

Learning in the Cloud: How Virtualization Is Revolutionizing K-12 Education

Whitepaper

Overview



Technology is revolutionizing every aspect of society, and that powerful shift is especially evident in the education field. The era of paper and pencil has shifted to tablets and multimedia-rich lectures, and schools are being wired to enhance learning across the digital spectrum.

While the majority of schools in developed countries have some level of technology integrated into their day-to-day operations – computer labs, interactive whiteboards, school-wide wifi access, etc. – others have struggled due to budget constraints. Finding cost-effective technology solutions has become a priority for many educators, which has led to a rise in popularity for cloud computing and virtualization.

Cloud computing is the practice of using a network of remote servers hosted on the Internet to store, manage and process data. Virtualization is the greatest tool for cloud computing as it allows for the creation of a virtual (rather than actual) version of a hardware platform, operating system, storage device or network resource. Because of this lean, resourceful approach, the utilization of cloud computing has resulted in a wide variety of operational and financial benefits for K-12 schools.

Cloud computing is also being widely embraced because of its eco-advantages. By operating in a cloud, less equipment is needed on-site, and less energy is consumed overall. That means lower energy bills, a healthier learning environment, and a more sustainable future for schools around the world.

The Evolving Role of Technology in Education



Nearly 10 years ago, technology in the classroom was still considered a luxury. Today, it's an essential tool to learning. It's no longer about providing the bare minimum, but discovering the most innovative ways to improve education through these vast and diverse technological resources.

A 2010 study from Microsoft, Accenture and WSP Environment and Energy found that 78 percent of K-12 teachers and administrators believe technology has positively impacted the classroom and the productivity of students. Approximately 65 percent of educators polled also believe that students are more productive now than they were three years ago due to readily accessible technology in the classroom.

Digital education encompasses a far wider set of tools than the traditional computer lab of yesteryear. Math teachers are posting their lectures on iTunes to free up actual classroom time to workshop problems. Textbooks are being replaced by E-books, leading over 600 school districts nationwide to distribute Apple iPads to each student. And Twitter has become a common communication tool for questions and updates between students and teachers. It's the new frontier of education, and the possibilities are endless – but budgets are not.

Cost Efficiency in a Struggling Economy

Cloud computing provides operational and financial advantages to K-12 schools in a number of ways. The scalable design of cloud operations means a school's service, budget, and faculty/staff size will not negatively affect its IT capabilities. Cloud platforms don't require the vast infrastructure of an average PC system, which involves a service provider to maintain and update it via data centers. With software and storage situated in a cloud, schools are able to rapidly deploy new applications and software updates while limiting maintenance. The days of purchasing software for each individual desktop or laptop device are gone.

Gartner, a technology research firm, compared the Total Cost of Ownership (TCO) of personal computers versus server-based computing (SBC) – a type of cloud computing. According to their report, the “TCO of a SBC deployment used to deliver all applications to users is around 50% lower than that of an unmanaged desktop deployment, and 11% to 18% lower than that of a locked and well managed PC deployment.” In addition, the direct costs “of SBC are between 12% and 27% lower than those of traditional PCs.” The research also says SBC options “are particularly attractive when client devices are shared by multiple users” like most schools operating today.

Other advantages to cloud computing include improved security and reliability, 24/7 access, and a simplified desktop environment. For schools struggling with budget cuts, faculty and staff lay-offs, and rising drop-out rates, the affordability and engagement of a virtual learning environment is invaluable.

Building a Sustainable Learning Environment



In addition to the operational and financial benefits, cloud computing helps to build a sustainable learning environment. More than 58 million Americans either work or attend classes in a K-12 school every day, and the push to green our nation's schools has become a top priority for environmental organizations.

On a broader scale, widely implementing technology in the classroom means less paper usage. The average student produces about 320 pounds of paper waste each year, and adopting a tech-savvy teaching style greatly reduces this trend. For schools already taking this initiative, cloud computing offers them a way to take it a step further.

A study done by research firm Verdantix (and sponsored by AT&T) for the non-profit Carbon Disclosure Project found that cloud computing will save large U.S. companies \$12.3 billion on energy costs by 2020 while cutting carbon emissions by 85.7 million tons annually. According to the 2010 study from Microsoft, Accenture and WSP Environment and Energy, the reasons for this lower energy use and carbon emissions are due to:

- **Dynamic Provisioning:** Reducing wasted computing resources through better matching of server capacity with actual demand.
- **Multi-Tenancy:** Flattening relative peak loads by serving large numbers of organizations and users on shared infrastructure.
- **Server Utilization:** Operating servers at higher utilization rates.
- **Data Center Efficiency:** Utilizing advanced data center infrastructure designs that reduce power loss through improved cooling, power conditioning, etc.

The study also found that companies can reduce their carbon emissions by 30 to 90 percent by switching to a cloud infrastructure. Data centers lose up to 96 percent of the energy coming into the building, resulting in inefficiency controlling internal temperatures, cooling the servers, and keeping servers idle. Using a cloud-based system can help in all these areas.

Classroom Spotlight: Cloud Computing in Action



With the many advantages to cloud computing in the classroom, there are a number of schools across the country that are putting the practice into place.

Frank Porter Graham Elementary School in North Carolina brought virtual desktops to over 600 students and teachers as part of the SIMtone Education Thunder Program. The program's goal is to provide technology resources to financially struggling schools and offers on demand access to SIMtone's Universal Cloud Computing virtual desktops. Frank Porter Graham Elementary School maintains the virtual computers that supply each student with homework, coursework, and other educational materials. As part of the program, the United States Fund for UNICEF is providing educational materials.

“ Cloud computing and virtualization technology offer exceptional opportunities for the technology and the telecommunication industry to give educational institutions and students in both developed and emerging markets, the vital computing tools necessary to close the gap and eliminate the digital divide, " said Mario Dal Canto, chairman and CEO of SIMtone Corp.

Indiana's Beech Grove City Schools have been battling a dwindling budget, leading to a 75% cut to its IT staff. But the school district managed to do so without negatively impacting student education, all due to a massive redesign of its technology infrastructure. Beech Grove City Schools' previous IT system required a full-time staff of seven people to maintain the six servers (each located in separate buildings), approximately 1,000 PCs, 200 MacBook laptops, 250 Apple iPod Touch mobile devices, and 30 HP mini-laptops.

District leaders determined a cloud would be the best method for consolidating all of the servers into one data center. The end result was faster point-to-point network connections and cloud client virtual desktops that led to conserving resources, lowering energy bills, and prolonging the life of the desktop devices.

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Conclusion



With technology advancing in leaps and bounds, cloud computing remains one of the most cost-effective, efficient and sustainable ways for schools to enrich the curriculum of their students. Devon IT's and Acer's new thin clients combine power, speed, and low energy consumption and the flexibility to support any VDI environment. All Acer thin clients are available with Devon IT's thin client software and Operating System, DeTOS.



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