LEADING EDUCATION INNOVATION

NAVIGATING STUDENT DEVICE 1:1 SUSTAINABILITY

Challenges and Solutions in a Post-Pandemic Landscape

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Introduction

This action-oriented report delves into the critical issues facing K-12 educational institutions in the wake of the COVID-19 pandemic, particularly in the realm of 1:1 student device programs. As educational technology evolves, schools encounter complex challenges related to sustainability, fiscal responsibility, and equitable access. The report identifies these challenges and offers innovative solutions to ensure the long-term viability of 1:1 initiatives. From extending the lifespan of school devices and navigating fiscal cliffs to uncovering hidden costs and fostering sustainability through various operational models, this executive summary provides a comprehensive overview of the report's key findings. By examining both immediate concerns and forward-thinking strategies, educational leaders and stakeholders will gain valuable insights into transforming emergency-driven actions into sustainable, intentional, and equitable digital learning environments.

Abbreviations

Abbreviations	Meaning
Background	
WHO	World Health Organization
CARES	Coronavirus Aid, Relief and Economic Security
CRRSA	Coronavirus Response and Recovery Supplemental Appropriations
ARP	American Rescue Plan
ESSER	Elementary and Secondary School Education Relief
IT	Information Technology
BYOD	Bring Your Own Device
LTE	Long Term Evolution
SEA	State Education Agencies
Methodology	
CIO	Chief Information Officer
CTO	Chief Technology Officer
Challenges to K-12 Sustainability	
EOL	End of Life
AUE	Auto Update Expiration
EOSL	End of Service Life
OEM	Original Equipment Manufacturer
LEA	Local Educational Agency
TCO	Total Cost of Ownership
MDM	Mobile Device Management
Sustainable Models	
OET	Office of Educational Technology
HVAC	Heating, Ventilation and Air Conditioning
SEA	State Education Agencies
DOE	(U.S.) Department of Education
IDEA	Individuals With Disabilities Education Act
ESSA/ESEA	Every Student Succeeds Act/Elementary and Secondary Education Act
DCL	Dear Colleague Letter
OSEP	Office of Special Education Programs
FCC	Federal Communications Commission
ACP	Affordable Connectivity Program
NTIA	National Telecommunications and Information Administration
BEAD	Broadband Equity, Access and Deployment Program

Executive Summary

Challenges to K-12 Sustainability

The Need to Extend Device Lifespan

1. Built-in expiry dates of school devices, otherwise known as end-of-life (EOL) dates, pose financial and environmental challenges as they necessitate recurring replacements.
2. It is recommended to form lifecycle plans based on the device's EOL, as using them past this point can compromise security and software functionality.
3. The real-world durability of these devices can differ from their promised lifespans, highlighting the importance of effective repair systems in schools to extend device life and reduce both e-waste and costs.

Easing the Fiscal Cliff

1. The "fiscal cliff" refers to the funding gap schools will face when Elementary and Secondary Schools Education Relief (ESSER) funds expire in September 2024, a situation exacerbated by the use-it-or-lose-it nature of the funds and other financial pressures such as declining enrollment and inflation.
2. More than 40% of Local Educational Agencies (LEAs) have used ESSER funds to address the digital divide, particularly through 1:1 device programs which are ongoing expenses rather than one-time capital expenditures.

Hidden Costs of a 1:1 Program

1. Implementing a 1:1 program involves hidden costs beyond device purchases, including supplemental accessories such as chargers and cases.
2. Repair parts, professional development, content applications, energy usage and additional staff are among the hidden costs associated with 1:1 programs.
3. CoSN's Total Cost of Ownership (TCO) methodology, including the TCO Assessment Tool, can provide insights to evaluate and manage the expenses of sustaining a 1:1 program.

Moving from Emergency Planning to Intentionality

1. Rob Dickson, CIO for Wichita Public Schools, highlights the importance of adapting quickly to meet digital equity and accessibility needs during emergencies.
2. Creative solutions, such as student tech teams, emerged as effective responses to immediate challenges and should be considered for long-term institutionalization in 1:1 programs.

Sustainable Models

Devices: An Operational Expense or a Capital Expense?

1. Traditionally, technology spending has fallen under CapEx due to historical budget models, but there are compelling reasons to consider shifting the purchase of replacement devices to OpEx for sustainability.
2. Funding devices through OpEx is more practical and aligns better with the recurring nature of technology expenses, offering a pay-as-you-go model that minimizes financial risk or waste for school districts.

Lifecycle Maintenance: Strategic Planning

1. Building a financially sustainable 1:1 student device program involves key considerations like stakeholder collaboration for input on device choice, inventory assessment to fill gaps and plan device lifecycles, and creating supportive policies for device management and disposal.
2. Data analysis is crucial for tailoring procurement plans, addressing digital inequities and maintaining fiscal responsibility.
3. Product review should consider device interoperability, EOL dates and repairability to ensure financially smart and sustainable device selections.

Repair Models[1]

1. This section discusses three repair models for school tech programs: Outsourcing Repairs, In-House Technology Teams, and Student Technology Teams
2. A hybrid approach may be best, taking into account factors like school size and tech needs. Data collection on device issues can help with identifying which repair system(s) to implement.
3. Engaging students in the technology repair process not only saves labor costs but also offers educational benefits, like college credits and certifications.

Available Federal Funding (Beyond ESSER)

1. This section outlines various federal funding sources beyond pandemic-specific funds like ESSER, targeting the enhancement of 1:1 digital programs in education.
2. Different government agencies such as the U.S. Department of Education (DOE), Federal Communications Commission (FCC), and federal programs such as the Affordable Connectivity Program (ACP) offer support, either directly by purchasing devices or indirectly by subsidizing internet connectivity.
3. Long-term initiatives like the Broadband Equity, Access and Deployment Program (BEAD) which provides broadband investments, and the Digital Equity Act which aims to tackle the digital divide, free up school budgets for other educational priorities.

Background

[1] PIRG's Right to Repair campaign advocates for laws that require manufacturers to provide consumers and independent repair shops with the means to fix products themselves. The goal is to reduce waste, promote sustainability, and break the cycle of constant consumption and replacement of electronics and other goods. Visit PIRG's Right to Repair page for more information.

One year after the official declaration of the COVID-19 pandemic by the World Health Organization (WHO), "by March 2021, 90% of district leaders provided a device for every middle and high school student, and 84% did so for elementary school students."[2] The pandemic brought forth an unprecedented amount of federal funding towards schools through various pieces of legislation: the CARES Act, CRRSA Act and ARP (see Abbreviations sections for complete names). These three acts included a portion of ESSER Grants with increasing amounts, respectively: ESSER I ($13.5 billion), ESSER II ($54 billion), and ESSER III ($122 billion). In total, the legislation allocated almost $190 billion of federal funds to schools. Many opted to fortify, implement, or expand 1:1 student device programs across all grade levels out of necessity due to various lockdowns and quarantine measures that precluded in-person instruction. The last of the federal funding, ESSER III from the ARP, is set to expire in September 2024; districts are bracing for the impending "fiscal cliff" when the funds are no longer available.

According to Futuresource Consulting, a market research consulting company, "[c]ombined spending on devices accounts for the largest share of school spending in 2021".[3] What will happen to 1:1 device programs—whether strengthened, expanded, or new—once emergency federal funding dries up in 2024? The aim of this CoSN report is to examine the challenges encountered by institutions when financing the acquisition of replacement devices and to propose sustainable solutions for school districts to maintain 1:1 programs at their achieved levels beyond the duration of the recovery funds that initially supported these initiatives.

