2020 Annual Technology Survey

Results Report

March 31, 2021

Issued by the Vermont Agency of Education

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Introduction

The Annual Technology Survey gathers information about education technology in supervisory unions/districts (SU/SDs) and schools. The survey is a tool for the Agency of Education (AOE) to collect information on how schools are using technology and the challenges they are facing in providing the infrastructure and equipment needed to equitably and effectively utilize technology to support student-centered learning. The survey also enables the AOE to observe patterns of technology use and infrastructure across SU/SDs and explore opportunities to leverage state investments to support coherence and access across the state. The FY20 survey (2019-2020 academic year) was opened in July 2020 and closed on September 30, 2020. Fifty-one SU/SDs responded to the survey. From those responses, data was collected on 276 public schools and career technical education (CTE) centers, representing 95 percent of all public K-12 schools. Please refer to the appendix section of this document for a listing of the survey questions.

We wish to thank the technology directors and other SU/SD staff members for their work to compile responses to this survey.

Summary of Key Findings

COVID-19 Influences: Prior to COVID-19, the majority of schools reported that their one-to-one program did not allow students to take home a device. However, in response to COVID-19, 75 percent of schools sent devices home with every student. Chromebooks remain the preferred one-to-one device schools provide to students. A corresponding increase in the provision of technical support for home device use was reported by 270 schools as students transitioned to a remote learning environment. The most common support mediums were telephone and/or email.

"I think it is important to leverage what we learned in the spring of 2020 into practice during the 2020 – 2021 school year" - Survey Respondent

In looking forward to the FY21 Annual Technology Survey, the AOE agrees with the respondent above and will collect data on how SU/SDs leveraged learning during emergency closure, Continuity of Learning and re-opening to advance their technological infrastructure to support student learning.

Broadband Connectivity: Fiber remains the primary connection type for schools with an equal distribution between schools with a direct fiber link versus a shared connection. Vermont SU/SDs made gains in broadband capacity with the majority of schools reporting download and upload speeds of 1 gigabit per second (Gbps) or greater. While SU/SDs and schools have made improvements on broadband connectivity, no/low broadband access in student homes remains

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a considerable concern. Fifty schools reported that 15 percent or more of their students lacked home broadband access.

"The period of remote learning in the spring of 2020 accelerated our use of technology throughout the district and spurred innovation in a number of areas. Educators are using technology to organize and distribute assignments, and to capture student thinking." - Survey Respondent

In looking forward to the FY21 Annual Technology Survey, how SU/SDs and schools are balancing their innovations and technology use with issues of student access and equity will be an area of note for the AOE.

Technology Systems: The most utilized Learning Management System (LMS) was Google Classroom, indicated by 77 percent of schools. Half of the responding schools reported using more than one LMS. Similarly, 70 percent of reporting schools use PowerSchool as their SIS. Additionally, a majority of respondents indicated a desire for a statewide platform for PLP development, as well as a virtual or hybrid professional learning and networking site.

"By use of a one-to-one program all the way through Kindergarten, classroom teachers have worked to extensively integrate (technology) into the classroom through tools like Google Classroom, coding, STEM, interactive technology, video conferencing, and the availability of equipment and training." - Survey Respondent

In looking forward to the FY21 Annual Technology Survey, the AOE will continue to examine how educator use of LMS platforms evolved in a post-pandemic learning environment, what new approaches may be utilized by educators, and how leveraging statewide investments in platforms and technology can best support the field.

Broadband Connectivity

In considering broadband connectivity progress within Vermont SU/SDs, AOE uses standards recommended by the State Educational Technology Directors Association (SETDA). These standards were originally released in 2012 and were last updated in 2019. The standards provide bandwidth capacity recommendations to support seamless digital learning opportunities for all students.

Broadband Access for Teaching, Learning & School Operations	SETDA 2014-2015 School Year Target	SETDA 2017-2018 School Year Target
An external internet connection to the Internet Service Provider (ISP)	At least 100 megabits per second (Mbps) per 1,000 students/staff	At least 1 gigabit per second (Gbps) per 1,000 students/staff

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How do the SETDA targets apply to Vermont?

Based on these previous SETDA broadband targets, Vermont SU/SDs and schools continue to make gains in broadband capacity. Schools have reported a steady increase in broadband speeds, indicative of improved connectivity. SETDA set a 2017-2018 broadband download target of 1 Gbps per 1,000 students and staff. The 2020 technology survey indicated that the majority of schools had download and upload speeds of 1 Gbps or greater. Twenty-one schools, or 8 percent of the schools responding to this question, reported broadband speeds of greater than 5 Gbps.

In 2019, SETDA changed its methodology and recommendations for broadband targets. SETDA now recommends broadband capacity on a per user basis with peak usage as a statistical measure within larger districts. In considering future educational needs, SETDA recommended the following broadband targets starting with the 2023-2024 school year.

- Small Districts – At least 2.8 Mbps per user with a minimum of 300 Mbps per district (less than 1,000 students)
- Medium Districts – At least 2 Mbps per user (1,000 to 10,000 students)
- Large Districts – At least 1.4 Mbps per user (more than 10,000 students)

How do these per user targets apply to a district's broadband capacity? As an example, for a small district with 500 students to reach the target of 2.8 Mbps per user, the district would need approximately 1.4 Gbps of capacity. In future technology surveys, AOE will work to collect data linking users, peak use, and broadband speeds to measure Vermont's progress in accordance with the SETDA recommendations. The data from the 2020 technology survey does not link broadband speeds to the number of users in a district nor consider peak use. Therefore, no direct comparison can be made with the new SETDA targets.

It should also be noted that pre-COVID, SETDA projected large gradual increases of 35 to 65 percent in student use of broadband starting in 2021. SETDA encourages school districts to have the ability to implement the network architecture and to provision enough bandwidth to ensure adequate user experiences during peak utilization.

The following are survey questions and responses related to broadband connectivity.

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Internet Service & Connection

Who is the primary Internet Service Provider [ISP] for this school?

Primary Internet Service Providers
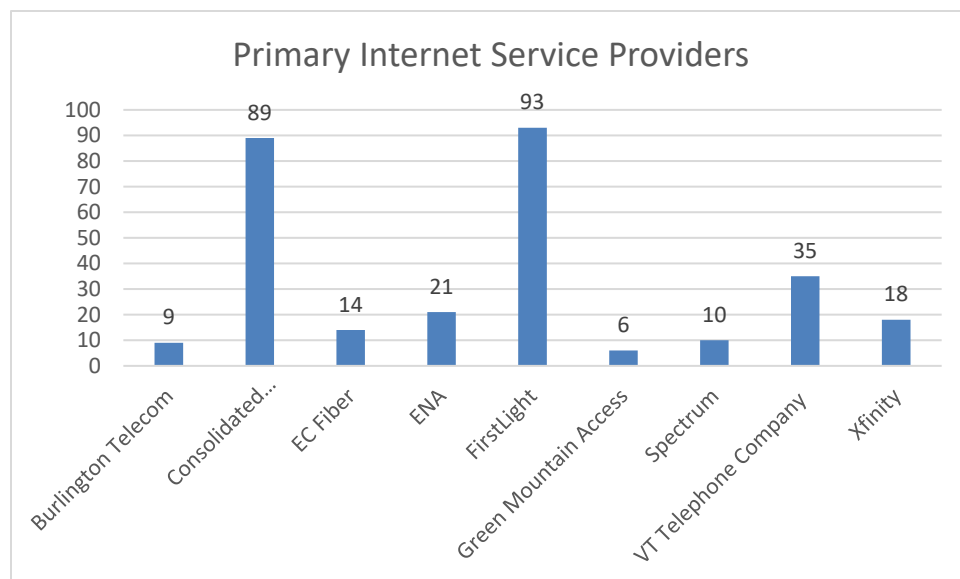
Consolidated Communications and FirstLight maintained their position as the primary internet service suppliers to schools. Both companies have a statewide presence. Some schools indicated they used multiple providers. If a school used VTEL and Xfinity, both providers were counted separately. ISP vendors with less than five responses are not included in the previous chart. There is more information on home internet access in Vermont on the Public Service Department website. [Public Service Department Interactive Broadband Map](#)

What is the primary connection type this school uses to connect to the internet?

