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## How to Ensure Technology Availability in the 21st Century K-12 Classroom



Life Is On



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# Introduction

Technology is infiltrating K-12 classrooms at a rapid clip as educators find new ways to employ computing devices and online resources to improve education and learning. Overall, the global market for education-related technology, services and content is expected to grow from \$193 billion in 2016 to \$586 billion in 2021, a compound annual growth rate of nearly 25%, according to the market research firm [Research and Markets](#).

That is an astounding growth rate, one that demonstrates the crucial role that technology is playing in our K-12 classrooms. In this e-guide, we'll look at some of the drivers for that growth, but also how it points to the need to treat K-12 IT infrastructure as the critical resource that it is.

That means paying attention to where equipment is stored, ensuring it's in proper racks and enclosures. It also means taking steps to ensure the equipment is always available, even in the face of the inevitable power disruption or outage.

Ensuring availability of critical IT resources, such as the



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devices that support Internet connections, means providing backup power, typically by using uninterruptible power supplies (UPSs). But merely installing a UPS is not quite enough. You've also got to pay attention to it over its lifecycle, providing routine maintenance not unlike you would for an automobile.

And recognizing that virtually all K-12 districts are budget-sensitive, on the pages that follow we also offer some sound advice on how to get the federal government to help fund many technology initiatives through its E-rate program.

We all want the best possible education for our kids and it's clear that technology is playing an ever-increasing role in delivering on that goal. We hope you'll find this e-guide valuable in ensuring the technology in your K-12 classrooms is always available to the students and educators who have come to rely on it.

### ABOUT THE AUTHOR:



Gordon Lord joined APC by Schneider Electric in 1995. In his current role, he is responsible for driving profitable revenue and partner enablement in collaboration with APC by Schneider Electric's distribution partners. With 18 years of channel experience, Gordon has held various inside and outside sales, marketing, and management roles. He has been recognized for his high performance, creativity and leadership, and has been named to UBM Channels "100 people you may not know but should" and "Top 30 Channel Leaders in their 30's." Gordon holds a Bachelor of Arts degree in Political Science & Economics from the University of Rhode Island.



# As K-12 Schools Continue to Go Online, Attention to IT Infrastructure is a Must

With each passing academic year, technology is playing a larger and larger role in K-12 education, as teachers and administrators seek to improve teaching and learning by making effective use of the latest computing devices and online tools. In some cases, they have little choice, as certain states are adopting mandatory tests offered online, forcing schools to ensure students have appropriate devices and Internet access.

All this activity is causing schools to take a fresh look at their technology infrastructure. In many cases, they find that infrastructure needs a significant refresh, to increase overall bandwidth and reliability. The good news is the federal E-rate program can often help in that regard, reimbursing up to 90% of the services and infrastructure related to providing Internet and telecommunications services.

The funds provide welcome relief to K-12 schools dealing with trends including the move to 1:1 computing, use of online resources in the classroom, and the advent of online standardized tests.

## 1:1 Computing

There's little question that schools are spending more money on computing technology. [Schools spent \\$15 billion](#)

on hardware for educational purposes in 2015, an increase of 7% from 2014, according to Futuresource Consulting, a U.K.-based provider of educational technology research.

In the U.S., an increasing share of that amount is going for Chromebooks, according to [this CNBC report](#) from Dec. 2015:

*So far this year, Google's Chromebooks make up 4.4 million of the 8.9 million devices sold to [K-12] schools and school districts. Put another way, every school day 30,000 new Chromebooks are activated in schools.*

Chromebooks, of course, are intended to be used with online resources, which means they require an Internet connection to be most effective.

## Online resources

The devices are attractive because they are relatively inexpensive and offer easy access to a variety of online resources, many of them from Google. As [CNBC reports](#):

*More than 50 million students are using Google's [Apps for Education](#) to share and collaborate on documents, submit homework, and research projects. Chromebooks [also] offer easy access to Google [Play for Education](#).*



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These and loads of other online resources make it far easier for educators to tailor lessons to students individually. Advanced students can work on more challenging lessons online while those who may be struggling get content more suitable for them – all in the same classroom at the same time.

Various online apps also help bring learning to life, whether it's a visualization of the solar system or dissecting a worm – without the blood.

“Nearly all school districts are using online learning at some level,” according to the [“2015 Keeping Pace with K-12 Digital Learning”](#) report from Evergreen Education Group, a consulting and advisory firm.

### Online testing

Another driver for computers in education is standardized testing, which is increasingly moving online. The situation is fluid as states make moves to updated standardized tests to match changes in curriculum as a result of the move to the [Common Core](#) standards in many states.

About 22 states gave either the [SBAC](#) or [PARCC](#) test in 2016. SBAC is online only while PARCC offers both online and paper versions (after some balking by member states that they would not be ready for online only).

The situation is fluid, however. Massachusetts, for example, has since decided to come up with its own test, using elements of its previous [MCAS](#) test as well as PARCC. It, too, however, will be online.

