



K – 12 Technology Sustainability

Guidance for School and Community Leaders

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Introduction

Across schools, libraries, universities, and virtually every educational environment, access to technology has become essential to enabling and scaling personalized learning. This was the case before 2020, and the shift to fully remote learning during the COVID pandemic accelerated and expanded the use of technology for learning. In Connecticut, the State, local schools and libraries, colleges, and philanthropic organizations invested in computers, home broadband connections, instructional software, and training to support fully remote and hybrid learning. As one-time pandemic relief funding ends, institutions now face the challenge of sustaining the use of technology for teaching and learning — and the ongoing costs of doing so.

This brief provides context for and resources to enable ongoing investments in learning through the use of technology. The Commission welcomes feedback from readers in order to strengthen this guidance and provide additional resources to support leaders, teachers, students, and families.

Expansion of Educational Technology

Pre-Pandemic Levels

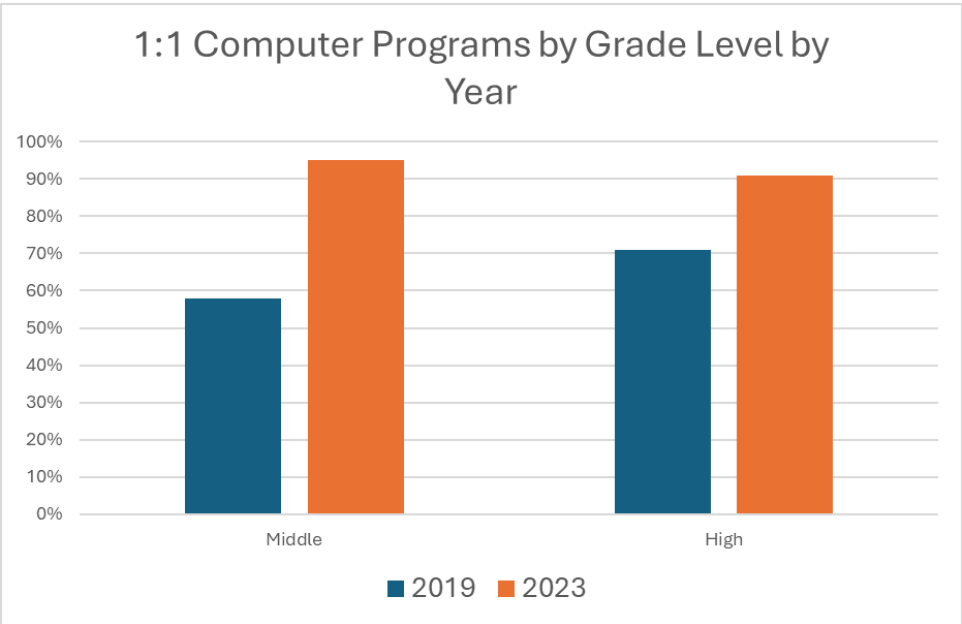
Contrary to the perception of many people, most schools had integrated and come to depend on computers and instructional software for learning well before the shift to remote learning in spring of 2020. For example, a 2017 Commission survey of schools indicated that approximately 70 percent provided computers on a one-to-one basis (“1:1 programs”) at the high school level and 58 percent at the middle school level. Even at the elementary (grades 3 – 5) and early elementary (PK – 2) level, 1:1 programs had a 43 percent and 20 percent adoption rate, respectively. And in terms of software use, the Commission’s LearnPlatform analytics platform showed more than [3,300 unique ed tech titles](#) in use across 50 school districts.

Remote Learning Expansions

With instruction moving online in March 2020, computers became available to any student in need of a device, with the state approaching a nearly 100 percent 1:1 ratio. Investments from the American Rescue Plan Act as well as the Dalio Foundation resulted in the rapid deployment of 144,000 computers. The State also made available home Internet connections through fixed, high-speed broadband as well as mobile, cellular hotspots. In the calendar year 2021, Commission data found districts using a total of 6,300 instructional software titles, nearly double the pre-pandemic total.