Primary Connection Type

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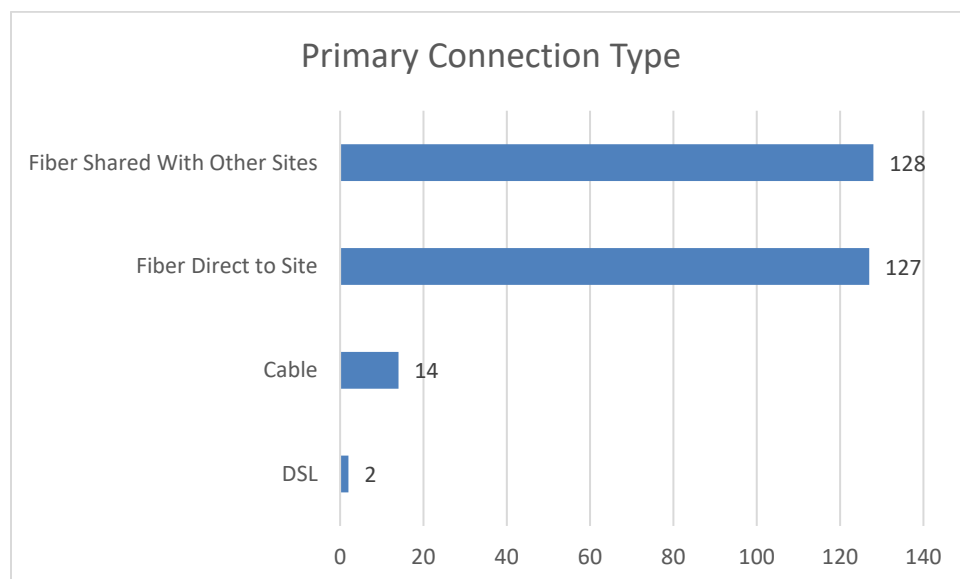
Fiber remains the primary connection type for schools. There was an equal distribution between schools that had a direct connection to fiber versus a shared connection to fiber. A direct fiber connection serves a single customer and provides the highest level of bandwidth and guaranteed speeds. A shared fiber connection supports multiple destinations and/or customers. During peak use there is more competition for the available bandwidth and having shared fiber may result in degraded connectivity and slower speeds. Typically, the cost for a shared connection is less than a direct fiber connection. In looking forward to the 2021 Annual Technology Survey, AOE will query schools to determine whether a shared connection is impacting use during peak periods. Additionally, the State may want to examine opportunities to ensure equity and access for all students by addressing disparities between schools in access to direct versus shared fiber.

Is your connection shared?

- 104 schools indicated they did not share a connection
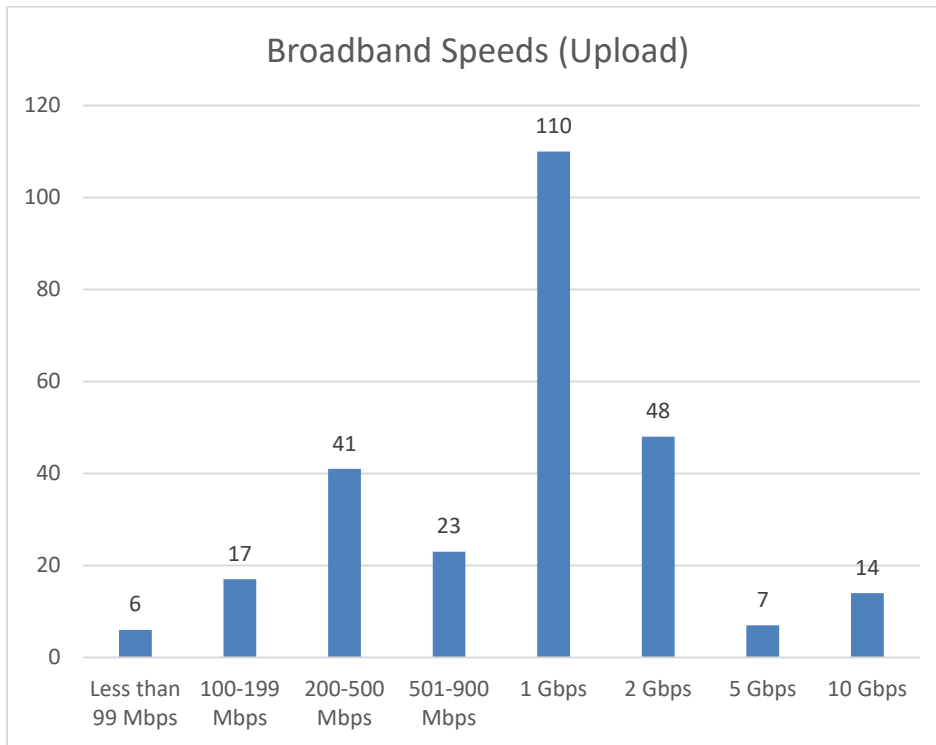- 172 schools indicated they did share a connection

How many schools share the connection?

- Shared among 11 schools – 2 SU reported
- Shared among 9 schools – 2 SU reported
- Shared among 8 schools – 3 SU reported
- Shared among 6 schools – 6 SU reported
- Shared among 5 schools – 8 SU reported
- Shared among 4 schools – 6 SU reported
- Shared among 3 schools – 2 SU reported
- Shared among 2 schools – 2 SU reported
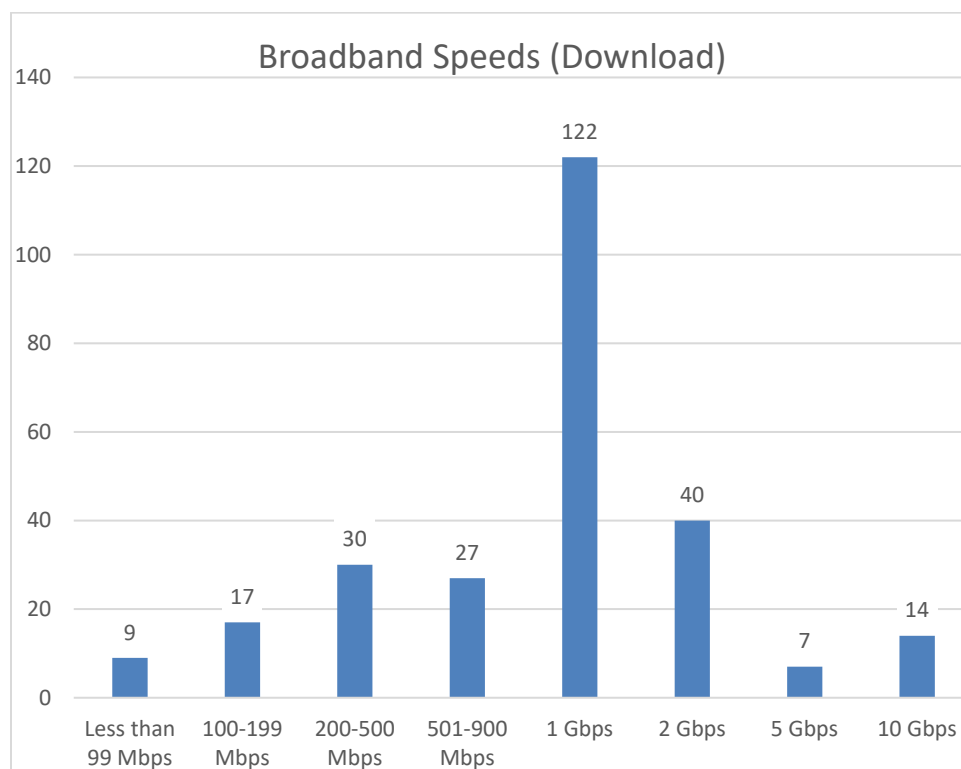
Upload and Download Speeds

According to the Federal Communications Commission (FCC), good internet speed should be at or above 25 Mbps. The download speed should be at or above 25 Mbps while the upload speed should not be less than 3 Mbps. Many Internet Service Providers (ISPs) allow different bandwidth limits for downloading and uploading. The upload bandwidth is less than the download bandwidth in many cases as most of the user activities require downloading of data from the internet. However, with the increased reliance on video conferencing software for remote and hybrid learning, upload speeds become more important. When engaging in video conferencing, users are downloading the video of the person they are talking to and simultaneously uploading live video to the servers. Both the download and upload speeds are important to ensure a good connection and video quality.

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What is your current upload speed (as advertised by your provider)?

Broadband Speeds (Upload)

Category	Value
Less than 99 Mbps	6
100-199 Mbps	17
200-500 Mbps	41
501-900 Mbps	23
1 Gbps	110
2 Gbps	48
5 Gbps	7
10 Gbps	14

As noted earlier in this report, Vermont schools have reported a steady increase in broadband speeds. In the 2019 Annual Technology Report, upload speeds of 1 Gbps or greater represented 27 percent of the responses. In contrast, 67 percent of the responses from the 2020 report indicated upload speeds of 1 Gbps or greater. Individual school response numbers are reported at the top of each bar in the chart above.

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What is your current download speed (as advertised by your provider)?

Broadband Speeds (Download)

Category	Value
Less than 99 Mbps	9
100-199 Mbps	17
200-500 Mbps	30
501-900 Mbps	27
1 Gbps	122
2 Gbps	40
5 Gbps	7
10 Gbps	14

As with the previous bar graph, the number of individual school responses are reported at the top of each bar. As with upload speeds, broadband speed gains were similarly noted by schools in the reported download data. In the 2020 survey, schools reporting download speeds of 1 Gbps or greater represented 69 percent of the responses, a ten percent increase from the 2019 report.