With so much reliance on online resources, schools must ensure the infrastructure is in place to provide reliable Internet connections. That means not only a speedy Internet connection and adequate wireless bandwidth, but racks to properly house all the required network gear, plus power distribution units (PDUs) and uninterruptible power supplies (UPSs) to ensure the equipment stays alive even in the face of power disruptions. With all that's riding on their online connections, schools can't take a chance that a simple thunderstorm interrupts the day's lesson – or, worse, a high-stakes test.

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If you work in a K-12 school district, you have more than likely been having lots of discussions about technology over the last few years. Maybe it's about beefing up the wireless infrastructure, getting a higher-speed Internet connection or moving to a 1:1 computing environment.

Amid these discussions, I wonder how much you've talked about how and where you're going to store all the IT equipment it takes to deliver those services, and how to keep it all up and running in the event of a power disruption. From what I've seen, such discussions are not top of mind for most school districts – but they should be.

Too often when I visit a school and ask to see the server room I'm escorted to a closet tucked in some indiscreet place, perhaps the janitor's storage room. There I see a jumble of equipment – servers, routers, switches, wireless gear – sitting on shelves, with wires going every which way and, often, plenty of dust. Sometimes the equipment is tucked into the corner of a classroom, because it happens to be one of the few with air conditioning.

This is no way to treat valuable IT equipment. And by valuable I'm referring not just to how much it costs, although that is certainly significant, but how important it is to the teaching and learning that goes on in schools every day. If you spend tens or hundreds of thousands of dollars on IT gear that is crucial to the educational experience, it makes sense to spend a little more on some proper racks, power and cooling products to protect it.

### Power protection

For starters, you need power protection. Most K-12 schools rely heavily on Internet-based resources during the

day, whether it's Google apps or [dozens of other online resources](#). If that connection goes down, teachers will be left scrambling to substitute another plan for the day's lesson.

Similarly, most schools have certain applications that need to be online all the time, such as the security tools that ensure safety on the Web and enable administrators to ensure students aren't surfing where they shouldn't be.

Preventing these tools from going down requires the use of [uninterruptible power supply \(UPS\)](#) systems that provide backup power whenever the utility power is unavailable. Depending on where your school is, such disruptions may be frequent, such as in this [Alabama district that sees 22 lightning storms per month](#) in the Summer. It's important to note that although school is out in the Summer, weather-



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related power disruptions can wreak serious havoc on IT gear if it's not properly protected – and that kind of physical damage has expensive implications.

Devices such as routers that provide Internet connections draw relatively little power, so it's entirely feasible to install a UPS that will power them for multiple hours. Most of the time, that's enough to get you through until the power comes back on.

### Racks and enclosures

Every school should also have at least one IT rack to properly house the routers, switches, storage units, servers and other IT gear. Stacking such equipment on shelves in a storage closet is risky, because it doesn't offer the ventilation the equipment needs nor the physical security it requires.

In situations where space is at a premium and there's no room for a proper server room or wiring closet, a purpose-built enclosure may make sense. Schneider Electric, for

example, has a line of enclosures that are made to be installed in non-dedicated spaces, such as a classroom or administrative office. The [NetShelter CX](#) line, known as the "server room in a box," enable schools to house everything they need in an attractive enclosure that looks like another piece of furniture. But they are lockable (providing the security that IT gear requires), virtually soundproof, come in various sizes, and include fans for self-ventilation.

Power protection, racks and enclosures are all eligible for rebates of 20% to 90% under the federal government E-rate program.

You spend a lot of money on the IT infrastructure required to drive the 21st century classroom. It makes sense to budget a bit more for power protection, racks or enclosures to ensure those classrooms remain online, even in the face of power disruptions.



# A Bit of UPS Maintenance Helps K-12 Schools Ensure Reliability of Internet Connections

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In my last article, I tried to make the case that, given how important online resources are to K-12 schools, they should invest in a UPS to keep the IT equipment that supplies their Internet connections up and running in the face of a power disruption. If you didn't already have them, probably you all rushed out and bought some UPSs, which is great – you'll sleep better. But there is a bit more to the story: now you should put those UPSs on a maintenance program.

UPSs, or uninterruptible power supplies, are not unlike cars in that they need maintenance over their lifetime to operate reliably and efficiently. In fact, the UPS lifecycle has a lot in common with that of a car. You have to carefully consider which model is best for you, install it in



Teachers and students rely on the internet to access the resources they need. Don't let a UPS failure put that connection in danger of failing in the face of a power disruption.

an environmentally friendly environment (akin to a garage), perform maintenance at regular intervals, tune it up occasionally, and replace it when it gets old and can no longer be considered reliable.

The exact life expectancy of a UPS will depend on a number of factors, beginning with the environment in which it lives. UPSs have batteries, which are susceptible to conditions such as excessive cold, heat, humidity and dust. They work best in a clean environment at a temperature of 77°F (25°C). While the UPS will certainly operate at lower or higher temperatures, a rule of thumb is that for every 15°F (8.3°C) above that temperature, the UPS battery life is reduced by 50%.

Beyond installing it in a friendly environment, there's always some sort of attention you can and should be paying to your UPS, just as with your car (as [this infographic](#) nicely illustrates).

