Beyond the IT Department:

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The Emergence of the CIO as a Digital Leader in K-12 Districts

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The reality is that our district IT division has been challenged to research, invest, implement, and evaluate technology solutions and resources at a much faster pace than pre-pandemic. Our district is much more dependent upon technology now than ever before, and the expectations for our division are much greater. The silver lining is that we have a new opportunity to influence the future of education and how technology can be better used to support learning."

K-12 District Chief Information Officer in Massachusetts

Introduction

t's no small statement to say that our nation's K-12 schools are more dependent on technology today than ever before. From the classroom to the central office, the use of online and digital tools and resources to support learning as well as school district operations is the new normal. While students in 3rd grade are creating their own online guizzes about the rainforest to demonstrate what they have learned in class, district office staff are creating professional learning videos to introduce teachers to the district's new learning management system. School principals are engaging parents in school activities through virtual meetings and social media posts, and their district's human resources staff are engaging with local colleges to recruit preservice teachers to an online job fair. What once seemed like an ambitious goal in terms of the effective use of technology to support both the academic and business operations within a school district is now closer to reality. The pandemic and resulting seismic shifts in school models opened the eyes of many to see technology use through a new lens. Now, armed with these experiential sightlines, many K-12 teachers, principals, administrators, and staff are investigating how to more effectively use technology resources to drive greater efficiency and effectiveness, including in teaching and learning. At the center of these investigations and experiments with new digital tools and resources are the school district's technology leaders.

In a recent article, Tom Ryan, the former Chief Information and Strategy Officer in Santa Fe Public Schools (New Mexico) noted that the role of K-12 technology leaders today has evolved significantly over the past few years from solving IT problems to serving now as their district's "digital leaders" guiding new efforts to transform the education enterprise and provide insights on how to use technology more effectively.¹ The same sentiment is felt by many district technology leaders who, while enthusiastic about championing a new era of technology use in their district, also feel the weight of that responsibility. For the past few years, Project Tomorrow[®] – through our research activities – has paid special attention to this evolving role of the district technology leader, not only to document the impact of the increased role of technology on their workload, but also to understand the new responsibilities CIOs, CTOs, and technology directors have as digital leaders within their district community. This report, which examines how the district technology management experience has changed due to the pandemic and the resulting increased dependence on technology, is the second in a special series of reports focused on technology in education from Project Tomorrow and Spectrum Enterprise. As with the first report, "Beyond the Homework Gap: Leveraging Technology to Support Equity of Learning Experiences in School,2" the findings are based the results of the 2020-21 Speak Up Research Project. To provide context for understanding the changed technology management experience over the past five years, data results in this report are compared to similar findings from the 2017-18 school year.

Foundational to this examination of the changed technology management experience is to hear what district technology leaders say has been the impact



of the pandemic on their district technology team and practices. According to 81% of district technology leaders, the most notable effect of the pandemic has been an increased workload on the information technology (IT) staff. The increased workload has been exacerbated by an expectation of 24/7 technical support both for internal stakeholders (61%) as well as families and students (67%). The district leaders' perceptions about their changed environment, however, also point to several new realities that are derived from this increased district dependence on technology. For example, 54% of technology leaders say they are more concerned today about a cyberattack on district infrastructure than before the pandemic. The increase in the use of digital tools and resources in many districts has expanded their district's vulnerability to a cyberattack with so many more points of contact and infiltration available. However, this heightened concern about cybersecurity has not dampened the tech leaders' excitement about the potential of technology to transform learning. As a statement about the critical importance of technology to support students' learning, nearly threequarters of district technology leaders (73%) say they are highly focused on ensuring that all students and teachers have continued access to technology and appropriate Internet connectivity outside of school, to support remote learning if needed but also to empower new learning experiences. Correspondingly, 42% of technology leaders say their biggest priority today is motivating teachers to take advantage of the increased access to technology, both in the classroom and beyond the school walls, to support new learning modalities for students. This new focus by district technology leaders on the teaching and learning aspects of their work is supportive of Mr. Ryan's characterization of a new era for tech professionals as digital leaders. By providing needed leadership to move their IT divisions from fixing problems to driving new solutions, the district technology leaders today are effectively modeling for their school communities how to turn the lemons of the pandemic into sustainable new approaches and practices that leverage technology for increased efficiency and effectiveness from the classroom to the central office.