Wi-Fi Access

Wi-Fi access outside of the school building took on greater importance as Vermont schools transitioned to remote and hybrid learning throughout the pandemic. Additionally, as educators began providing instruction through tools dependent on reliable and robust broadband connections, home internet access for students became of primary importance. Early in the pandemic, AOE partnered with the Public Service Department to obtain the addresses of students who were learning remotely but lacked access to reliable home internet. From that survey, 27,000 unique addresses were identified.

In the 2019 technology survey, schools only reported on the presence of guest or public Wi-Fi access throughout the school building. A majority of schools -- 83 percent -- reported having Wi-Fi access throughout the building. The 2020 survey sought to document Wi-Fi access outside the building. If students did not have home access, could they obtain access from the school by using devices while in close proximity to the school building? As in 2019, the 2020 data showed

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the majority of schools, 92 percent, had public Wi-Fi access. However, those numbers dropped as schools were asked to provide information on accessibility from the exterior of school buildings and after hours. Eighty percent of schools reported providing Wi-Fi access outside the exterior of the school building after hours and 66 percent of schools reported Wi-Fi access was present in the school parking lot. In the 2021 technology survey, AOE will seek to understand how schools are working to provide internet connections for remote learning outside of the school infrastructure. The specific answers to the Wi-Fi survey questions are provided below.

Does your school provide "Guest" or "Public" Wi-Fi access?

- 22 schools reported there **was no** public Wi-Fi access provided by the school
- 254 schools reported there **was** public Wi-Fi access provided by the school

Is your Guest/Public Wi-Fi accessible from the exterior after hours?

Of the 254 schools reporting they provided public Wi-Fi access
- 34 schools reported the Wi-Fi was not accessible beyond the exterior of the school building
- 220 schools reported the Wi-Fi was accessible beyond the exterior of the building after school operating hours

Is your Guest/Public Wi-Fi accessible from the parking lot?

Of the 254 schools reporting they provided public Wi-Fi access
- 71 schools reported the Wi-Fi was not accessible in the parking lot of the school
- 183 schools reported the Wi-Fi was accessible in the parking lot

Is there another location in the community to access free Wi-Fi?

- 22 schools indicated there was no free Wi-Fi in their community
- 254 schools indicated that there was other free Wi-Fi in the community

Cell Phone & Broadband Service

In previous technology surveys, AOE has surveyed schools on the presence and quality of their cell service to ascertain the viability of phones being used as instructional tools or resources. The question of cell phone coverage also gives a sense of the viability of using cell towers as access to the internet for schools and students. This in turn relates to addressing the "homework gap" whereby students can gain access to the internet from home on school devices via a local cell tower signal. In the 2020 survey, schools were asked to describe their cell phone coverage via an open-ended question. The result was a range of qualitative answers that have been grouped according to types of response to the question. There were 235 schools that provided adequate response data. From the 235, 38 percent of schools reported that cell phone coverage was "good" at the school; 14 percent reported cell phone coverage being available but "poor"; and 48 percent of schools indicated that cell coverage was not available or was not strong enough for use at school. For more information on cell coverage in Vermont, the Department of Public Service has an interactive mobile [wireless map](#) on their website.

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*What is the typical cell phone coverage at the school?*
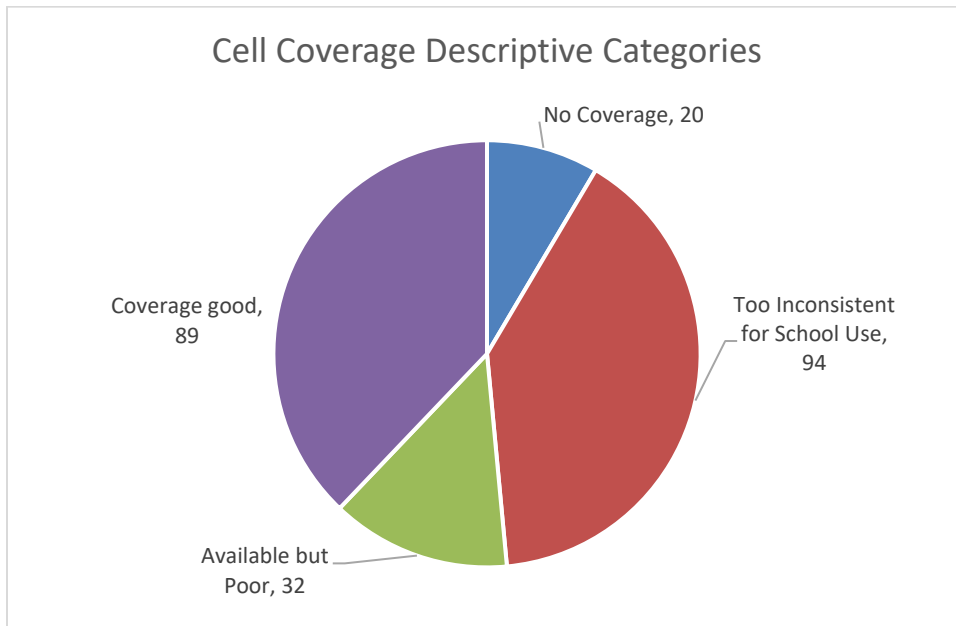
There were also 41 schools that either did not respond or their response could not be grouped in this descriptive data (e.g., some schools entered a telephone number to this question). For the 2021 survey, AOE plans to refine this question by providing specific dropdown options for schools to respond to.

Does your SU/SD survey students to determine their home broadband access?

- 49 schools reported they do not survey students for home broadband access at the SU/SD level
- 227 schools reported they do survey students for home broadband access at the SU/SD level

AOE will continue to ask SU/SDs to collect and report this information on a regular basis. AOE and the Public Service Department have worked cooperatively in the past to identify student addresses where broadband connectivity was a concern.

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Based on your survey data, what percentage of students DO NOT have broadband access at home?

Percent of Students With No Home Broadband Access as Estimated by Schools
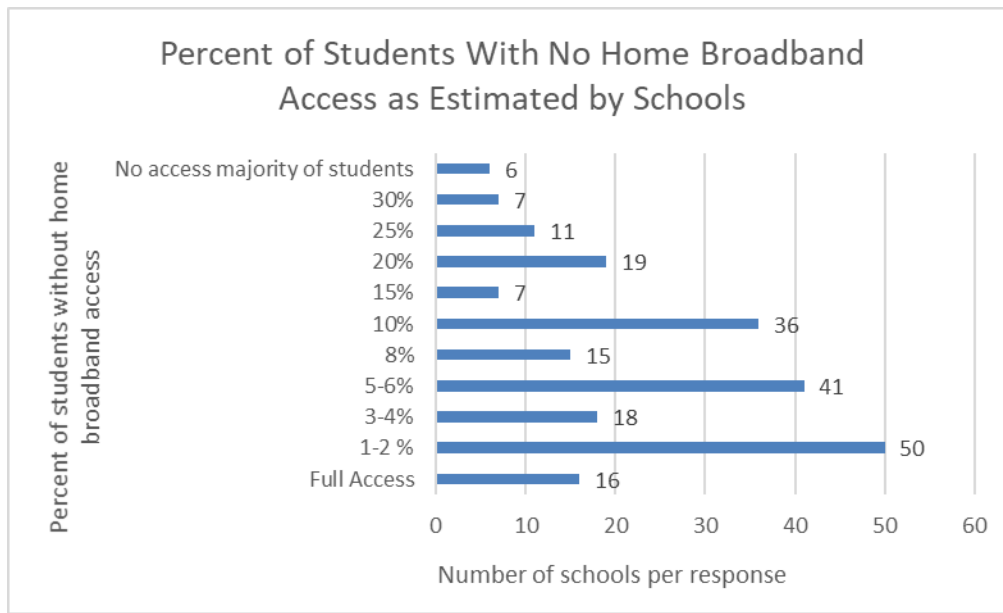
While SU/SDs report good broadband access at the schools, particularly with the growing use of fiber, the lack of broadband at home for students remains a challenge. Of the 82 percent of schools that surveyed students to determine their home broadband access, 22 percent (50 schools) reported that 15 percent or more of their students lacked home broadband access. Among those schools estimating that the majority of their students lacked home broadband access, estimates ranged from 50 percent to 90 percent. Those schools were primarily located in Lamoille North Supervisory Union and the Orange Southwest Supervisory Union.

How do you collect information on home broadband access for students?

Forty-eight schools responded to this open-ended question. Below is a list of the common responses. Similar responses were grouped into one representative response. In the 2021 survey, AOE plans to restructure this question to increase the response rate and capture specific information around SU/SD data collection approaches.

- Anecdotal
- Annual student update
- Emergency COVID survey
- From students/families reports to us
- Report to front office
- Requests for help & PSD resources
- School-based survey about internet at home
- Survey sent home with start of school paperwork
- Teachers inquire with students on a case-by-case basis
- Via email complaints

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Explain why you do not collect information on home broadband access for students.

There were 11 responses to this question. Similar responses were grouped. Collecting this information is important as a means to ensure communication channels are in place to provide pertinent information to students and families.