For UPSs that are less than 3 years old, an extended warranty likely makes sense to protect your UPS investment. While details will vary, in general the warranty should get you 24x7 technical support and a free replacement if the battery happens to die prematurely. It may also cover free shipping on any required replacement parts.

At 3 to 7 years old, you should consider replacing the UPS battery, as that's right in the wheelhouse for expected battery lifespan – again, not unlike a car battery. Your UPS vendor should be able to provide a battery that's fully assembled with instructions for how to hot-swap it, so you don't have shut down the UPS or any attached equipment.



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Ask for postage-paid packaging so you can recycle your old batteries.

If your UPS is more than 7 years old, it's time to think about replacing it. Newer UPSs come with advanced features, such as remote monitoring and management capabilities, extended run-time, and more. It's also a matter of reliability as well as efficiency; because new UPSs are far more energy efficient than older models, many of them having [EnergyStar](#) ratings, so you'll save on operating costs. To further ease the cost burden, some vendors (including APC by Schneider Electric) offer discounted pricing on new UPSs with your trade-in.

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Give your UPSs the attention they deserve throughout their lifecycle and they won't let you down.

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APC also has online tools to guide you through decisions at each phase of the UPS lifecycle. The [Service Selector](#) helps customers with newer UPSs find the most appropriate maintenance package while those with somewhat older models can use the [Upgrade Selector](#) to find a new battery. When it's time for a new UPS, the [UPS Selector](#) can help you find the right model. You can use the tools yourself or call on an APC partner to walk you through the options.

You know you need your Internet connection to stay up so your teachers and students can access the resources they need. Don't let a UPS failure put that connection in danger of failing in the face of a power disruption. Give your UPSs the attention they deserve throughout their lifecycle and they won't let you down.



Given the importance of online resources, K-12 schools should invest in a UPS to keep the IT equipment that supplies their Internet connections up and running.



# Get Up to Speed on E-rate and Save Big on K-12 School Technology Projects

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A colleague of mine recently asked an IT reseller who focused on the K-12 market how helpful the E-rate program was to her. To my colleague's amazement, the reseller had no idea what E-rate was. To me, that is a sign that we as an industry need to do a better job of getting the word out on this program that can save K-12 schools lots of money – so consider this article my contribution to that effort.

E-rate is the more common name for the [Schools and Libraries Program](#), a federal government initiative launched in 1997 to help improve telecommunications and Internet services at K-12 schools throughout the country. Through E-rate, schools are eligible to receive rebates ranging from 20% to 90% of the costs of installing and maintaining telecommunications and Internet services, depending on the relative wealth of the school district. The idea is to ensure that all schools have adequate telecom and Internet services, so that we don't become a land of "haves" and "have nots" with respect to these important communications services.

The program is funded through the Federal Communications Commission Universal Service Fund (USF), which, in turn, is funded through taxes we all pay



Through E-rate, schools are eligible to receive rebates ranging from 20% to 90% of the costs of installing and maintaining telecommunications and Internet services.

on our telecommunications bills, whether landline or wireless. That's important because it largely insulates E-rate from the vagaries of the annual federal budgeting process and whoever is in the White House. It was launched during the Clinton Administration and survived the two succeeding presidents – one from each party – unscathed.

In 2014, the FCC updated the program, putting new emphasis on high-speed

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connectivity as well as wireless networks. It also greatly increased the amount of money available, from \$2B to \$4.5B over 4 years; we are now entering year 3 of that pool.

That's a lot of money and it's been doing a lot of good for K-12 schools. The program currently supports more than 118,000 school and library facilities and 50.4 million K-12 students, according to the E-rate consultancy [Funds for Learning](#).

While that money is intended to support telecom and Internet services, it can also apply to the infrastructure that supports those services. So it applies not only to the fees schools pay to a voice or data services provider, but also to the equipment that supports internal connections, as well as installation and maintenance of those connections.

In practice, that means if a school needs to install wireless access points, routers, switches and cabling to support Internet connectivity, that's all eligible. Same goes for the phone systems that connect to voice services. **Racks to house hardware are likewise eligible, as are the power distribution units (PDUs) and uninterruptible power supplies (UPSs) that ensure all that equipment has reliable power – a crucial consideration given how much schools rely on their online services.** Need help from a service provider to install all that gear? That's covered, too.

E-rate can dramatically change the return-on-investment equations for school technology initiatives.

Depending on the district and the exact rebate for which it's eligible, E-rate can dramatically change the return-on-investment equations for school technology initiatives, making projects that may have seemed out of reach eminently feasible.

What's more, it's not a one-time deal. Now that the program has been in place for 20 years, many districts will be finding they need to update services for which they've already received E-rate funds. That's perfectly fine, as there's no limit on the number of times you can request rebates for eligible services and equipment.

The FCC designated the non-profit Universal Service Administrative Co. (USAC) to administer E-rate. To learn more about the program, check out the [USAC's E-rate page](#). To learn about some of the APC solutions for K-12, visit the [APC Education page](#).

## Additional Resources

[APC Education Solutions](#)

[APC Education Blog Posts](#)