1:1 Programs - Not Just Devices

Though the focus of this report is on replacement devices, it is important to note that 1:1 programs encompass much more than devices alone. The term "1:1 ecosystem" works to capture this expansiveness. The 1:1 ecosystem includes, but is not limited to, professional development concerning how to incorporate digital tools (software and hardware) into the curriculum, IT support, cybersecurity, student data privacy, and internet access both in-school and in student households. 1:1 also necessitates the creation of supportive policies such as an Acceptable Use policy, Device Repair and Loaner Device protocols, Device Replacement, insurance policies, and more.

It is impossible and unproductive to isolate devices from the larger 1:1 ecosystem. For example, what use are devices without internet access both at school and at home? How effective can they be without instructor training on their incorporation into the curriculum? Therefore, this report, though primarily centering around devices, ended up having a much broader scope.

Report sections that broaden the focus of replacement devices are as followed:

- Hidden Costs of a 1:1 Program
- Case Study 4 – Available Federal Funding

Post-Pandemic School Scenarios

[2] PowerSchool Group LLC, "Education Focus Report: Top District Priorities and Shifts in PK-12 Education," (2022): 74.

[3] Futuresource Consulting LTD, "EdTech Voice Outlook for Compute Devices," (September 2022).

Schools/school districts might typically identify with one of the following three scenarios related to when they first started their 1:1 student device programs. This section describes those three scenarios and what respective readers can look forward to getting out of this report.

1. Continuation (of an existing 1:1 Program)

This category describes schools that had implemented full-scale 1:1 programs prior to the pandemic. The majority of school districts fit into this category, according to CoSN's State of EdTech 2020 Survey which collected data from 500 K-12 institutions. Close to half (49%) of respondents "report having one device for each student…same as the prior year" (27). However, it is important to note that this survey defined having a 1:1 program with programs in which devices were either provided by district program or BYOD ("Bring Your Own Device"). Also, many of these 1:1 programs were in school only, and students may or may not have had the ability to take devices home. For these institutions, internet connectivity at school was the main cost/concern.

While other institutions may be concerned with how to continue their 1:1 program when emergency funding ends, Vince Humes, Director, Innovative Technology Solutions at Northwest Tri-County IU5, describes how schools that already operationalized 1:1 in their budgets might not have as much of a fiscal shift: "They were already funding all those things." Frankie Jackson, current Subject Matter Expert at CoSN and project director for the Verizon Innovative Learning Schools (VILS) program, describes these schools as having a smoother transition into virtual learning than those without a 1:1 program in place:

> "Those schools already had devices, they already had connectivity, they had already worked through the curriculum, they'd already trained teachers to work with students that were connecting from home."

However, although they were better positioned than schools that did not have a 1:1 program already in place before the health emergency, these school districts still went through significant transitions: "Many districts that had 1:1 programs in place found the devices to be 'woefully underpowered' to meet the demands of video streaming and collaboration tools".[4] CoSN's Student Home Connectivity Study Visual Data Story and Public Dataset has found that a significant percentage (over 85%) of network traffic in remote learning is used for video. It is expected that this will continue to be the case. [5]

With the pandemic and students learning from home, student household internet connectivity became a major challenge. For these institutions, internet connectivity at school was the main cost. It was not just about distributing devices to students but ensuring they would work without home internet, either in the form of having built-in LTE or providing supplementary hotspots. Schools also had to consider how much data was needed each month to support student learning virtually. That said, access to cell towers was not a given as they were nonexistent in many communities across the nation.

[4] The Consortium of School Networking (CoSN), "The State of EdTech Leadership in 2021," (2021): 36.

[5] "CoSN Home Connectivity - Visual Data Story and Public Dataset," Innive K-12 360°, last modified Dec 7, 2022, https://public.tableau.com/app/profile/jennifer.boronyak/viz/CoSNHomeConnectivityStudy-VisualDataStoryandPublicDataset1/CoSNStudy-VisualDataStoryandDataset.

Schools falling into this category may consider enhancing or upgrading their existing 1:1 programs. To that end, sections that may be most pertinent are as follows:

- Devices With Short Life Spans
- Hidden Costs of a 1:1 Program
- Case Study 2 – Devices: An Operational Expense or a Capital Expense?

2. Expansion (of an existing 1:1 program)

This category encompasses schools or school districts that had previously established 1:1 programs at some grades before the pandemic. These programs were subsequently expanded for other grades as an emergency measure for students to attend school virtually. Looking at 1:1 by grade level, CoSN's State of EdTech 2020 Survey reveals that 66% of High Schools and 69% of Middle Schools had implemented 1:1, while only 43% of Elementary Schools had done so. Just three years later, CoSN's [2023] report describes the expansion of 1:1 programs across all grade levels: "These percentages represent a significant increase in implementation since 2020."[6] These schools and districts are likely to be concerned with how to maintain their now expanded 1:1 program without ESSER or ECF funding.

Sections most pertinent to school districts in this category are as followed:

- Case Study 4 – Available Federal Funding
- Easing the Fiscal Cliff

3. Implementation (of a new 1:1 program)

This category describes schools that lacked a preexisting 1:1 program prior to the pandemic. Consequently, when transitioning to virtual instruction, they initiated such programs, often relying on emergency funding sources for implementation.

Schools in this category should read the report in full, but the most pertinent sections are as follows:

- Easing the Fiscal Cliff
- Case Study 1 – Moving From Emergency Planning to Intentionality
- Lifecycle Maintenance: Strategic Planning
- Case Study 4 – Available Federal Funding

It is important to note that recently, a roundtable discussion about the environmental sustainability of student devices was held by CoSN and SETDA. The discussion included industry stakeholders, State Education Agencies (SEAs) and school districts. One of the takeaways was that 1:1 is no longer the standard. In fact, 15% of districts now provide students with two or more devices.[7] To see a summary and takeaways from the conversation, please visit CoSN-SETDA Roundtable on the Sustainability of District-Issued Student Devices.

[6] The Consortium of School Networking (CoSN), "EdTech Leadership Survey Report 2022," (2022): 18.

[7] The Consortium of School Networking (CoSN) and The State Educational Technology Directors Association (SETDA), "Summary and Takeaways," CoSN-SETDA Roundtable on the Sustainability of District-Issued Student Devices, (August 2023): 2.

Methodology

To gather insights for this report, interviews were conducted with six current and former CIO/CTOs and with one director from a regional educational service agency. Furthermore, discussions were held with two individuals from the U.S. Department of Education's Office of Educational Technology. These interviewees were selected based on their extensive experience and expertise, ensuring a diverse range of perspectives. Interviews were conducted primarily through video conferencing software but were sometimes administered via email. Research for this report also drew upon relevant webinars and articles. Articles include past CoSN State of EdTech Leadership reports and other CoSN resources. These, among all other works referenced, are cited in the report for those interested in further reading.

A Note on Vendor Neutrality

CoSN is vendor neutral and does not endorse products or services. Any mention of a specific solution is for contextual purposes.

Key Findings

Despite the call to specific sections after each category, the entire report serves as a good starting point in thinking about and planning how to continue 1:1 (and growing trends for +2:1) programs at their current standing, or improved, after the September 2024 obligation deadline for federal pandemic response funding. There are two parts, with the first being "Challenges to K-12 Sustainability" and the second being "Sustainable Models." The report will close with a discussion on other funding streams that will continue to be available after emergency pandemic funding concludes next September (2024).