- Each school already knows which homes don't have internet access.
- This is collected from their sending school.
- Have not updated the data this year.
- We survey but return rate on survey is low and elementary students are not aware of their service at home, therefore our survey numbers are unreliable.

Do you have a list of student home addresses that have no/low broadband? Have you shared this list with the Public Service Department?

There were 196 schools that reported they did have a list of student home addresses that have no/low broadband. Eighty schools did not have such a list. Of those with a list, 20 had not shared the list with the Public Service Department and 176 had shared the list. It should be noted that the AOE collaborated with the Public Service Department (PSD) earlier in the year to collect priority student addresses from schools for the CARES Act funded connectivity initiative program.

School Technology & Device Availability

The COVID pandemic required schools in March of 2020 to close and institute remote learning through the end of the 2019-2020 school year. When the 2020-2021 school year started, schools supported a variety of learning models (i.e., in-person, hybrid, and remote learning). With a marked increase in remote learning, SU/SDs worked to ensure students had the appropriate devices. This section of questions focused on SU/SDs' school device profile, one-to-one status, remote IT support and classroom capabilities.
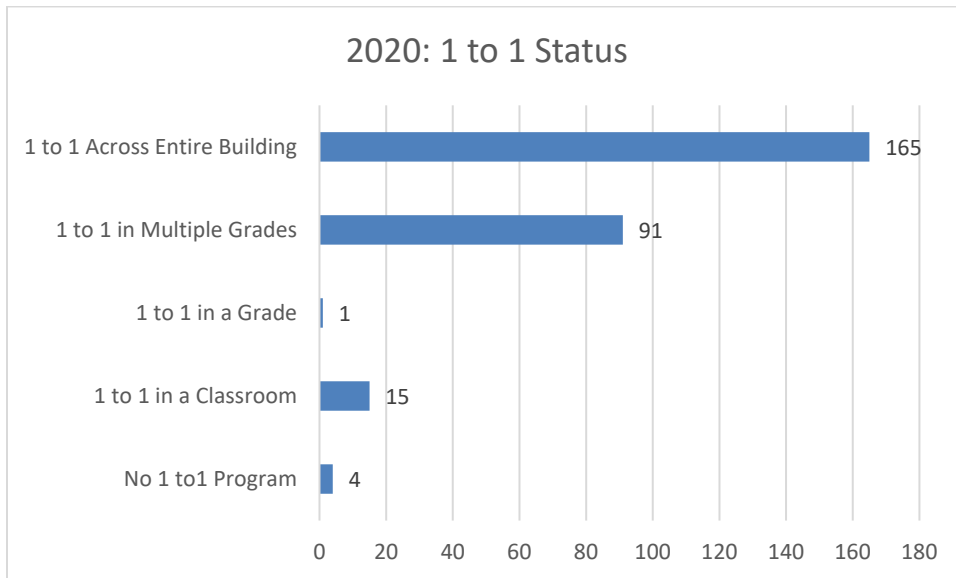
Student Devices

How many TOTAL devices are currently available for school use?

The number of devices available system-wide for school use compared to K-12 student enrollment were approximately equal. Schools reported there were 73,290 devices available for school use. The K-12 student enrollment as of October 1, 2020 was 74,643. There were seven schools that provided non-responsive answers to this question. More illuminating to the status of devices to students is the data on a school's one-to-one status.

Which option most accurately describes the one-to-one status in your school?

One-to-one computing is defined as a program where each student has a computing device dedicated to them over the course of a year, or multiple years, at their school. In the 2020 survey, more schools indicated one-to-one computing was available across the entire building than in 2019 or 2018. In 2020, 165 schools indicated device availability throughout the entire

building. This was up markedly from 2019 where 93 schools reported building-wide availability and 71 schools in 2018. AOE assumes the switch to remote learning due to the pandemic facilitated this increase in one-to-one computing. The advent of Chromebooks -- inexpensive, cloud-based machines that are easily managed -- has also helped to expand one-to-one computing.

2020: 1 to 1 Status

Category	Value
1 to 1 Across Entire Building	165
1 to 1 in Multiple Grades	91
1 to 1 in a Grade	1
1 to 1 in a Classroom	15
No 1 to1 Program	4

Please provide an estimate percentage (%) by type of devices your school has for student use – need to add to 100%.

Percentage of Devices: Breadowns 2020

Device	Percentage
Desktops	2%
Laptops	8%
Tablets/iPad	11%
Chromebooks	79%
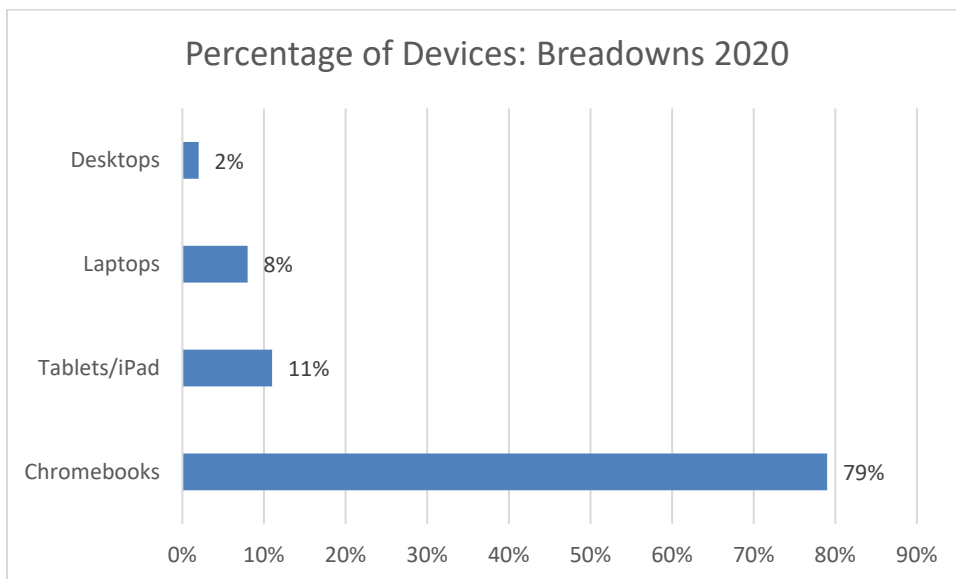
Vermont schools have steadily increased their use of Chromebooks as the preferred means for delivering one-to-one devices to students. This year, 79 percent of devices provided to students by schools were Chromebooks, compared to 70 percent in 2019 and 61 percent in 2018. In reporting the estimated percentage of device types for student use, 92 of the 274 responding schools reported 100 percent of the devices provided to students were Chromebooks. Cost and

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platform standardization, which enables updates, repairs, and assessments, are factors supporting the growth in Chromebook use. However, Chromebooks have limited uses without an active internet connection. File storage utilizes Google Cloud and requires schools to be comfortable with storing files remotely. The high rate of Vermont Chromebook adoption suggests schools have adapted to these conditions and are structuring their educational requirements to fit the device.

Does your school currently have a Bring Your Own Device (BYOD) policy?

BYOD policies allow a school to clarify when and how a student may use a personal device during the school day. Of the 276 school responses, 73 percent of schools reported they did not have such a policy. There was a similar response to this question in 2019, with the majority of schools indicating they did not have such a policy in place. The lack of such policies may indicate that Vermont schools believe they are managing personal student device use appropriately without the need for a school-wide policy. If educators are finding students are distracted by using a personal electronic device like a smartphone, they may elect to put in place such a policy. BYOD policies also control what devices may be used in a classroom. Limiting use to just school-provided equipment promotes an even "playing field" whereby students from both higher- and lower-income families are using the same devices. In the 2021 survey, AOE will explore reasons why Vermont schools do not have a BYOD policy in place.

COVID, Devices, & IT Support

Before remote learning was put into effect, did your one-to-one program allow students to take a device home? As a response to COVID-19, has your school sent devices home to every student?