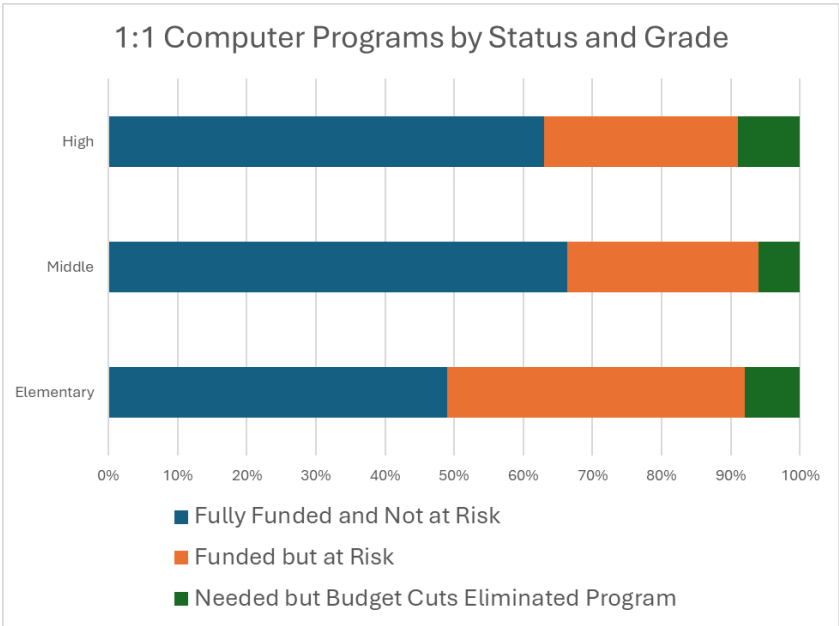
Current State of Ed Tech in Connecticut

Data collected from school districts in the summer of 2023 indicates that levels of student computer and software access remain high. A total of 29 school districts educating 153,196 students (30 percent of the statewide enrollment), 1:1



computer programs were still in place in 90 percent of high schools and middle schools. The use of software, as measured by total number of apps in use, decreased slightly from 2021 levels, with approximately 6,000 titles used by teachers statewide.

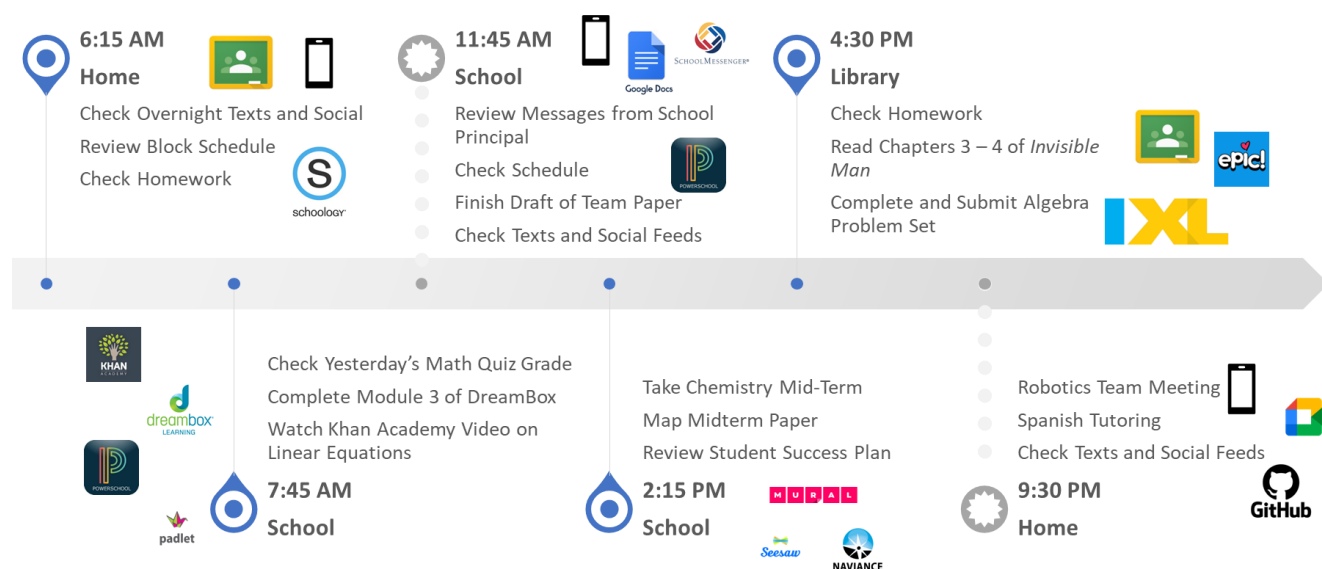
The same survey results from the summer of 2023 indicated that many of the student computer programs were at risk, despite high adoption rates.



Looking at computers alone, the collective cost to provide devices for all students totals \$168M (one-time purchase), or \$42M annually if purchased through a four-year lease.

Moving beyond the costs and unit totals of technology in schools, digital learning has become integral to teaching and learning. The average district uses hundreds of

apps to provide access to instructional materials and support grading, assessment, collaboration, project-based learning, and a host of other functions. The following diagram illustrates a typical “day in the life” of a student.



Anatomy of a K – 12 Technology Budget

Technology benefits and enables virtually every aspect of teaching, learning, and operations in schools. Given the expansion of and dependence on digital tools — especially through one-time pandemic investments — defining clear lines of a “technology” budget has become a challenge. To complicate the challenge of consistent budgeting, as of this writing, much of the hardware purchased with relief funding is nearing its end of life, imposing unusually large replacement costs on schools. Comparing investments across districts reveals different approaches to tracking investments, even for the same products. For example, one district may consider schoolwide math intervention software as a “technology” line item, while another categorizes it as “instructional materials.”