In this report, we provide evidence from the Speak Up Research Project about the ongoing evolution of district technology leaders to embrace their new role as digital leaders with the following key findings:

Key Findings

- By virtue of the expanded set of digital tools and resources available for teachers and students, the role of the district technology leader now extends directly into the classroom.
- To boost increased efficiency and effectiveness, districts are embracing more cloud applications to address both academic and business operational goals.
- Adequate classroom bandwidth to support the increased usage of digital tools and resources by teachers and students continues to be a challenge in many districts despite the increased focus on technology use.
- Technology leaders have a clear vision for how technology can be better utilized and the types of tools and resources that will best support district goals.

For the past 18 years, Project Tomorrow, a national education nonprofit organization, has been investigating the role of digital tools, content, and resources within schools and classrooms through the Speak Up Research Project. Since 2003, over 6.2 million K-12 students, parents, teachers, and administrators have shared their firsthand perspectives and ideas on the role of technology in education. Reflecting the priorities and concerns of school and district leaders, the research has also focused on the challenges associated with technology usage, including how to fund the necessary investments in infrastructure and tools.

¹ https://www.govtech.com/education/k-12/from-fixers-to-leaders-the-expanding-role-of-school-cios

² https://enterprise.spectrum.com/content/dam/spectrum/enterprise/en/pdfs/resources/reports/SE-ED-RR010-Beyond-the-homework-gap-Leveraging-technology-to-support-equity-of-learning-experiences-in-school.pdf

By virtue of the expanded set of digital tools and resources available for teachers and students, the role of the district technology leader now extends directly into the classroom.

he magnitude of the adoption of new technologies to support student learning over the past three years has been unprecedented. The dramatic increase in the implementation of 1:1 programs, where every student is assigned a tablet, laptop or Chromebook for their own use, is a good example of the acceleration of technology adoptions over the past few years. Most district technology leaders had long advocated for 1:1 programs before the pandemic. In 2014, 86% of tech leaders stated that students having access to a personal digital learning device was important for their school success. School and district administrators shared that same position. But the process of turning that visionary goal into a reality was not easy in most districts. The cost of providing every student with their own tablet, laptop or Chromebook was simply not economically feasible. Even more importantly, however, classroom technology use prior to the pandemic was still a primarily supplemental activity, not fully integrated into the instructional process. Educators valued the use of devices within learning, but the benefits were hard to quantify. Most continued to see technology as a tool for engaging students in learning rather than as a vehicle for supporting new learning experiences or helping students develop college- or career-ready skills. It was difficult to build a strong return-on-investment (ROI) argument based

on engagement outcomes only. Consequently, even as recently as the 2017-18 school year, only 34% of school principals said their school had adopted a 1:1 program with students being assigned their own tablet, laptop or Chromebook (Table 1).

To support the continuity of learning during the pandemic, however, districts needed to accelerate their plans for deploying devices to every student. Fortified with pandemic-specific funding from their state or the federal government, most districts made significant investments in devices to assign to students. In New York City alone, 357,000 digital learning devices were purchased in spring 2020 to support remote learning. While there is a great deal of discussion nationwide about the sustainable impacts of the pandemic, the increased access that students have to technology, notably personal learning devices, is significant. As depicted in Table 1, 92% of school principals now say that their school has a 1:1 program in place that not only provides students with access to devices in class but also affords them the opportunity to take those schoolowned devices home to support homework and extended learning. Realizing that students also need home Internet connectivity, 77% of principals also report that they now have in place a hotspot loaner program for families that lack home connectivity.

Table 1: Digital tools and resources used in classrooms - 2017-18 vs. 2020-21 comparative

Digital tools and resources	% of school principals who say they have implemented these digital tools and resources in their school		
	2017-18	2020-21	
1:1 assignment of devices for students to use in school and take home	34%	92%	
Social media for communication with parents	84%	89%	
Cloud-based communication and collaboration tools for student use	78%	87%	
Online courses for teachers' professional learning	63%	81%	
Online curriculum and instructional materials	51%	79%	
Online courses for students	36%	74%	

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By providing each student with a tablet, laptop or Chromebook, school districts are more likely to provide students and teachers with expanded access to other digital tools and resources. In the same comparative analysis provided in Table 1, student access to online courses more than doubled from 36% in 2017-18 to 74% in 2020-21. Likewise, student and teacher access to online curriculum and instructional materials increased by 51%. Nearly three-quarters of schools (74%) now report using a learning management system to support enhanced teacher productivity and student learning processes.