The pandemic prompted the majority of Vermont schools to send a device home with every student. With the start of the pandemic, 75 percent of the schools reported that as a response to COVID-19, their school began sending a device home with every student. Before remote learning was put into effect due to the pandemic, just 29 percent of the schools indicated that their one-to-one program allowed students to take home a device. This shift in practice among all schools points to the influence the abrupt change to a remote learning environment had on Vermont school device practices. In the 2021 survey, AOE would like to determine if this shift required schools to purchase additional devices or whether their current inventory was sufficient to meet the demand. Among the 25 percent of schools that reported they did not send devices home with students in response to the pandemic, AOE hopes to learn why this practice is in place.
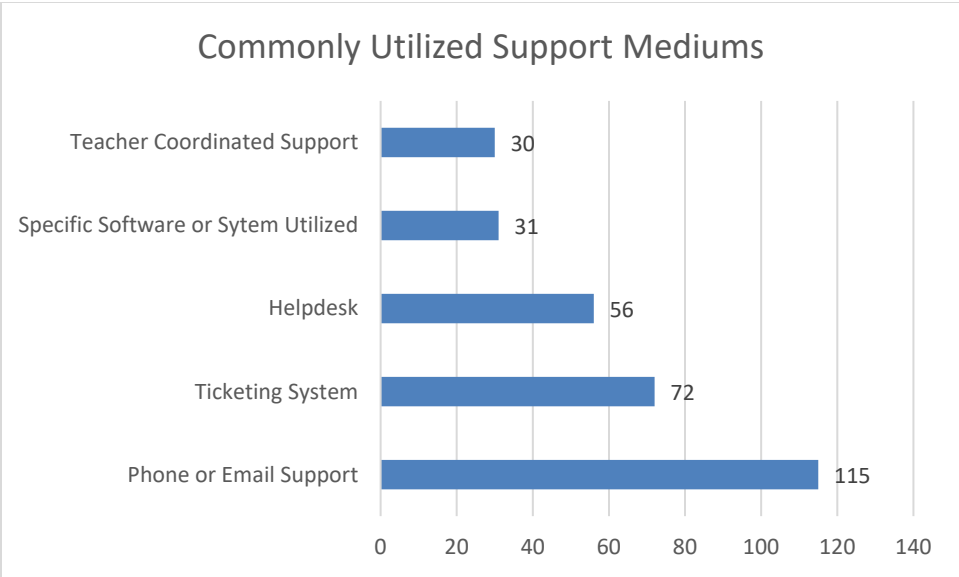
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Comparison: Device Practice Pre-COVID vs COVID
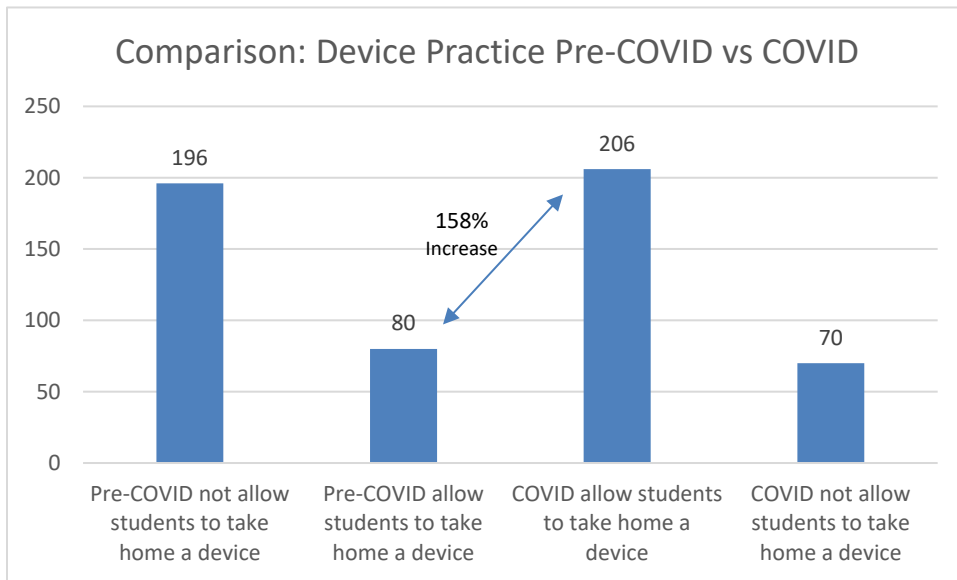
As a response to COVID-19, are you allowing students to keep devices over the summer?

A majority of schools stated they would not allow students to keep devices over the summer. Sixty-one percent of schools reported they would not allow students to keep devices. While the survey did not collect data on the reason for that decision, schools may be collecting devices to update and perform other services on them. The remaining 39 percent of schools would allow students to keep devices during summer break.
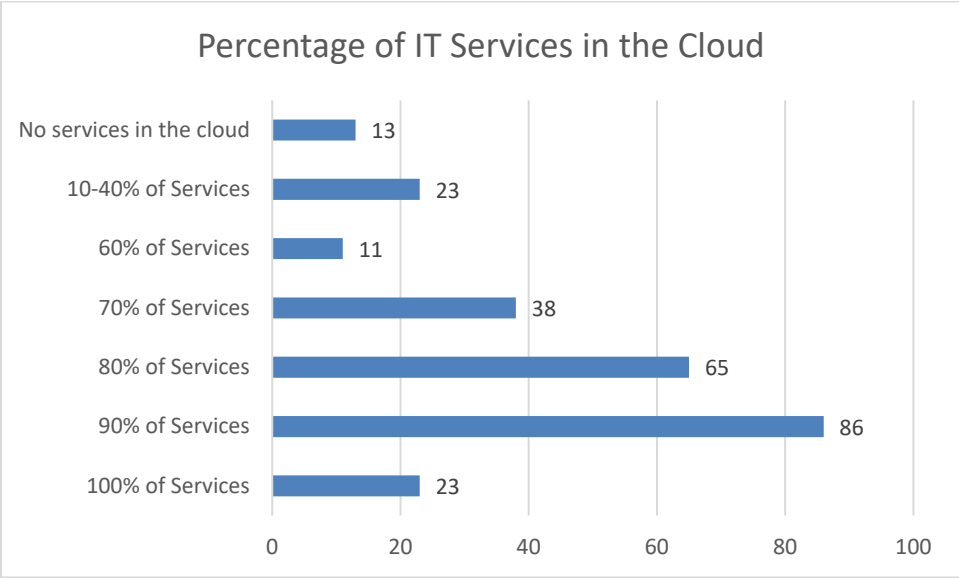
How have/will students/families receive IT support in a remote environment? (open answer)

Providing IT support in a remote environment was a new challenge for schools. School IT support teams had to quickly adjust to accommodate remote users. A noted change was the inclusion of parents to the user support base. IT support teams and educators had to provide parents with technical support as they were working to assist their children in using devices from a home environment. All responding schools reported that some type of IT support was provided for students and families. The following chart shows the most common type of support schools provided. In the 2021 technology survey, AOE hopes to learn what changes implemented by IT support teams may be continued into the post-COVID environment.
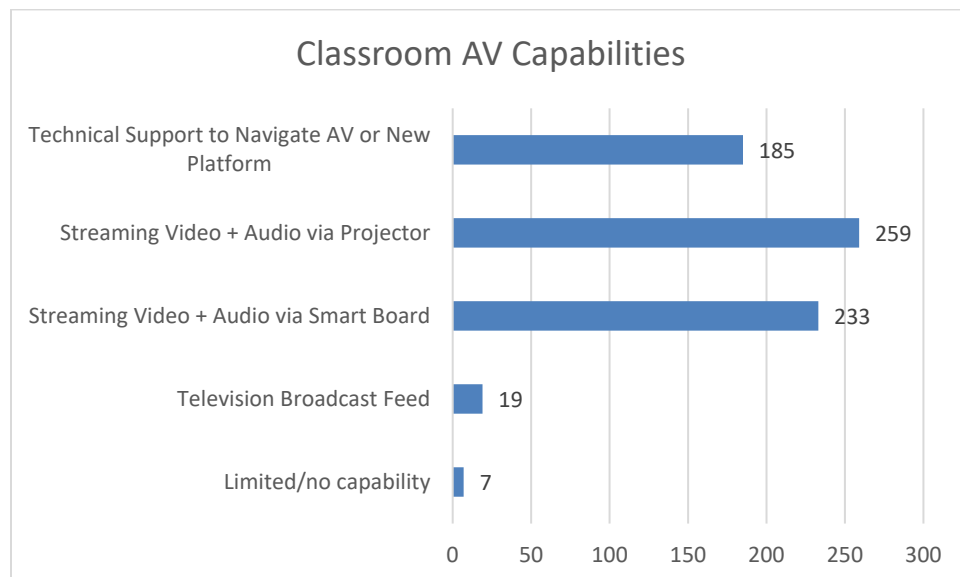
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Commonly Utilized Support Mediums

Support Medium	Value
Teacher Coordinated Support	30
Specific Software or Sytem Utilized	31
Helpdesk	56
Ticketing System	72
Phone or Email Support	115

Approximately what percent (%) of your IT services are currently in the cloud?

The majority of schools reported using some level of cloud-based services. Utilizing the cloud to store data and deploy programs provides schools with a variety of benefits. Among those benefits is the accessibility of cloud-based software platforms that enable teachers and students to have access to school materials and programs whether physically on-campus or learning remotely. Cloud-based services also facilitate collaboration and the sharing of information as materials may be simultaneously available online for a class to interact with on a particular assignment. IT staff may implement security protocols to access these services in the form of passwords and other identification, creating a safer and more secure online learning environment.

Percentage of IT Services in the Cloud

Category	Value
No services in the cloud	13
10-40% of Services	23
60% of Services	11
70% of Services	38
80% of Services	65
90% of Services	86
100% of Services	23

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Classroom Capabilities

What capabilities are there in your district/schools for in-classroom video/audio?