That said, leaders should be aware of the following general types of critical technology investments:

- **Student and Staff Computers:** Includes Windows, Chrome, and Apple devices as well as tablets. Deployment approaches can include one-to-one programs, in which all students receive a dedicated device for school and home use, “center-based” computers that remain in classrooms, or shared carts with sets of devices

for use across classrooms. Different staff roles (e.g., educators, administrators, business services staff) may require quite different computing capacities and configurations. Devices have a shelf life of between three and five years.

- Educational Software: On average, Connecticut districts use 1,640 educational software products (see [2023 Commission Annual Report](#)). These tools range in purpose from helping students master math and literacy skills to supporting the design of project-based learning. Many titles bring monthly or annual fees, and even “free” software has indirect costs in the form of technical support from district support teams.
- Enterprise Software: Beyond classroom-level, instructional software, districts depend on higher-level, “enterprise” products such as student information systems, assessment systems, learning-management systems, and notification systems. These platforms provide essential functions such as grade management, enrollment, transcript management, attendance, and mandated state reporting. Most also have a parent “portal” or app that provides transparency into student learning and achievement.
- Operational Software: Examples include food services, transportation (bus routing), maintenance ticketing, and fee-management.
- Classroom Technology: For nearly 20 years, the standard technology “build” in classrooms includes an interactive whiteboard and projector or digital display. Other elements may include classroom computers or tablets (see “Student and Staff Computers” above) as well as adaptive technologies such as audio enhancement systems.
- Phone Systems: From a hardware perspective, schools maintain the multi-function, Internet-based handsets as well as local and centralized public branch exchange (PBX) systems. Phones also depend on circuits or connections, often with backups in the event of Internet outages.
- Printing: As much as teaching and learning have gone digital, schools still need to print, especially at the lower grade levels. Classroom printers (see “Classroom Technology” above) as well as large, shared, multi-function devices in common areas fall into this category. Many districts have outsourced the management of these devices and services, switching to leased options and support on demand.
- “Internet of Things”: Consider Internet-connected infrastructure that manages HVAC and other infrastructure, down to cameras and other safety devices and software.
- School Networks and Security: All those computers that Connecticut invested in came back to brick-and-mortar schools after the pandemic. Ensuring proper wireless connectivity as well as the routers, switches, and internal wiring requires annual upkeep and capital replacement. Districts also need to have dedicated,

high-speed circuits to central offices as well as each physical location to meet the growing bandwidth needs of modern classrooms and school operations.

- Cybersecurity: Given the increased frequency, severity, and complexity of attacks against schools, districts must invest in cybersecurity hardware, software, training, and services.
- Back Office: Finance and human resources (“enterprise resource planning”) systems are essential to operations, purchasing, hiring and managing staff, processing grants, and ensuring that staff get paid and receive benefits.
- Professional Development: Virtually all of the above software and hardware types require initial and, often times, ongoing training and support to ensure these investments are used with fidelity.
- Staffing: Last but certainly not least, districts need qualified technology professionals to manage these digital investments. Generally these support levels remain razor thin. A [2021 Commission report](#) found that the average district has just more than five (5) team members supporting more than 1,000 devices each.

Opportunities for Cost Savings

The increased footprint of one-time and recurring costs, coupled with the tapering of federal relief dollars, calls for creative ways of ensuring sustainability in technology investments. The following sections offer ideas on ways school districts can assess and minimize technology spend while maximizing these investments.

Federal Programs

E-rate

The Universal Service Schools and Libraries Program, commonly known as “E-rate,” offsets the costs of connecting to the Internet and providing robust and secure internal networks. Now in its twenty-fifth year, this program uses fees on telecommunications services to provide connectivity and networking discounts of up to 90 percent for schools and libraries.

Steps you can take:

- Explore eligibility and your district or library’s eligibility, [past filings](#), and awards at <https://www.usac.org/e-rate/>
- Read the Commission’s 2019 report, “[E-rate in Connecticut: Survey Results and Opportunities for Schools and Libraries](#)”

Title IV-A: Safe and Supportive Schools

The federal Title IV-A program provides funding through the Connecticut State Department of Education to support access to a well-rounded education, improve school conditions for student learning, and bolster the use of technology for learning and digital literacy. This last priority represents an opportunity for Connecticut schools to leverage these funds for teacher professional development, among other potential investments. The Connecticut Department of Education administers the IV-A program, with 95 percent of funds going directly to local education agencies.