Given these unprecedented increases in the use of digital tools and resources, it is not surprising that district technology leaders feel that their workload has increased significantly over the past three years. But this reality has also helped to elevate the role of the district technology leader within discussions about the future of learning in their district. One key trend that supports the premise of the CIO or CTO as a digital leader for their district is the elevation of that position to district cabinet. Having the district technology leader as a member of the superintendent's cabinet has multiple benefits, including helping to facilitate better decision-making around digital learning initiatives and goals. The blending of insights and knowledge between the curriculum leaders and the technology leaders will inevitably lead to more effective plans relative to classroom technology usage. Additionally, district technology leaders gain a new appreciation for the value of the successful deployment of digital tools and resources in the classroom and the realization of tangible

outcomes. The understanding of those student and teacher outcomes is critical to the articulation of a meaningful return on investment for technology in education.

The increase of technology use in the classroom combined with district technology leaders' direct involvement in the process of implementing these new digital tools has had a substantial impact. Today, technology leaders have a broader view on the benefits of effective technology use in schools, beyond supporting continuity of learning if schools were to close again.

District Technology Leaders: Benefits and Outcomes of Effective Technology Use in Schools

- Provides students with opportunities for extended learning beyond the school day (78%)
- Improves communications between students, teachers, and parents (74%)
- Improves the quality and relevancy of classroom instructional materials (61%)
- Enables more equitable learning opportunities to take place in schools (52%)
- Supports the development of stronger teacher technology skills (52%)
- Increases consistency of instruction across classrooms (48%)

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To boost increased efficiency and effectiveness, districts are embracing more cloud applications that support both academic and business operational goals.

s with 1:1 programs, school districts have been on a steady but slow march to embrace more cloud-based applications for many years. While in 2011, only 19% of district leaders were talking about moving away from on-premises applications to cloud applications at that time, 10 years later in 2021, 86% of districts report cloud strategies as part of their overall technology vision. In many ways, the pandemic and shift to online applications to support both teaching and learning as well as business operations accelerated the pace of that movement. Table 2 illustrates the comparative growth in the implementation of cloud-based applications from the 2017-18 school year to the 2020-21 school year. The highest growth (61%) is noted in the implementation of a cloud-based curriculum portal to support teaching and learning across the districts. Given that 78% of district technology leaders say that their preference is for all teachers to use digital content that has been reviewed and approved by the central office, the growth in a centralized curriculum portal that is managed by district administrators makes sense.

It is noteworthy that the use of a cloud-based human resources applications or online personnel systems increased significantly as well, from 42% in 2017-18 to 58% in 2020-21. Whereas the pandemic and resulting shifts in traditional school models accelerated the necessary adoption of cloud-based applications to support remote learning, the adoption of cloud solutions for more traditional business operations has been a slower process. Financial systems continue to be generally viewed as inappropriate for the cloud even today, with only 42% of districts reporting that their financial systems are cloud-based. Interesting, 50% of districts in 2017 said they had no plans for move their financial systems to the cloud; in 2021, 50% of districts continue to have that same view. Similar resistance exists today with student achievement data and student information systems.

Despite those few pockets of resistance, district technology leaders are gaining a new appreciation for the value of cloud-based applications, just as they did for the benefits of technology to support student learning and teacher effectiveness. In alignment with those technology benefits, district leaders note that the use of cloud applications (such as a standardized online curriculum) increases students' abilities to access those essential learning materials when students are at home

Table 2: Implementation of cloud-based applications in K-12 districts - 2017-18 vs. 2020-21 comparative

Cloud-based applications	% of districts who l specific cloud	Growth from	
	2017-18	2020-21	2017-18 to 2020-21
Communication and collaboration tools	93%	98%	+ 5%
Online courses for students	58%	89%	+ 31%
Digital/video file storage	67%	83%	+ 16%
Learning management system	69%	81%	+ 12%
Content filtering	68%	81%	+ 13%
Online curriculum portal	49%	79%	+ 30%
Video streaming service	55%	79%	+ 24%
Digital media tools for student use	68%	77%	+ 11%
Human resources/ personnel systems	42%	58%	+ 16%

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(56%) and promotes a more expanded integration of technology within the day-to-day instructional process (42%). District technology leaders see the effective use of cloud applications as both supporting their own internal technology division needs and helping them provide better services to their external clients, notably teachers and students. The leaders now identify the following as key benefits for moving more applications into the cloud:

- 1. Greater flexibility relative to IT management (70%)
- 2. Less storage constraints (62%)
- 3. Getting out of server business (56%)
- Increased student access to digital instructional materials outside of school (56%)
- Facilitates greater integration of technology within learning (42%)

The combination of the increase in technology available to support teaching and learning and the significant uptick in the implementation of cloud-based applications has brought two significant challenges for K-12 districts. One concern is the privacy and protection of the data derived from the increased use of digital tools, and the other is whether school and district Internet bandwidth capacity will be able to support both current and future connectivity needs.