Classroom AV Capabilities

Category	Value
Technical Support to Navigate AV or New Platform	185
Streaming Video + Audio via Projector	259
Streaming Video + Audio via Smart Board	233
Television Broadcast Feed	19
Limited/no capability	7

The most common capabilities reported in Vermont classrooms were streaming video plus audio via projector (259 schools). Schools also reported having streaming video plus audio via smart board (233 schools) in most classrooms. Sixty-seven percent of the schools (185) reported having the technical support to navigate audio visual tools or use a new platform. Only 19 schools reported having a television broadcast feed in classrooms. This is an area for further reflection by the AOE, particularly as its partnership with Vermont PBS continues to expand. Seven Vermont schools reported limited or no AV capabilities in classrooms.

How many devices do you have that are task or course specific (video editing/graphic design, CAD)?

There were 234 schools that responded to this question. Sixty-seven percent of schools reported that they had no devices that were specific to a task or course. Twenty-nine percent of schools reported they had between one and 49 devices that were specific to a task or course. The remaining schools reported having more than 50 devices dedicated to a specific course or task. As previously discussed in this report, 79 percent of the devices provided to students in Vermont schools are Chromebooks. One reason why a minority of schools utilize devices for specific functions could be due to the versatility of the Chromebook.

Education Technology & Student-Centered Learning

When Vermont schools made the move to remote learning in March, teachers and students were challenged to use digital tools in ways they may not previously have utilized. Questions in this section explore those learning and information platforms schools relied on to stay connected and deliver instruction.

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Online Learning

Prior to remote learning/COVID-19, what percentage of students participated in online learning?
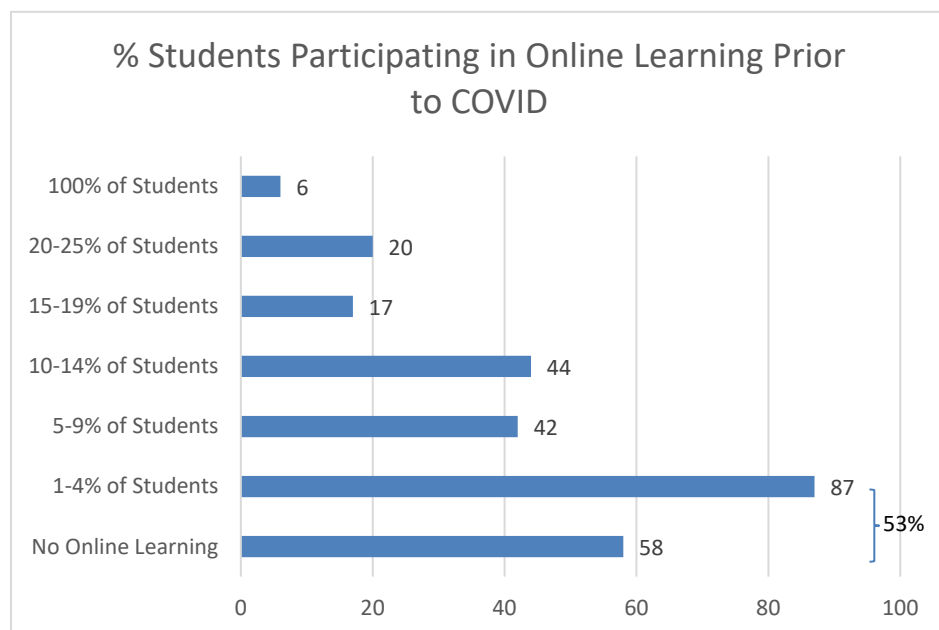
The chart above indicates that 53 percent of the responding schools had fewer than 4 percent of their students engaged in online learning prior to the pandemic. As previously noted in this report, the switch to remote learning expanded the distribution of devices to students and facilitated an increase in one-to-one computing. The closure of schools and the mandate to move to remote learning would likewise have resulted in an unprecedented increase in students participating in online learning.

What online provider(s) do you use? (open-ended response)

Online Provider of Remote Learning	Responses*
Brigham Young University Online	11
Code.org	1
Community College of Vermont	1
Edgenuity	5
Khan	10
Plado	1
Scratch	1
Virtual High School	54
Virtual Learning Academy Charter School	1
Vermont Virtual Learning Cooperative	151

* Schools could enter multiple responses. In addition, there were 55 schools that entered "not applicable" to this question.

Other responses received included:
- (Used for) live streaming for an algebra class
- (Used for) STEM/STEAM and Computer Science
- Various providers depending on the school

Software Platforms

The following questions on Learning Management System (LMS) and Student Information System (SIS) platforms are new to the technology survey. Recognizing the abrupt shift to remote learning due to the pandemic, AOE wanted to survey schools regarding the platforms they were using. This information will be used to help both schools and AOE evaluate the systems that are being utilized and to note what other platforms are being effectively rolled out throughout the state.

An LMS is a software application for the administration, documentation, tracking, reporting, automation, and delivery of educational courses or learning and development programs. There were 252 schools that responded to this question. Of those, 52 percent reported using more than one LMS/SMS.

What is your school's current LMS/SMS? (Learning Management System/Student Management System) (open-ended question)

| School's Current LMS/SMS	School Responses*
Alma	2
Canvas	25
Destiny	3
Google Classroom	194
JumpRope	9
LMS	5
Managebac	8
NEO	2
Otus	7
PowerSchool	21
Schoology	25
Seesaw	82
Toddle	8
Unified Classroom	9
VTVLC	7
Other	4

*131 schools named more than one LMS/SMS in use

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What technology program does your school use for SIS? (Student Information System)

SIS Technology Platform Used	School Responses
Alma	13
Empower	2
Infinite Campus	31
MMS	9
PowerSchool	189
Rediker	2
School Messenger	1
Tyler SIS	13
Web2School	11

A Student Information System (SIS) is a software platform used to manage student data. Student information systems provide capabilities for registering students for courses; documenting grading, transcripts, results of student tests and other assessment scores; building student schedules; tracking student attendance; and managing many other student-related data needs in school.

What commercial automated calling system(s) if any, do you use for communication with your community in the event of an emergency?

Automated Calling Systems Utilized
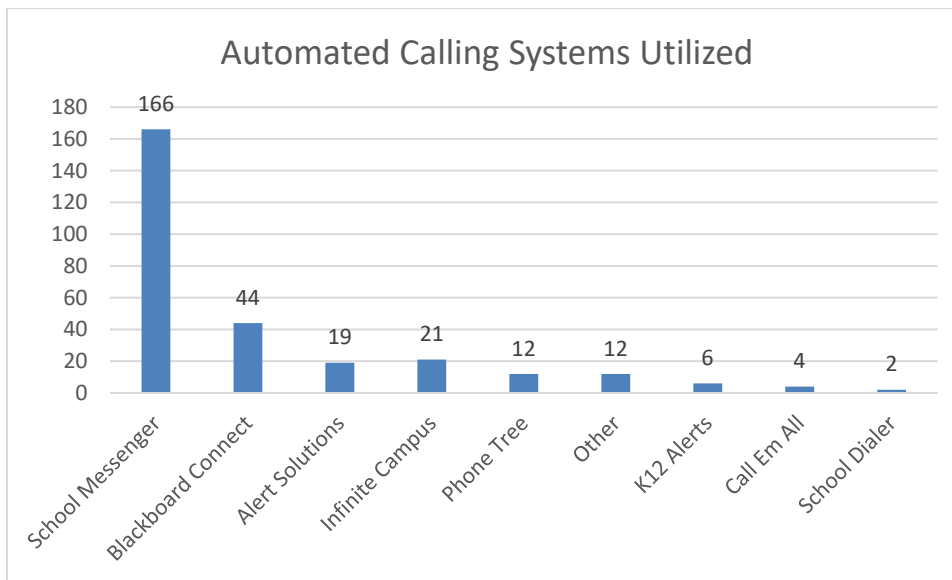
School Messenger remains the dominant emergency calling system among Vermont schools, as it was in 2019. These systems provide an automatic calling service that delivers phone messages to parents, teachers, students, and faculty in a timely manner. Voice messages are recorded by an administrator and the calls are automatically placed by the phone systems to the specified audience.

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Personalized Learning Plans & Proficiency Tracking

A Personalized Learning Plan (PLP) is a plan created by a student, with the support of parents/guardians, teachers/mentors and peers, that defines the scope and rigor of academic and experiential opportunities that will lead to secondary school completion, postsecondary readiness, and civic engagement. In Vermont, Act 77 requires that every publicly funded Vermont student in grades 7-12 participate in the personalized learning planning process.

What support would be helpful to you/your staff in continuing to develop the connections between personalized learning and technology? (could choose more than one response)

Possible Responses	Number of respondents
A common, statewide platform or platforms to support coherence across the state.	146 indicated this response
A PLP Platform Fair at which participants could preview products and interact with vendors.	107 indicated this response
Focus groups organized by region or other means to inform/co-develop resources and technical assistance.	106 indicated this response
An online/face-to-face/hybrid Professional Learning Community or network.	83 indicated this response
Other	25 indicated this response

Other comments included:
- Clearly defined standards and expectations by grade level.
- Time and opportunity for internal education.