Challenges to K-12 Sustainability

This section includes three key challenges faced by institutions as they fund the implementation of replacement devices for students. "Challenges to K-12 Sustainability" aims to explore the challenges faced by institutions as they fund the purchase of replacement devices for students. This following portion first describes the impact of the planned obsolescence of devices, in the form of their EOL or Auto-Update-Expiration (AUE) dates, on school budgets. It then includes a discussion on the fiscal cliff that will be created by the conclusion of federal emergency funding in September 2024. The last challenge identified is not directly related to replacement devices. It highlights how the imminent obligation deadline will have a ripple effect on the 1:1 ecosystem as a whole, which includes the funding of replacement devices.

This section ends with a case study called "Moving from Emergency Planning to Intentionality." It demonstrates how challenges can sometimes inspire the implementation of innovative approaches. This case study serves as a great transition into the next part of this report called "Sustainable Models."

Before going into the challenges, it is important to understand the differences between End of Life (EOL) and End of Service Life (EOSL). EOL refers to the phase when a device is no longer in production by the Original Equipment Manufacturer (OEM), yet may still receive maintenance and post-warranty support, offering an opportunity for extended use. Conversely, EOSL marks a more definitive end point, where the OEM stops all forms of maintenance and support, often resulting in increased costs for any remaining support as well as potential issues like decreased performance and security vulnerabilities.

When considering devices that no longer receive updates past a certain date, they have usually reached their EOL status, indicating that the manufacturer will no longer provide automatic software and security updates. This is different from EOSL, where even basic support and maintenance are discontinued, but the device can still be used.

The Need to Extend Device Lifespan

End-of-Life and Auto Update Expiry have been a long-time concern of school districts due to the costs associated with replacements. A public advocacy group called Public Interest Research Group Education Fund (U.S. PIRG) wrote a report called the Chromebook Churn that argued how the built-in expiry date of Chromebooks presents both a financial and environmental challenge for school districts. In May 2023, CoSN and SETDA hosted a roundtable discussion with representatives from industry, state education agencies and school districts around K-12 device sustainability. The intent of this ongoing collaboration is to advocate for a new model that provides reliable, long-term, easily manageable technology for modern learning environments. Extending the lifespan of devices is one of the key priorities of this project.

Public conversations like the CoSN and SETDA Environmental Sustainability work and reports like PIRG's Chromebook Churn are beginning may be having an impact. As of September 2023, Google Chromebooks released before 2021 now come with a 10-year lifespan until their “expiration date,” significantly extending the time schools can use them before needing replacements. More broadly, built-in expiry dates across all devices can restrict how long schools are able to use them effectively.

In part two of this report, Sustainable Models, under “Lifecycle Maintenance,” CTOs suggest creating a lifecycle plan around the EOL date of devices. Using these devices past their EOL dates is not recommended due to the previously mentioned consequences. The arrival of the AUE date means the device will no longer receive software updates, such as security updates and bug fixes. This can impact the function of learning management applications and browser extensions.[8] Vince Humes mentions cybersecurity concerns when using devices after their AUE date.

Built-in expiry dates are identified as a key challenge in this report. They cause a strain on school technology budgets, as districts find themselves needing to purchase new devices whenever their current ones reach the end-of-life. "Expiration dates” also generate e-waste that schools must create a process to get rid of (this creates more of a procedural lift than a financial one as later in the report it is made clear that schools should not be paying for device recycling).

As mentioned previously, Google Chromebooks’ automatic update “expiration date” is now extended to 10 years for all Chromebook models released before 2021. According to the Chromebook blog post Chromebooks will get 10 years of automatic updates, the length of time Chromebook platforms (released before 2021) will receive automatic updates (10 years) is a longer commitment than any other current operating system offers. Given their prominent role in K-12 schools, this could have broader implications for the longevity of student devices as a whole.

It is worth noting that while devices may promise a certain lifespan, or a certain amount of time it will continue to receive updates, the practical reality can be different. Students can be rough on their devices, which can also lead to a shorter functional life than is theoretically possible. How an institution educates students and parents about device care and conducting routine “tech checks” can also impact

the life of devices. In the second part of this report, the section "Repair Models" features three different ways K-12 schools approach device repairs. Having a robust device repair system is key to increasing both the environmental and financial sustainability of your 1:1 programs as it reduces both e-waste and costs related to replacing the device entirely.

Easing the Fiscal Cliff

The term "fiscal cliff" describes the large funding gap created when ESSER funds are no longer available after September 30, 2024. The use-it-or-lose-it nature of the funds, meaning that the money must be committed by September of 2024, can make the cliff appear even steeper as schools scramble to "use it." Districts using ESSER III to fund capital improvement projects can apply for a liquidation deadline extension. This report is most concerned with 1:1 student device programs in which this deadline extension, where districts could have until March 30, 2026 to liquidate pandemic funding, does not apply.

Though the funding has an expiry date, many school districts have used some funding for ongoing or recurring needs. 1:1 device programs count as an ongoing expense due to many factors. Power cords and supplementary accessories such as styluses can be misplaced or damaged. As mentioned in the previous section, built-in expiry dates and students roughhousing with their devices are factors that drive the need for replacement devices. Additionally, licenses for learning management systems often come with annual fees. In other terms, 1:1 programs align closer to schools operating expenses (OpEx) rather than their capital expenditures (CapEx). The distinction between OpEx and CapEx is further elaborated in Case Study 2 in the second part of this report.

According to the Fiscal Year 2021 Annual Performance Report created by the U.S. Department of Education, of those that received ESSER funds, more than 40% of all Local Educational Agencies (LEAs) reported using them "to provide at least one type of home internet access to their students," including purchasing devices with built-in internet connection (11.8% of total LEAs that received ESSER funds).[8] These statistics reveal how emergency funding addressed the digital divide that existed before the pandemic. There was an imperative to do this because students could not participate in remote learning without a device at home with connectivity.

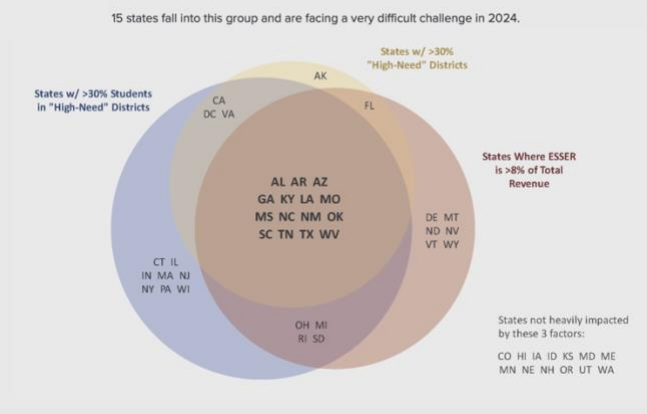
However, even after students returned to in-person instruction, CoSN's 2022 Home Connectivity Study found (Finding #1) that there was more internet usage during non-school hours compared to the hours when school was in session. Therefore, lacking or limited home connectivity should still be a large priority for district leaders as well as policy makers to confront—especially as students are experiencing notably reduced network speeds during non-school hours compared to school hours (Finding #2).[9]

The fiscal cliff does not exist in a vacuum, and other pressures can shape the trajectory of its decline. For example, many school systems are also facing declining student enrollment which equates to decreased state funding. This makes the cliff "steeper," as regular budgets will be lower upon the conclusion of emergency federal funding. Additionally, many school systems are spending more on supplies and other

[8] U.S. Department of Education, Office of Planning, Evaluation and Policy Development, "Fiscal Year 2021 Annual Performance Report," Elementary and Secondary School Emergency Relief Fund, (December 2022): 9.