Adequate bandwidth to support the increased usage of digital tools and resources by teachers and students continues to be a challenge in many districts.

espite the significant investments made by school districts over the past few years to keep up with increased demands for classroom connectivity, many students, teachers and school principals feel that current Internet capacity is insufficient to meet teaching and learning needs.

- Nearly 4 in 10 school principals say Internet bandwidth capacity is a limiting factor in using more digital tools and resources in the classroom.
- A majority of students in grades 6-12 (54%) say Internet connectivity in their classrooms is too slow or inconsistent to support effective learning.
- 63% of teachers say that to support their new digital learning practices, they need Internet connectivity in their classroom that is more consistent and reliable and can better accommodate high-bandwidth digital resources.

While some district leaders may not want to hear this news about the dissatisfaction with current Internet capacity, the statistic that nearly two-thirds of teachers are demanding enhanced connectivity in their classroom should be viewed as a positive development. Not only are teachers using more technology in their classroom, but their valuation on the positive impact of that technology usage on their own productivity and the learning outcomes for their students has matured as well. Teachers' acknowledgment that they need higher-bandwidth connectivity means that the use of online and digital tools and resources is now part of the fabric of their classroom instructional practices.

The end-user perspective that Internet capacity in the classroom could be a challenge is not news for most district technology leaders. Only 28% of district CIOs and CTOs nationwide currently believe that they have enough bandwidth capacity to meet all local needs (Chart A). The percentage of leaders holding that view is very similar to the number of district leaders who said the same in 2017-18. However, two-thirds of district technology leaders acknowledge concerns about their connectivity levels and performance.

The difference in the perspective of district technology leaders today compared to 2017-18 is in their concerns about future capacity needs. Whereas fewer districts are experiencing occasional capacity problems compared to 2017-18, a greater number of district technology leaders today are waking up in the middle of the night stressed about how to meet future demands. These leaders realize that the genie cannot go back in the bottle relative to technology usage now. As a result of the pandemic and the increased dependency on technology, more digital devices are in use every day, all day in classrooms, and each device brings another access point to the network. The standardization of online tools and resources as the new normal for instructional materials has amplified the criticality of high-speed, high-bandwidth access to the Internet. And the increased usage of cloud applications, to support both academic and business operations, has



elevated the profile of Internet connectivity throughout the district enterprise, including the superintendent's office. In their new role as digital leaders, today's K-12 district CIOs and CTOs must be proactive in terms of managing their district's bandwidth capacity, with the understanding that demand will continue to increase as both teachers and administrators gain additional familiarity with digital tools and resources that support educational objectives.



Concerns about

addressing future

capacity needs

Chart A: Status of district Internet bandwidth capacity - 2017-18 vs. 2020-21 comparative

Experiencing

occasional capacity

problems

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Have more than

enough bandwidth

capacity

Not meeting current

needs today

Technology leaders have a clear vision for how technology can be better utilized and the types of tools and resources that will best support district goals.

eyond responding to the needs of key stakeholders and end users, district CIOs and CTOs are leaning into their new role as digital leaders and developing their own visions for how technology could be better used to support learning. In many ways, these vision statements are informed by the still-rippling impacts of the pandemic over the past three years, and what the technology leaders now say are the best use cases for digital tools and resources. At the center of those visions is an absolute need for increased Internet bandwidth capacity.

When asked about their priorities if they had increased bandwidth, 60% of district technology leaders say they would focus on proven tools and resources that could improve the teaching and learning experience in the classroom. The types of tools and resources they would implement include more online videos, courses, and curriculum solutions (Table 3).