New this year was the response option of having in place a common, statewide platform to support coherence across the state as a means of assisting schools in PLP development. This option was the response most selected by 57 percent of the responding schools. Also new this year was the response regarding providing schools with an online/face-to-face/hybrid Professional Learning Community or network. Thirty-two percent of the responding schools indicated that would be helpful. In 2020, the AOE invested in a web-based platform, Edmodo, that powers the newly conceptualized VTED Learns Network to connect educators across the state. Additionally, the platform can also act as an LMS at no cost to schools and districts. In 2018, the AOE hosted a PLP Platform Fair with mixed success. AOE will use the survey responses regarding PLP platforms to guide discussions around statewide investments and programming.

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What technology platforms are students using to develop their Personalized Learning Plans (PLPs)?

Tech Platform Students Use for PLP	School Responses*
Alpine Achievement	8
bulb	10
Canvas	22
Dreambox Learning	18
Google Suite	233
Naviance	43
None	16
Other	27
PowerSchool	26
SchoolHack/Lift	7
Undecide/researching	11

*schools could name more than one tech platform

Google Suite remained the dominant platform cited by schools to develop student PLPs. In the 2019 survey, Google was also listed as the most used platform, with only very limited use of other platforms by schools. Of interest this year is the emergence of Naviance. In 2019, only 15 schools cited Naviance as a platform used to develop PLPs. Naviance experienced almost a threefold increase in use by schools for PLP development in the 2020 survey.

Do you utilize the same tool or platform for PLPs to track proficiencies in your school?

Eighty percent of the schools reported they used separate tools and platforms for PLP creation and to track proficiencies.

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What system does your school use to track proficiencies? (PBGR) (open-ended question)

Alma	7
bulb	10
Empower	2
Google Suite	6
Gradebooks	1
Infinite Campus	16
JumpRope	27
MMS	1
Neo	5
Performance Matter	4
PowerSchool	109
SeeSaw	3
TeacherEase	8
VCAT	16
Web2School	11
Other	6

**schools could name more than one technology platform*

Do your proficiency tracking and PLP systems integrate together?

A majority of schools reported that their systems did not integrate. Currently, the AOE is exploring and hosting information sessions related to PLP and transcript integration platforms and will continue work to examine the systems used by schools for proficiency tracking and PLP creation to evaluate whether system recommendations are needed in this area.

Technology Education

Technology education is designed to teach students how to use technology, both through practical hands-on instruction on how to use hardware or digital platforms, as well as how to use technology to make meaningful learning experiences. The pandemic forced Vermont schools into remote learning environments and challenged students and educators on how to use technology effectively to further learning. The questions in this section examine how schools continue work to embed ISTE standards into curriculum and solicits experiential comments illustrating technology use.

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Given the adoption of the ISTE (International Society for Technology in Education) standards in 2017, how deeply is technology embedded in your school's curriculum?

How deeply is technology embedded in your school's curriculum? (1 is the lowest)

Rating	Count
1	0
2	23
3	151
4	75
5	20
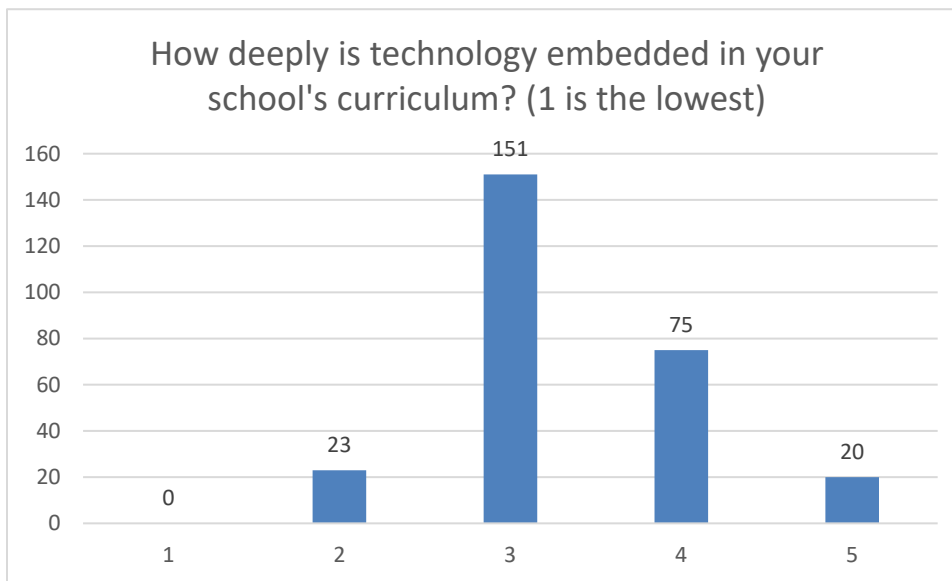
In 2017, the Vermont State Board of Education adopted the ISTE standards. The use and adoption of ISTE standards remains at the local level. In the 2020 survey, schools were asked to rate how deeply technology is embedded within their school's curriculum. A majority of schools (56 percent) selected a "3" to designate a middle ranking, while another 36 percent perceived technology to be embedded above the middle designation. Such responses indicate schools are working hard to incorporate technology education into curriculum. ISTE standards may be viewed at ISTE Standards for Students | Agency of Education (vermont.gov).

How has technology education been leveraged in your SU/SD to teach students how to use technology in meaningful ways? (open answer)

This question expands on the previous ranking exercise to solicit how technology is embedded within a school's curriculum. There were 215 responses to this question. There were 14 schools that were not sure how technology was used in meaningful ways. Below is a summary of the responses. Like responses were grouped within a single bulleted response. The AOE will include questions specific to Online Teaching Specialist endorsement and needs-based professional learning in the 2021 survey.

- Added computer classes.
- We have a program called "Technology Ambassadors" comprised of 5th and 6th grade students who are interested in helping out their school community and the world with their technological knowledge. To enter the program, students go through a mock job interview (ran by their peers) and must complete a project to showcase their skills. Students work together to solve real world technology problems at the school and throughout the community. These students often get to be the first ones to try new

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technology, and then lead by example and help and educate their peers on how to use new technology as well.

- By the use of one-to-one programs all the way through Kindergarten, classroom teachers have worked to extensively integrate (technology) into the classroom through tools like Google Classroom, Coding, STEM, interactive technology, video conferencing, and the availability of equipment and training.
- By utilizing the Substitution Augmentation Modification Redefinition Model.
- Daily routine.
- Day-to-day hands-on use and teacher-led practice.
- Each school has a technology curriculum.
- Expanded STEAM offerings in all grade levels, and expanded business department for HS.
- Given them the ability to watch lessons repeatedly to maximize retention. Flexibility. Creativeness.
- Highly embedded with G-Suite
- Implementation of two learning management systems, Canvas and SeeSaw. Our offerings are expanding to use VTVLC offerings. We have our initial implementation of iPads in the early grades. We have increased software cohesion among the elementary students.
- In-class learning involved G-suite; the transition to remote was very easy.
- Instructional coaches help classroom teachers incorporate technology into their lessons. We have embedded technology and supports at all levels.
- Integrated into lesson planning, students are shown how to use various tools.
- Integrating technology into classrooms has allowed teachers to customize learning based on student needs. Technology amplifies the role of the teacher by providing opportunities for collaborating, creating and reflecting. Digital citizenship is always on the forefront of discussions with staff and students.
- It's embedded across curricula.
- Most of the technology education has been around using the different tools and platforms being provided, and home communications.
- Our instructors work well with the ISTE standards of Innovative Designer, Creative Communicator, Knowledge Constructor, Digital Citizenship, Empowered Learner and Computational Thinking through the use of technology. It is a very long list of things we accomplish across grade levels.
- (Principal comment) Teachers are largely responsible for teaching students how to use technology in our school. During this time of hybrid and remote learning, teachers need to teach students how to use different platforms like Canvas, Seesaw, Dreambox and Lexia. We have a Technology Coordinator who works between three schools. She does not have the time to co-instruct. Her time is taken just doing the upkeep of keeping our IT up and running. We do not have a data manager in the district and our school does not have a Tech Integrationist. We do have 1-1 devices for students. Technology is used every day for instruction in terms of projecting and interacting.
- Principals Digital Citizenship. Teaching students how to use the best tool for the job.
- Supporting professional growth of teachers, instruction in coding at younger grades, Makerspace education.

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- Tech integrationists have formed close working relationships with classroom teachers as well as school librarians to identify and support the integration of technology into the school's regular instructional practices.
- The period of remote learning in the spring of 2020 accelerated our use of technology throughout the district and spurred innovation in a number of areas. Educators are using technology to organize and distribute assignments, and to capture student thinking. Additionally, the period of remote learning also created a number of opportunities for personalization using technology.
- Technology is integrated throughout the curriculum--Google Classroom and one-to-one laptops, Makerspace, Vernier sensors and data collection in science, video production in many classes, use of MS Office and Google suite is integrated across the curriculum.
- Universal Design for Learning strategies and assistive technology.
- We have implemented a Tech Committee last year which has representatives from the district who come together to plan how technology will better be integrated into our curriculum.