[9] Innive K-12 360°, "CoSN Home Connectivity - Visual Data Story and Public Dataset."

operating expenses due to inflation. Also, states that received more federal aid will face a steeper fiscal cliff. See the Venn diagram created by Education Resource Strategies below:



(left: *Education Resource Strategies*[10])

Hidden Costs of a 1:1 Program

The implementation of a 1:1 program goes well beyond simply purchasing devices. It requires the adoption of an entire infrastructure that supports technology-enabled learning. Supplemental accessories, professional development and the creation of policies are the hidden costs (or lifts) involved with the implementation of a 1:1 program. Frankie Jackson shares the metaphor: "Technology is like paying for utilities. [Likewise,] when you buy a car and you've got to buy gas." CoSN has a known methodology called Total Cost of Ownership (TCO) that enables you to evaluate and comprehend the expenses associated with obtaining and sustaining a 1:1 program, including networks, computers, devices and personnel.

Supplemental accessories include chargers and cases. Desert Sands USD Superintendent Dr. Kelly May-Vollmar shares that starting in 7th grade when students receive their Chromebooks, they also receive an industrial protective case. Not all students received a case originally, but upon noticing increased breakage starting in 7th grade, the district invested in cases to mitigate repair costs. Wichita Falls CIO Rob Dickson also expresses how middle school students are harder on the devices and therefore receive thicker cases than elementary students. These examples reveal the importance of tracking device repairs per grade level as part of a robust and broad asset management system, as the data can reveal where cost-saving measures can be implemented.

In addition to supplemental accessories, repair parts should also be available for IT or other computing device support teams to use to fix broken devices. Yorkville CUSD Executive Director of Technology Don Ringelestein urges school technology leaders to be aware of all of their options in sourcing parts. He mentions buying directly from wholesale stores in bulk if the demand justifies it. Holding professional development sessions on how to integrate devices into the school curriculum is another cost to keep in mind. Other hidden costs related to 1:1 programs can include content and curriculum specific applications, energy usage, and additional staff.

[10] Education Resource Strategies, "Here's Why Some States Are Facing a Steeper ESSER Funding Cliff in 2024," Tools and Publications, last modified March 28, 2023, https://www.erstrategies.org/tap/analysis_esser_funds_fiscal_cliff_by_state.

Lastly, a substantial hidden cost is the impact of devices on Mobile Device Management (MDM) licensing. MDM is a software-based technology that allows organizations to manage, secure and monitor mobile devices across a network. Depending on the specific device, either a one-time or annual license may be required for its management. For subscription-based licenses, state regulations could restrict the utilization of capital expenditures, thereby impacting operating expenses.

CoSN has designed a tool that helps those planning a technology landscape in their districts with understanding all the associated costs. The CoSN Total Cost of Ownership (TCO) tool previously referenced includes an overview of it as well as tips and recommendations for performing your own TCO assessment. It includes the following three resources you can immediately use. They can be downloaded with these following links:

- TCO Assessment Tool
- Indirect Labor User Survey
- TCO Example Workbook

Case Study 1 – Moving From Emergency Planning to Intentionality

This case study features remarks from Wichita Public Schools CIO Rob Dickson, who elaborates on reactive versus purposeful reactions to starting 1:1 student device programs. This case study reveals how adversity, like the COVID-19 emergency, can sometimes encourage the adoption of creative solutions, such as the use of student tech teams. It can be productive to reflect on solutions implemented during the pandemic to determine which should be institutionalized and supported (financially or otherwise) for the long term.

Dickson describes shifting intentions and employing creative solutions during a highly volatile time. Dickson came to Wichita in August 2019, and was involved in building out a 1:1 program that was to be gradually implemented for three years. When the COVID-19 health emergency hit in March 2020, it necessitated an overnight rollout of a comprehensive 1:1 program for all grades.

Implementing an Accelerated 1:1 Program

Dickson described the start of a comprehensive vetting process for computing devices to support the different schools in the district that had varying computing needs. In the summer of 2019, he set up a laboratory where he had five different styles of computing devices with several different vendors per type of style. Students were invited to try out various devices and to share their thoughts. However, with the start of the pandemic, this process had to be fast-tracked without sacrificing the ability for the device to meet instructional needs.

Before the health crisis, Dickson's team was considering the allocations for each grade and school to be distributed and scaled gradually. With quarantine and lockdown measures, there was a new "classroom:" the student's home. The priority shifted to getting students connected to school as quickly as possible to mitigate instructional interruption.

When asked about the main difference between the 3-year plan to implement a 1:1 program versus an accelerated plan to the same end, Dickson answers: the intention. Where previously each curriculum

aligned to different grade level ranges could have informed a deliberate and specific purchase of a device that aligned with educational goals, the emergency called for a more universal, one-size-fits-all approach to device selection. Availability and accessibility emerged as being the most important criteria for devices.

The priority Dickson underlines is one of digital equity and access. He elaborated on the kinds of accessories that make a device support digital equity and accessibility. The district landed on devices that had built-in LTE connection, so students without access at home could get online with their district-issued device. For pre-K through third grades, they went with an iPad with built-in LTE connection. For fourth through twelve grades, they also had a device with a built-in LTE card. The built-in LTE cards supported digital equity and access, as the school, through ESSER funding, was able to provide internet access to families that lacked it.

Before the pandemic, Wichita Public Schools had applied and been accepted to be part of Verizon Innovative Learning Schools (VILS) cohort. This meant that all twelve middle schools that had Title I status received iPads with service from Verizon for their students.

A 1:1 program goes beyond the mere provision of devices to students; it encompasses a comprehensive infrastructure of technology support. Dickson describes a process of turning inspiration into creative solutions during an emergency. He described the VILS schools as “lighthouse schools” because they offered guidance and direction to other (non-VILS) institutions in the district. Thanks to being part of the Verizon cohort, these schools served as beacons, helping to implement new technology effectively. Using student tech teams at the high school level was in part inspired by the VILS model that had implemented such teams at the middle schools.

These student tech teams were a creative solution that fulfilled needs that could not be covered by the district’s technology repair staff. “Had we taken the three years to do so, I could have hired additional staff to support 1:1...I didn’t have time, so out of necessity, we built a student tech team,” says Dickson. The use of student tech teams arose as an emergency measure but proved to be highly effective in both supporting the 1:1 program and enriching student’s knowledge of technology. Later in this report is a further description of student tech teams as well as other repair models. This pandemic strategy turned into a positive and sustainable solution that benefited both the students and the school. In today’s post-pandemic landscape, it is important to institutionalize such supportive measures.

Sustainable Models

This second part of the report is concerned with sustainable solutions to the previously identified challenges. A working definition of sustainability comes from a webinar hosted by edWEb.net called Plan for Technology Sustainability with your COVID Relief Funds. It reads as follows: "...the active process of establishing your initiative—not merely continuing your program, but developing relationships, practices, and procedures that become a lasting part of the community."