Steps you can take:

- Learn more about the Safe and Supportive Schools (Title IV-A) program at <https://safesupportivelearning.ed.gov>

State Resources

Education Technology Dashboard

District leaders can use the free tools made available from the Commission for Educational Technology to track educational technology usage. Through LearnPlatform (now part of Instructure), schools can collect and review real-time student and teacher data on digital tool usage. The “Ed Tech Dashboard” provides a number of benefits. It enables decision-makers to gauge the value of software investments, allowing for the reduction or removal of licenses that teachers and students do not use. The dashboard also enables instructional leaders to identify apps in use that may have broader benefits to the school community, encouraging open discussions on what works to support student achievement.

Steps you can take:

- Read an overview or schedule a demonstration of the [Ed Tech Dashboard](#)
- Easily deploy the toolset to gain real-time insights on ed tech spend and usage

Purchasing Efficiencies

State, regional, and other agencies provide a variety of tools to provide transparency and cost savings in purchasing. From the centralized and searchable database of contracts available from the Department of Administrative Services (CT Source) to cooperative purchasing through the Connecticut Education Network (CEN), Regional Education Service Centers (RESCs), and library associations, many resources are available to schools and libraries to streamline purchasing and appreciate cost savings.

Steps you can take:

- CT Source: Explore contracts posted through [CT Source](#), where Connecticut State agencies, towns, and non-profits may post procurement needs.
- Connecticut Education Network (CEN): The State's high-speed education network provides schools, libraries, and universities with competitive pricing on services from cybersecurity and monitoring on student devices to network management for school administrators. Visit www.CTEdunet.net for more information.
- RESC Alliance: Many of the six RESCs provide volume or cooperative purchasing services at the state level and as part of multi-state programs. Visit www.RESCAlliance.org to learn more about the technology purchasing options your RESC provides.
- Library Resources: While this report focuses primarily on K – 12 school needs, public and private library leaders have a host of resources tailored to their needs. Visit [Bibliomation](#), the [Connecticut Library Consortium](#) (CLC), [Library Connection, Incorporated](#) (LCI), and [Libraries Online](#) (LiON) for details about technology services and purchasing programs.

Free and Open Education Resources

In 2021, the Commission launched the State's open education resources (OER) portal, "Go Open CT." The site enables any educator in Connecticut to access more than 10,000 standards-aligned, high-quality instructional materials. These include full textbooks, courses, unit plans, instructional videos, and assessments. Leveraging these resources is now possible because of the investments in computers and high-speed networks as points of delivery. School leaders can look at cost savings in other parts of their budget — instructional materials, curriculum, etc. — because of the technology investments they have made.

Steps you can take:

- Create an account today at www.GoOpenCT.org
- Explore thousands of relevant materials that teachers can use in classrooms today, including the State Department of Education's [model curriculum](#)
- Use the collaboration and authoring tools to build courses for sharing across schools and districts, enabling one-time investments of time to offset annual third-party curriculum and materials costs

General Best Practices

In addition to the specific recommendations above, leaders should consider the following guidelines to ensure sustainable technology investments, with an emphasis on creating sustained and predictable capital and operational costs that do not depend on gifts, grants, or other sources of one-time funding.

- **Capital Replacement Cycles:** For hardware purchases, consider the realistic lifespan of computers, networking appliances, and other equipment. Consider purchasing waves of equipment each year to stagger costs and approach consistent hardware investments year over year.
- **Leasing:** As with capital replacement estimations, technology leaders may consider leasing equipment — especially computers — in order to maintain consistent and predictable spending.
- **Uniformity of Technology Choices:** Purchasing the same types of hardware over time can bring indirect cost savings. Technology teams must invest “sunk” time into learning how to manage computers (imaging, repair, and troubleshooting) as well as other types of equipment. For example, technicians may spend significant time in earning certifications in specific networking platforms, an indirect investment that districts must repeat if adding other types of switches, routers, and firewalls to their portfolio. And the costs of licenses (annual as well as startup) will increase and become more complex to manage by introducing different technologies into an education environment.
- **Indirect Costs:** As noted above, all technologies include “carrying” or indirect costs. These take the form of time for educators, leaders, and support staff to learn and master the use of new software and hardware. Districts should consider investing in the replacement of technology that requires significant support time, even if doing so requires capital outlays. Monopolizing limited human resources to avoid paying for new technology brings opportunity costs that may not appear on the bottom line of a budget but that impede innovation and effective use of digital tools for learning and administration.
- **Collaboration:** Peer sharing of agreements and advice via the Commission’s listserv and other channels offers informal but powerful benefits. In between the model of “going it alone” versus large-scale cooperative purchasing — which can take years to execute — is a less formal approach of simply sharing insights. Leveraging contract costs, scope, and terms across institutions represents a low-effort, high-impact means of making purchasing transparent and controlling costs.

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