What professional development or resources are needed in your SU/SD to support your education technology program(s)? (open answer)

There were 187 responses, with 89 schools not responding. Below is a summary of the responses. Like responses were grouped within a single bulleted response. The AOE will use this information to provide guidance for future professional development offerings and resource development.

- One-stop shopping. Learning and data management that blends smoothly.
- A common technical proficiency curriculum state-wide would be great.
- A significant barrier to all professional development is devoting sufficient time. We rely on our technology integration coach, school tech teams, and librarians to stay abreast of emerging technologies and tools and often to provide and support the PD of colleagues.
- A statewide LMS or SIS (with a year or so of notice) would be greatly appreciated.
- Common platforms across the state would be incredible -- then resources and PD would be much more effective/efficient.
- Conferences.
- Continual professional development to stay abreast of new developments and needs. Continued focus on the time to implement these initiatives.
- Creation of tech integrationist position(s), professional development on resources such as G Suite, STAR, Seesaw, IXL, etc.
- Curriculum tech audit, embedded PD for universal practices, deeper UDL (Universal Design for Learning) implementation.
- Digital citizenship resources, internet safety resources for K-5.
- Funding.
- I don't know. COVID has really changed so many things.
- I think it is important to leverage what we learned in the spring of 2020 into practice during the 2020-21 school year. I also think that additional PD around personalization would be really helpful. Lastly, I believe that more statewide contracts for software (Seesaw, Zoom, etc.) and professional development in these areas would be helpful.

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- On-demand online offerings and virtual after school training sessions; funds to promote in-house mentoring programs.
- PD around flipping the classroom.
- (Principal comment) I believe the district is beginning the process of hiring another IT person so that our IT person can be at our school full time. I still think a data manager for the district would be important because the work of keeping rosters up-to-date and our student enrollment system, Powerschool, up to date is shared among many people but not really anyone's job. Therefore, we are always behind, and data is always inaccurate. A Tech Integrationist that could be shared among schools would be helpful to teach teachers how to use technology to its full potential. They are often just scratching the surface and flying the plane while they're building it. PD in all of the platforms we are using would be great. PD in how to teach remotely is essential. PD in how to utilize technology for learning, not just using technology for technology sake.
- User-based internet security, digital citizenship.
- Virtual teaching best practices and integrating technology at higher levels, integrating LMS.
- What are we supposed to be doing with Edmodo?

Computer Science & Makerspaces

In this section are questions related to both computer science and to makerspaces.

In the 2020 survey, AOE introduced new questions to specifically gauge whether computer science as a class was offered to students and specific instructional content. Computer science is the science that deals with the theory and methods of processing information in digital computers, the design of computer hardware and computing applications. AOE will use this information to better understand the work and needs of schools to further instruction in this area.

Does your SU/SD offer computer science courses? (yes or no) What grade ranges are computer science courses available?

There were 276 responses. Of those responses, 155 schools responded "no" they did not offer computer science courses and 121 schools responded "yes" they did offer computer science courses. Responses indicated the most common level for CS courses to be offered is at the secondary level, grades 9-12. Some schools also indicated they offered courses at the middle school level (41), and seven schools indicated CS courses were offered at the elementary level.

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What computer languages are taught?

Responses are from 121 schools that indicated they did offer computer science courses.

Computer Science Language Taught	Responses *
"Block-based (scratch, code.org)"	83
"Python Ruby"	53
AP CS	30
Basic	15
C-based	12
HTML	6
Java-based	32

schools could enter multiple responses

Regarding computer science and STEM activities, please check all that apply in terms of activities the SU/SD provides for students.

All but three of the 276 schools responding indicated they offered come kind of computer science and STEM (Science Technology Engineering Math) activities. Schools are offering a wide range of activities to engage students. The responses below mirror the top three responses from the 2019 technology survey. The top three activities remained the annual hour of code; other coding activities; and makerspace activities. Two activities that showed a marked uptick in engagement were robotics and technical education and design offerings.

Computer Science & STEM Activities	Responses*
After School/Computer Club	110
Annual Hour of Code Activities	217
Computer Club During School	35
FIRST Lego League Challenge	47
Makerspace	197
Other Coding Activities	211
Robotics	183
STEM, STEAM, STREAM Courses	154
Summer Offerings	95
Tech Ed & Design Offerings	139

schools could name more than one activity

If you checked off makerspace in the previous question, please check the appropriate boxes below to tell us more about it.

A makerspace is a collaborative workspace inside a school, library, or separate public/private facility for making, learning, exploring and sharing that uses a wide range of technical and non-technical materials for creative projects. Vermont schools remain engaged in creating and

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operating makerspace areas and using these spaces to promote learning throughout the curriculum.

Location/Status of Makerspace in School	Responses*
Makerspace is in our library/media space	107
No designated space in the school	90
Built/repurposed room in school	91
Planning a Makerspace within next year	15
We use a space outside of school	2

*schools could select more than one response

In your makerspace, please check the boxes to help us understand what equipment is available to students.

Response Choices	Responses*
3D Printer(s)	196
Laser cutter	96
Vinyl cutter	108
CNC Drilling/routing equipment	41
Power hand tools - drills, saws, etc.	95
Soldering or welding kits/materials	70
Papermaking or cutting materials	130
Sewing machines	89
Robotics - Dash & Dot, robot kits, etc.	164
Little Bits kits	85
Arduino and/or related tools	134
Not sure	5

*schools could select more than one response

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Appendix

AOE utilized a new survey platform called Cognito. Cognito enabled the online survey to be better coordinated at the SU/SD level. However, the format of the survey did not lend itself to a simple numerical progression of questions. Rather, depending on the response to certain questions, a respondent would be directed to a different screen to continue the survey. Below are the questions represented within the survey. Not all drop-down options are listed. Where applicable, drop-down options are represented in the main body of this report as the results are reported.

AOE Tech Survey 2020

Annual Technology Survey - Please complete by September 30, 2020. If you would like to preview the questions, you can find a pdf here: https://education.vermont.gov/documents/aoe-tech-survey-2020-2021.

- Name
- Email
- Phone
- What is your Supervisory Union or District?
- What is your title?
- Are you the primary contact for technology related matters at your SU/SD?

School specific data (Complete this section for All Schools in your SU by clicking "Add School")

School 1

- What is the name of your school?
- Which option most accurately describes the one-to-one status in your school?
- Before remote learning was put into effect, did your one-to-one program allow students to take a device home?
- As a response to COVID-19, has your school sent devices home to every student?
- As a response to COVID-19, are you allowing students to keep devices over the summer?
- Please provide an estimate percentage (%) by type of devices your school has for student use. (Please note that this question asks for percentages as opposed to whole numbers and the percentages need to add to 100%)
- How many devices do you have that are task or course specific (video editing/graphic design, CAD)?
- How many TOTAL devices are currently available for student use?
- Does your school currently have a Bring Your Own Device (BYOD) policy?

District Wide Information: Internet Service Provider, Wi-Fi, connectivity information

The remaining questions speak to district wide information.

- Who is the primary Internet Service Provider for this school?
- What is the primary connection type this school uses to connect to the Internet?
- What is your current upload speed (as advertised by your provider)?
- What is your current download speed (as advertised by your provider)?
- Is your connection shared?
- Does your school provide "Guest" or "Public" Wi-Fi access?
- Is there another location in the community to access free Wi-Fi?
- What is the typical cell phone coverage at the school?
- Do your SU/SD survey students to determine their home broadband access?
- Based on your survey data, what percentage of students DO NOT have broadband access at home?
- Is this information publicly available? Please provide a URL to a webpage or other resource.
- Do you have a list of student home addresses that have no/low broadband?
- Have you shared this with the Public Service Department?
- Please provide the list of addresses of students' homes that are not connected to broadband.
- What capabilities are there in your district/schools for in-classroom video/audio?

Supports and Platforms

- How have/will students/families receive IT support in a remote environment?
- Approximately what percent (%) of your IT services are currently situated in the cloud?
- What commercial automated calling system(s), if any, do you use for communication with your community in the event of an emergency?
- What technology platform does your school use for an SIS?
- What is your school's current LMS/SMS?
- What technology platforms are students using to develop their Personalized Learning Plans (PLPs)?
- What support would be helpful to you/your staff in continuing to develop the connections between personalized learning and technology?
- Do you utilize the same tool or platform for PLPs to track proficiencies in your school?
- What system does your school use to track proficiencies?
- Do your Proficiency Tracking and PLP systems integrate together?
- Prior to remote learning/COVID-19 what percentage of students participated in online learning?
- What provider(s) do you use?

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STEM/STEAM & Computer Science

ISTE Standards

- Given the adoption of the ISTE standards in 2017, how deeply is technology embedded in your school's curriculum?
- How has technology education been leveraged in your SU/SD to teach students how to use technology in meaningful ways?
- What professional development or resources are needed in your SU/SD to support your education technology program(s)?
- Regarding Computer Science and STEM activities, please check all that apply in terms of activities the SU/SD provides for students.
- Does your SU/SD offer computer science courses?

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