We start with a case study that argues for the consideration of funding towards the 1:1 ecosystem as an operational expense rather than a capital expense. This report also discusses five important considerations when strategically planning or upgrading your district's current 1:1 program. These factors are elaborated upon to explain their significance in fiscal and, sometimes, environmental sustainability. Subsequently, this report describes three different repair models that can be employed individually or in combination. The report concludes by highlighting various funding streams available now and in the future once emergency pandemic funding ends. Insights come from a conversation with Kristina Ishmael, the Deputy Director of the U.S. Department of Education Office of Educational Technology (OET), and Ji Soo Song, Digital Equity Advisor at the OET.

Case Study 2 – Devices, an Operational or Capital Expense?

As the report is concerned with financing replacement devices once federal pandemic emergency funding concludes, it is important to examine the different categories that expenses fall under. This section will first define what operational and capital expenses are, and then make the case for technology funding to be under the former, if possible. "Operational expense" and "capital expense" can be abbreviated to "OpEx" and "CapEx," respectively.

Capital expenses are often non-recurring large purchases. Capital expenses are often non-recurring large purchases. CoSN's blog post *Technology Budgets: Moving from Capital Expense (CapEx) to Operational Expense (OpEx)*, which is available to members only, gives examples of what typically falls under capital expenses. These include "fixed physical assets such as buildings, busses, servers."[11] Operational expenses generally cover recurring costs: "they are predictable expenses that are predicated on a pay-as-you-go model."[12]

Traditionally, technology spending has been under CapEx, and this could be due to how "many IT budget models pre-date the advent of leasing and cloud computing and were implemented when computer equipment costs were extremely high."[13] There are a few reasons to shift the purchasing of replacement devices to part of operational expenses, especially when considering sustainability.

[11] The Consortium of School Networking, "Technology Budgets: Moving from Capital Expense (CapEx) to Operational Expense (OpEx)," accessed September 26, 2023, https://www.cosn.org/technology-budgets-moving-from-capital-expense-capex-to-operational-expense-opex-2/.
[12] The Consortium of School Networking, "Technology Budgets."
[13] The Consortium of School Networking, "Technology Budgets."

Staying Current with Technology

Capital assets (such as buildings, HVAC systems, etc.) are typically acquired with the intent of using them for an extended period, often spanning several years or even decades. This short lifespan of devices poses a significant challenge, as highlighted in the "Challenges" section of this report. Vince Humes of Northwest Tri-County IU5 describes how using capital expenses for devices might not be the best fiscal decision, as districts may continue to make bond payments even after the devices have become obsolete. However, Humes is aware that some districts may not have had a choice but to fold technology budgets under capital expenses. In such cases, one should be sure to consider how long a device will be used by the district and then maximize its useful life.

CapEx involves significant upfront investment in long-term assets. It is not sustainable to purchase a bulk number of devices with capital funding. The consequences of buying devices in bulk are expanded upon in the report's first blog post titled "Stagger System for Purchasing Devices." This blog describes a purchasing model that staggers the EOL of different batches of devices so that they do not go out of commission all at the same time. Instead, one batch or wave at a time reaches EOL; therefore, only a fraction of the total number of devices needs to be replaced at a time. Through OpEx funding, schools can spread costs over time, avoiding large upfront investments that may be burdensome for budgets. This approach offers greater flexibility and enables schools to regularly refresh and update devices to keep pace with technological advancements.

Consistency

Don Ringelestein also advocates for the use of OpEx budgets to fund 1:1 initiatives. He highlights the challenges associated with securing capital funding for what is really a recurring expense. Ringelstein questions the sustainability of having to repeatedly seek approval through referendums or bond measures from voters to maintain ongoing 1:1 device programs. District leaders might have to ask themselves, "To what extent is 1:1 here to stay?" when considering between using CapEx or OpEx to sustain it.

Placing devices under operational expense budgets aligns better with the practicality of student devices. These devices inevitably undergo wear and tear by students, necessitating ongoing repairs and maintenance. OpEx, based on a pay-as-you-go model, promotes sustainability by procuring replacement materials like screens and keyboards on an as-needed basis. This approach minimizes the risk of overcommitting capital funds (CapEx) for device repairs or replacements.

As with any recommendation, it is crucial to ensure that the decision between funding 1:1 with CapEx or OpEx is the right fit for your particular district. For further reading, please see *Technology Budgets: Moving from Capital Expense (CapEx) to Operational Expense (OpEx)*, prepared by CoSN:

- Technology Budgets: Moving from Capital Expense (CapEx) to Operational Expense (OpEx)

Lifecycle Maintenance: Strategic Planning

The following describes five important considerations when building out a financially sustainable 1:1 student device program. They are as follows, listed in no particular order:

1. Stakeholder Collaboration
2. Inventory Assessment

3. Product Review
4. Device Management and Disposal
5. Policy Development

Stakeholder Collaboration: Including a variety of perspectives in every part of the planning process supports financial sustainability in many ways. It is essential to align the program with the needs of various stakeholders, including individuals from the IT department, curriculum specialists, and most importantly, the students who will be the primary users of the chosen devices.stating, "We've got to figure out if what we're buying is really working for people." Getting input on what device to purchase can be done by seeking feedback from student body organizations within your school(s).

Educational IT professionals can give input on what kind of device is interoperable with the learning software that schools or districts already employ. Without their participation, schools risk purchasing a device that is not compatible with the learning software that they might already have contracts with. Therefore, their device of choice was not a financially sustainable one, as they might need to either buy a compatible one or commit to using a different learning software. They also can weigh in on the extent to which the device is repairable and how easy or not it is to source replacement parts. The consideration of repairability will be expanded under "Product Review" in this section.

It makes smart financial sense for curriculum specialists can give input on what capabilities a device should have. For example, different grade groups within schools can have varying computing needs. CIO Rob Dickson describes how K-3 students need a lower level of computing than a 4th or 5th grader who might be starting to learn keyboarding skills. It is not cost-effective to buy a device with a high level of computing for all grades, as elementary school students do not necessitate such advanced capabilities compared to higher grade levels. Like the IT professionals, they are also knowledgeable on what learning software is being used in their classroom and can advocate for an interoperable device.

Inventory Evaluation and Data Analysis: Taking inventory of current devices that are circulating in your current 1:1 program is crucial to understanding what gaps need to be filled currently and in the future. Records that must be maintained include, but are not limited to, the device's serial or other identification number, the student/employee it is assigned to, its EOL date, its current condition, and funding sources (and the percentage of cost paid by source). State Education Agencies (SEAs) and Local Education Agencies (LEAs) are required to efficiently manage and be responsible for all finances, belongings and additional resources they receive. All assets must be properly accounted for and ensure that they are only used for approved objectives. For inventory purchased with federal funds, see Code of Federal Regulations.

Knowing the EOL date of the current devices in your possession allows you to plan the procurement of future devices. Blog 1 of this report, titled "Stagger System for Purchasing Devices," identifies the best practice to purchase devices in waves corresponding with staggered end of use so that devices do not reach their end dates at the same time. This makes it easier to manage costs by only needing to replace a fraction of devices that have reached their end date, instead of making a large one-time purchase for all devices at once. Registering the funding source is also important. If devices are purchased using title

funds, there are rules about their required usage period and how to handle them once they are no longer in use.

Part of this stocktaking process should be understanding the digital landscape of your students. This can take the form of a survey sent home to families to complete. Another way to assess your students' digital environment and identify gaps in digital access include toggling through CoSN's new Digital Equity Dashboard.This Dashboard consolidates data from multiple national datasets into a single interface, enabling you to perform a needs assessment for strategic planning. District leaders can search their schools by county and zip code. From there, one can see various data points. The ones that are the most pertinent in device procurement are: % without a computer, % without internet, and 2022 download and upload speed.