In addition to prioritization of those tools and resources, 52% of the leaders would recommend addressing the Homework Gap by supporting a broader network that Table 3: Priorities for increased Internet bandwidth capacity - tools and resources to improve teaching and learning

If you had increased Internet bandwidth capacity, what would be your priorities for usage?	% of district technology leaders
Increase usage of video and other multimedia instructional materials in the classroom	56%
Provide students with greater access to our network when they are outside of school	52%
Implement more cloud-based applications	52%
Offer our teachers more online courses for professional learning	44%
Increase classroom access to online curriculum and instructional materials	40%
Utilize more online communication and engagement tools with our parents and greater community	40%

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provides more access points for students to use the district's Internet capacity. This is a remarkable change from the view of district technology leaders five years ago. At that time, only 27% felt that an expanded network was an important priority.

Similarly, 4 in 10 district technology leaders would like to see more utilization of online communication and engagement tools with the district community. Given that K-12 leaders nationwide are increasingly focused on how to effectively engage with a diverse parent population, this focus on leveraging online tools to address that need specifically is smart management. And again, this priority usage may be another experiential lesson learned from the pandemic when the use of online communication tools, including social media to communicate critical school information to parents, was a new frontier in many districts. Comparatively, only 19% of technology leaders had this usage on their radar in 2017-18.

Ending thoughts and questions for further discussion

t a critical time in K-12 education, many of today's CIOs and CTOs are stepping beyond their more traditional IT management responsibilities to be part of larger discussions about the transformation of the school experience. The district technology leaders bring expertise to these discussions that are highly valued and timely. With the increased availability and dependence on technology to support both academic and business operations in K-12 districts, our nation's district technology leaders provide a trifecta of insights and knowledge to ensure that the utilization of these digital assets are successful and effective:

- Understanding the potential capabilities of various new digital and online tools and resources to transform user experiences, both in the classroom and in the central office.
- 2 Having experience in how to implement those tools and resources effectively from an enterprise perspective and with the requisite security provisions in place to protect valuable assets including student data.
- Connecting the dots between usage and tangible outcomes that support the mission-critical goals of their district.

In this second report in the new Project Tomorrow – Spectrum Enterprise series for 2022, we highlighted the emerging impacts of the pandemic and resulting disruptions to traditional school models on K-12 district technology leaders. But the larger narrative about the long-tail effects of that era in American education is still being written. This is especially true as districts begin to assimilate the lessons learned into new visions for the future of education. To support those reflections,



we have identified key questions that can help jumpstart important and timely new local discussions with teachers, administrators, school board members and community partners. Central to these discussions must be an understanding of the new role of technology within the learning experience. Fortunately, our nation's K-12 technology leaders appear ready and skilled to help their districts leverage the experiences of the past three years to create new visions for the future.

- 1 Consensus today is the pandemic and the resulting disruptions to traditional school models have significantly changed K-12 education forever. Given that, how is your district reflecting on the lessons learned from the experiences of students and teachers? And how are your using the insights gained from those reflections to improve educational opportunities for all students?
- 2 Measuring the impact of effective technology usage within teaching and learning is more important than ever. Increasingly, many school districts and communities are interested in understanding the ROI of technology investments and student usage of online and digital resources on students' academic achievement. As an education leader, how are you articulating the benefits or outcomes of effective technology usage within your school or district community? How are your colleagues defining effective technology usage today? Is your vision for the future aligned with the expectations of your stakeholders and colleagues?
- A new realization is that to fully leverage the potential of technology within the learning process, district leaders will need to foster a new level of cooperation and collaboration between disparate divisions, including the IT, curriculum and education services departments. How is your district developing a shared vision for how to effectively utilize online and digital tools to not only meet educational needs but also enterprise goals?
- With a bright future ahead for more effective technology usage in K-12 education, what do K-12 district technology leaders need to translate that potential into a reality? What types of support will be most helpful right now to support a new vision of technology effectiveness in our districts? How can districts capitalize on this new emerging role of their CIOs as digital leaders to establish more forwardlooking plans and strategies that can address key challenges in education, including equity, learning loss and teacher effectiveness?





About Project Tomorrow

Project Tomorrow's nonprofit mission is to support the effective implementation of research-based learning experiences for students in K-12 schools. Project Tomorrow is particularly interested in the role of digital tools, content and resources in supporting students' development of collegeand career-ready skills. For the past 18 years, the organization has focused efforts on national research projects and the design and implementation of evaluation, efficacy and feedback studies examining the impact of digital tools or technology-enabled learning models in the classroom. Learn more about our research activities including our globally recognized Speak Up Research Project at www.tomorrow.org.

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