemic ends, and it will end, we will never take for granted the precious moments we have with our students.

2021 and the years following will be marked as the years where we fundamentally changed "how" we teach. No longer will we waste our class time with simple information transfer. Instead, students will interact with content before they come to class. They will do this digitally, where they can interact with their

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teachers and their peers. And then face-to-face time will be transformed. It will be a place of learning where students actively participate in their learning, connect with their classmates and teachers and take ownership of their own learning.

And make no mistake, students won't put up with passive learning anymore. The pandemic has shown them that they can learn anything from a YouTube video and need schools for something much different than information transfer. They want and will demand from schools: help with difficult concepts, deeper connections, hands-on learning, minds-on learning and launching pads to their dreams.

Jon Bergmann, Chief Academic Officer, *Flipped Learning Global Initiative*