To give an example, Mississippi's Holmes County might have more of a need for devices with built-in LTE as 49.7% of the population is without internet, according to the Digital Equity Dashboard. In Mississippi's DeSoto County, only 11.1% of the population is without internet. Therefore, schools in DeSoto might have a reduced need to invest in as many LTE devices compared to what might be necessary for Holmes County. By tailoring procurement plans to actual needs revealed by data, schools can address digital inequities while maintaining fiscal responsibility.

Through evaluating your current inventory, conducting surveys with families and analyzing available data, institutions can make informed financial decisions in developing their 1:1 program.

Review Products: Different schools within districts have distinct needs. For example, Dr. May-Vollmar shares a cautionary tale where students in the district's virtual school received the same devices as in-person students. It quickly became clear that the students enrolled in the virtual classrooms needed a different device to accommodate more space for downloads. Ultimately, the students received a device with a larger screen and more storage space. As mentioned before, it is important to choose a device that is compatible with learning needs, including the required software and applications used by your school(s). Interoperability is also key for the smooth functioning of the device in your district's educational environment.

The following two functions of a device are particularly important to the end of financial sustainability: its End-of-Life (EOL) date and its durability and repairability.

Device's End-of-life (EOL) Date

It is important to note that two different devices may be released at the same time, but one could have a later EOL date than the other. When reviewing products, the EOL date should be considered for various reasons. For example, does the device of choice have the same EOL as other devices in your inventory? If so, the consequence will be that they both go out of commission at the same time, necessitating a larger replacement purchase than if their end dates were staggered. See more in Blog 1, which is included in this report. Understanding EOL allows schools to plan device procurement strategically.

While EOL dates are commonly announced by manufacturers, EOSL (End of Service Life) dates are less standardized and may not always be publicly declared. EOSL is often more fluid and may depend on a variety of factors, such as existing service contracts, availability of replacement parts and the manufacturer's ongoing support policies. For the latest EOSL details, it is best to consult directly with your service providers.

Durability and Repairability
Dr. May-Vollmar described experimenting with dropping devices and overextending computer screens when vetting out devices to see how they would withstand expected roughhousing by students. When assessing the repairability of a device, inquire with the manufacturer on whether repair parts are readily available and if the device lends itself to easy repairs. It is also important to find out if utilizing technicians that are not certified by the vendor could void the warranty. As mentioned before, collaborating with educational IT professionals gives insight into this process of assessing a device's durability and repairability.

Device Management and Disposal: Instead of reinventing the wheel, perhaps **s**ee if your district already uses an asset management system that has the capability to keep track of student devices. For example, some districts use library software for checking out devices.

Regarding device disposal after all student data has been removed from the device, Don Ringelestein suggests, if not established already, to develop a good relationship with an organization that recycles devices in bulk. He expresses that, "You should not be paying anybody to recycle. You should be getting money from devices your district is no longer using." Though, he also points out that in some small or remote districts, this may not be an option.

Peter Robinson, Technology Director at Auburn School Department, shared advice on reselling devices before they become obsolete. He describes the importance of timing when reselling devices, noting that selling three to four-year-old devices can recoup 20-25% of the cost for new ones.[14] Finding the right time to sell can be a challenging balance between maximizing resale value and incurring the cost of new devices. Visit Sustaining 1-2-1 Programs By Selling School Devices for further information and advice.

The Technology Sustainability Toolkit, provided by Digital Promise and Verizon, considers the residual value of devices. Residual value is the estimated worth of an asset at the end of its useful life.[15] In terms of student devices, it refers to how much it can be sold for when the district stops using it. The Toolkit describes how certain products could experience periods of high resale value, during which there might be an ideal window for exchanging old devices for newer ones.

Create Supportive Policies: Building out expectations on how the devices should be used and outlining clear processes for getting a device repaired will support the longevity of devices. Clear policies that

[14] Erik Ofgang, "Sustaining 1-2-1 Programs By Selling School Devices," Tech and Learning, June 9, 2023, https://www.techlearning.com/how-to/sustaining-1-2-1-programs-by-selling-school-devices.

[15] "Residual value definition," Accounting Tools, July 29, 2023, https://www.accountingtools.com/articles/the-residual-value-calculation.html.

outline acceptable behaviors, responsibilities and consequences for misuse can help to prevent future misunderstandings and ensure all parties know how to responsibly interact with technology. Guidelines can support the sustainability of a 1:1 program, as they can minimize the risk of device damage and also provide a structured approach for addressing such issues when they arise.

Blog 3 of this report, titled "Insurance for Student Devices," expands on the key attributes of insurance policies employed by Wichita Public Schools, the largest school district in Kansas.

The following are relevant resources either mentioned or not mentioned in this section.

- Digital Equity Dashboard
- CoSN's Lifecycle Replacement Planning document

Case Study 3 – Repair Models

One of the takeaways of the CoSN-SETDA Roundtable on the Sustainability of District-Issued Devices is the growing concern over device breakage. Certain districts are seeing a notable increase in device damage compared to pre-pandemic levels. The roundtable summary report cites a May 2022 *EdWeek* article that identified nearly half (43%) of district administrators indicated that student-caused device damage was a significant issue.[16] All school community members should be well-informed about the device repair procedure to ensure a quick turnaround.

Device repairs are crucial for the sustainability of 1:1 programs, as they extend the lifespan of devices. This reduces the need for frequent replacements and minimizes electronic waste, which aligns with environmentally responsible practices while enhancing cost-efficiency. This section describes three different repair models, and districts are not limited to just one but rather a combination of them. For instance, when faced with a repair challenge beyond the capabilities of an in-house tech team, outsourcing can provide a solution for fixing the device. Alternatively, so perhaps an in-house tech team could advise a student tech team and train them to fix lower-level repairs.

Figuring out which model(s) is best for your district depends on a myriad of factors, including school size and the school's technology layout (i.e., does the institution have a tech-heavy instructional model?), among other factors. If not done already, it is important to collect data on the kinds of repairs being made on student devices to see if there are any trends. Synthesizing this data can impact decisions, such as the procurement of a protective case to prevent a common kind of breakage in the first place. It can also lead to revising acceptable use policies the following school year to mitigate common accidents observed.

[16] Kevin Bushweller, "What the Massive Shift to 1-to-1 Computing Means for Schools, in Charts," Education Week, May 16, 2022, https://www.edweek.org/technology/what-the-massive-shift-to-1-to-1-computing-means-for-schools-in-charts/2022/05.

1. Outsourcing Repairs

Some school districts choose to outsource repairs if the volume of devices to be repaired coming in is too large, or too complex, for an in-house technology team to handle. Consider if it is more cost effective to outsource device repairs. Part of this requires analyzing the type of breakage happening to student devices. To see if this repair model is necessary, school leaders should ask themselves if an in-house tech team can accomplish all IT priorities each year while addressing repair needs. Keep in mind that the repair company you choose to collaborate with might have expanded capabilities compared to your small, in-house technology team. In addition to repairing devices, outsourced technicians might be able to give operational and fiscal advice relating to your school technology landscape.

As described in this section's introduction, a hybrid approach (employing more than one kind of repair model) might be what fits best for your needs. Support can be outsourced during specific times of the year, such as during a summer refresh of devices (and in setting up new devices) in preparation for the next school year.

2. In-House Technology Teams

Ringelestein, CIO of Yorkville CUSD, speaks to an in-house technology team model at his previous district. Every school in the district handled repairs internally through what was called the ChromeDepot. The ChromeDepot is made up of the district technology team as well as students. Ringelestein compares the ChromeDepot to the Geek Squad from Best Buy and describes it as a walk-up service that students could access during the school day.

The key elements that make ChromeDepot and other in-house technology teams a success are:

- **Sufficient Loaner Inventory:** It is important to have enough loaner computers to give out to students so that their instruction is not interrupted while their device is being repaired.
- **Cloud-based Programs:** Ensuring your learning programs are cloud based so that when a student's device is compromised and in the process of repair, they are able to access their work from a loaner device. Opting for cloud-based programs is beneficial to all the different kinds of repair models, not just in schools where there are in-house technicians.
- **Centralization of Tech Support**: Technology support provided by the ChromeDepot is not just for students but also staff and parents. This streamlining of technological support is efficient and ensures consistent assistance for all.
- **Leverage Student Support:** Leveraging support from students provides those students with hands on learning and the potential to earn certificates or college credit. With students handling lower-level repairs, schools can potentially save on labor costs.

In addition to the ChromeDepot, Maine Township High School District 207 has a technology support webpage with distinct information for employees, parents and students. This webpage includes various written and video tutorials on frequently asked questions. For students, there are various relevant articles on topics such as how to uninstall a Google Chrome Extension and troubleshoot charging issues. A webpage for users offers several benefits. First, it empowers students and teachers/staff to independently solve technology problems, which in turn fosters digital literacy. Second, users resolving minor issues themselves can work to lighten the workload of an in-house technology team.

3. Student Technology Teams

CIO Rob Dickson describes being inspired by how the schools in his district that were part of Verizon Innovative Learning (VIL) employed the use of student technology teams. He observed the benefits that came with being involved with a technology team. Students who are a part of a technology team are able to have an experimental learning experience while gaining valuable industry skills. Seeing these benefits, Dickson was inspired to start student technology teams at non-VIL schools.

Two years ago, Dickson's district started a program for high school students where they could serve as part of a technology team for other Wichita Fall schools. In the past year, the team made up seventeen students. Being part of this technology team, they become dual enrolled in Wichita State University in applied learning and are therefore able to earn college credit for their work. They also get paid $15 an hour for their labor. See if there are opportunities for students to earn certifications for their involvement in a student technology team.

A student technology team can be employed, along with any of the other repair models, as a first resort for lower-level repairs. There should be a teacher or staff member guiding and supervising these students. Training students on how to troubleshoot has its own unique benefits. For example, when a classroom issue like a projector problem occurs, having a student with troubleshooting skills already present in the room reduces instructional disruption compared to the delay of retrieving a technician from the office to resolve it.

For further reading on student technology teams, see the Toolkit linked below presented by Digital Promise and Verizon:

- Student Tech Teams Toolkit

Alternative Student Participation

There are other ways students can participate in supporting 1:1 programs in addition to students being part of technology teams. Superintendent May-Vollmar gives the example of tapping into student content creators to make instructional videos on acceptable uses of a student device. One of the middle schools in her district had a broadcast journalism class. She suggests not reinventing the wheel and, instead, tapping into groups that already do the work you are looking for, as part of their coursework or otherwise, such as creating films or graphic design.

Involving students in creating and starring in the videos can potentially connect them with their peers more effectively than having a district CTO deliver the same information. May-Vollmar suggests there could be more buy-in from students seeing their classmates, rather than a CTO they might not have seen before, disseminate information on device care.

District leaders shared a script with broadcast journalism students to ensure the video effectively covered all the necessary points. This video is shown at the beginning of the school year during the orientation period. The video, titled "Chromebook Care," addresses where to check out their device and tips for its maintenance. Tips include how to keep it clean, how to charge (and the importance of having it charged for the school day), how to hold it safely and more.

In the video, much of the advice is proactive, which is significant in reducing the incidence of device damage.

- Chromebook Care Video (2019) presented by Desert Sands Unified School District's YouTube channel

Case Study 4 – Available Federal Funding (Beyond ESSER)

The COVID-19 pandemic exposed glaring issues of digital equity and access. Enough so that in 2022, the United States' State Department issued a Declaration for the Future of the Internet. The section titled "Inclusive and Affordable Access to the Internet" in the Declaration highlights a principle aligned with the U.S. vision for a free, open and inclusive internet. This principle focuses on "promot[ing] affordable, inclusive and reliable access to the Internet for individuals and businesses where they need it and support efforts to close digital divides around the world to ensure all people of the world are able to benefit from the digital transformation."[17] This case study explores some sources of federal funding available beyond time bound emergency pandemic funding (ESSER and Governor's Emergency Education Relief) that could be used to maintain 1:1 programs.

Kristina Ishmael, Deputy Director of the U.S. Department of Education Office of Educational Technology (OET), emphasizes the importance of obligating ESSER funds by September 2024. Ishmael explains, "We have to show that school districts spent all their money to report back to Congress and say, 'Look, we really can use all these dollars.'" It is a best practice for districts to spend all available ESSER funds so the OET can make the case for continuous funding support. This section will continue to feature comments and recommendations from Ishmael as well as Ji Soo Song, who serves as a Digital Equity Advisor, also at OET.

The aim of this case study is to provide an overview of various programs supported by different government agencies (U.S. Department of Education, the Federal Communications Commission) and programs such as education funding and the Affordable Connectivity Program (ACP) that impact 1:1 programs either directly or indirectly. For example, a direct impact would be using Title IV, Part A of ESSA to purchase devices. The ACP, which supports eligible households to afford broadband, serves as an indirect impact, though directly related to the larger ecosystem that surrounds 1:1 (in that student broadband access at home relates to the effectiveness of 1:1). These funding resources are currently available and will continue to be available after the ESSER obligation date deadline. There will be a brief description of the program and its applicability to the framework that surrounds 1:1.

U.S. Department of Education (DOE)

Schools will always receive funding from the Individuals with Disabilities Education Act (IDEA) and Every Student Succeeds Act (ESSA). Funds from these federal education programs are distributed to State Education Agencies (SEA). The SEAs then have their own formulas to determine how much of that money goes to the Local Education Agencies (LEAs). Both IDEA and ESSA have formula and discretionary funds, the latter of which are competitive grants that SEAs (and other eligible entities like institutions of higher education) apply for.

The following are some examples related to the 1:1 ecosystem of how funds from IDEA and ESSA can be used. The examples come from Section One of the Office of Education Technology's (OET) *Dear*

[17] U.S. Department of State, Bureau of Cyberspace and Digital Policy, A Declaration for the Future of the Internet, accessed September 26, 2023, 2, https://www.state.gov/wp-content/uploads/2022/04/Declaration-for-the-Future-for-the-Internet.pdf.

Colleague Letter (DCL): Leveraging Federal Funds for Teaching and Learning with Technology. This resource, as well as others, is linked at the end of this section.

Individuals with Disabilities Education Act (IDEA)

Formula grants under IDEA are administered by the Office of Special Education Programs (OSEP). IDEA supports eligible children with disabilities with accessing public education and secures special education and other pertinent services towards their academic success. (source) See examples below from *Dear Colleague Letter* on how IDEA funds can be applied to the 1:1 ecosystem.

- "...to support activities to help reduce paperwork including expanding the use of technology in the individualized education program (IEP) process for children with disabilities, parents, and teachers..." (2)
- "...to improve the use of technology in the classroom by children with disabilities to enhance learning..." (2)
- "...to support the use of technology, including technology with universal design principles and assistive technology devices, to maximize accessibility to the general education curriculum for children with disabilities." (2)

Every Student Succeeds Act (ESSA or ESEA)

Elementary and Secondary Education Act (ESEA) was reauthorized in 2015 as ESSA. No Child Left Behind (NCLB), passed in 2002, was a previous version of the law. This law focuses on improving K-12 public education by providing federal funding to schools and setting educational standards and accountability measures. While there are nine titles under ESSA, the following features the first four as they are the most relevant to the scope of this report.

Ishmael describes how schools can use various titles in parallel with the following example, "You might be able to use Title II dollars to help full professional development for edtech use, but then you might use Title IVA dollars to actually buy devices."

The following table refers to Part A of titles unless otherwise stated. The quotes are examples provided by the OET's *Dear Colleague Letter* and are organized in a table to coincide with their respective title (Titles I-IV).

Title I - Improving Basic Programs Operated by State and Local Educational Agencies
• "... **provide digital learning opportunities** to support ongoing, job-embedded, collaborative, digitally-literate professional learning **for educators** [in Title I schoolwide programs]" (1)
Title II - Preparing, Training, and Recruiting High-Quality Teachers, Principals, or Other School Leaders
• "...**hire coaches** to tailor professional development to the needs of individual educators for assistance in equitably integrating technology into curricula and instruction" (1) • "...**support ongoing professional development** on how to implement blended learning models and to **support planning activities for blended learning programs**" (1)
Title III - Language Instruction for English Learners and Immigrant Students
• "provide **supplemental professional development** to teachers, principals, and other school leaders to help them provide more effective instruction to English learners (ELs) through digital or online methods" (2)
Title IV - 21st Century Schools
• "...help educators **better discover, use, and share digital content**. This might include training educators to find and adapt relevant Open Educational Resources (OER)" (2) • "...**purchase software and devices** that are an essential component of a grantee's plan to facilitate collaboration between schools and practicing scientists or engineers, and to increase access to science, technology, engineering, math, and computer science courses." (3) • "...build technological capacity and infrastructure by p**urchasing devices, equipment, and software applications** to address shortfalls." (3)

Federal Communications Commission (FCC)

E-Rate Program

The E-Rate program provides discounts to eligible schools and libraries with funding through the Universal Service Fund. Eligible schools and libraries receive discounts on telecommunications, telecommunications services, Internet access, internal connections, managed services, and basic maintenance of internal connections. Discounts ranging from 20% to 90% are based on the poverty level of the schools, with rural schools and libraries receiving a higher discount rate.

Though not directly related to the funding of devices, the E-Rate program works to support the 1:1 ecosystem by providing the essential infrastructure and connectivity necessary at a discounted rate. With this money-saving measure, if eligible, more funds could be freed up for schools to support purchasing of replacement devices.

Affordable Connectivity Program (ACP)

This program is most relevant to parents and guardians of students. The ACP offers eligible households a monthly discount of up to $30 for internet service, and for households residing on qualifying Tribal lands, the discount is increased to $75 per month. Additionally, qualified households have the

opportunity to receive a one-time discount of up to $100 to buy a laptop, desktop computer, or tablet from participating providers.

Song mentions, "We have a little more than 19 million households across the U.S. that are taking advantage of it [while] there are 48 million households eligible. There is a lot more work to be done making sure that folks are [making the most] of the ACP." Schools are well positioned to increase awareness of this program to caregivers. The FCC provides an ACP Consumer Outreach Toolkit, which is linked at the end of this section under "Relevant Resources." This toolkit includes flyers, backpack handouts and more to support spreading awareness.

During the pandemic, some districts provided hotspots for students who did not have internet service at home. CoSN's *2023 State of EdTech Leadership* found that "less than 9% of respondents reported that all their students have broadband access at home."[18] Consequently, the report found that:

> "With federal pandemic funding (Emergency Connectivity Fund) for student home access from the FCC coming to an end, many respondents expressed concerns about their ability to sustain broadband access, and the majority are worried about being able to sustain student access to devices."

There has already been a downward trend of schools supporting off-campus broadband access, with 95% of districts doing so at the height of the pandemic compared to 74% in 2023.[19] Perhaps a concentrated effort to support eligible households by making use of the ACP can reduce costs related to providing internet connectivity to those that need it. In turn, more funds can be freed up to purchase replacement devices.

For further reading on school and home connectivity, see CoSN's Digital Equity webpage. The webpage links to CoSN's most recent (2022) Student Home Internet Connectivity Study, created in partnership with the Chan Zuckerberg Initiative (CZI), among other resources, including the Digital Equity Dashboard.

- 2022 Student Home Connectivity Study
- 2021 Student Home Connectivity Report
    - 2021 Visualized Data

National Telecommunications and Information Administration (NTIA)

Broadband Equity, Access and Deployment Program (BEAD)

BEAD is funded by the Infrastructure Investment and Jobs Act, also known as the Bipartisan Infrastructure Law, signed by President Biden in 2021. This program authorizes $42 billion towards "[bringing] high speed internet to all Americans."[20] The fifty states, the District of Columbia, and other territories received formal notice (for state-specific allocations amounts, please visit Biden-Harris Administration Announces State Allocations for $42.45 Billion High-Speed Internet Grant Program) of their allocations on June 26th, 2023.

[18] The Consortium of School Networking (CoSN), "CoSN 2023 State of EdTech Leadership," (2023): 6.
[19] CoSN, "2023 State of EdTech," 6.
[20] "Broadband Equity Access and Deployment Program," BroadbandUSA, accessed September 26, 2023, https://broadbandusa.ntia.doc.gov/funding-programs/broadband-equity-access-and-deployment-bead-program.

This program has the ability to impact the 1:1 ecosystem by making high-speed internet more available to places that were previously unserved or underserved. As mentioned before, CoSN's 2023 State of EdTech reports only 9% of students having broadband at home, with even less (7%) having adequate broadband, meaning service that is "suitable for standard video conferencing." Like the Affordable Connectivity Program (ACP), BEAD activities, such as implementing or upgrading the Internet in overlooked locations like rural areas, can save districts spending on hotspots and other tools that fulfill the same need.

It is important to note that this is not an immediate solution. BEAD is focused on building up physical infrastructure to support adequate broadband. Song provides examples, including "the fiber networks that need to go underground and the cell towers that need to go up." These are multi-year initiatives, and districts and households may not feel the impact until much later. However, considering this program in your long-term financial planning allows for the potential reallocation of funds to other priorities, such as replacement devices, as the need to budget for hotspots and similar expenses may diminish over time.

Digital Equity Act Program

This $2.75 billion program, according to Song, "[makes sure] that the infrastructure is met with the human side of the equation." This program coincides with the BEAD program and is concerned with digital equity and inclusion. The program's funding will support a diverse range of activities, including the development and implementation of digital equity plans, digital inclusion projects, and the comprehensive evaluation of their impact. The Digital Equity Act Program is related to the 1:1 program ecosystem in that their efforts are towards a similar end: narrowing the digital divide. With government backing for these initiatives, the onus on schools to close the digital divide is shared, thereby freeing up additional funding for other priorities, as mentioned earlier.

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