



**VERTIV SMART INFRASTRUCTURE FOR
ENABLING THE TECHNOLOGY-DRIVEN
EDUCATION IN A DIGITAL ERA**

Introduction

Technology injects an improved way of thinking and doing the normal things differently, better and faster with less hassle and at a much more affordable rate. Modern technology has created incredible tools and resources that put the most useful information at our fingertips. Nevertheless, some sectors still need to catch up to take full benefits of these advances.

Particularly, education is the key enabler in our society's development process. Institutions such as universities, colleges, and schools are the pillars of the education system that impart knowledge and ensure widespread acceptance of various subjects, including technology. The modern economy has shifted the world's requirements of the education system to and the way it deals with the tremendous innovations in science, technology, engineering and business, etc. Education has to adapt to the latest advancements and ensure that the future generation is ready to lead. Educational institutions are adopting new teaching methods and modernizing their technological infrastructure to adapt to these new needs.

After the inception of high-tech Internet-based infrastructures such as cloud computing and edge computing, there was a boom in the learning modes followed by the education sector. Some of the key trends are:

- E-learning and EdTech
- Computer Aided Instruction (CAI)
- Virtual Learning Environment (VLE)
- Educational Information and Communication Technology (ICT)

Barriers to Technology Adoption

Integrating technology is no longer a novelty, but a necessity now. It is crucial not only because learning, teaching and all other functions are efficient, but also as it's the need of the hour. If the stated strategy of an institution is to promote the use of educational technologies, that institution must establish an adequate framework for the successful use, development and support of the technologies.



Although many educational institutions desire to be part of technology-driven education, they are stuck with a number of challenges. A few of them are:

- **Legacy Technology Infrastructure:** Today, the flow of data has surpassed all of the limits and it is ever-increasing to focus on the latest modes of courses and student enrollment. To collaborate with industries, a superior IT framework must be put in place to support high-volume software installation and conduct research on cutting-edge technologies. In order to process an exorbitant amount of data, server power and related accessories; it is not only necessary to be scaled, but it must also be future proof to meet the forthcoming needs.
- **Manageability:** Due to the lack of professional training, it's tedious for schools to manage the complex technology infrastructure. Therefore, they require an ecosystem that includes a single console-driven system that is easy to deploy and easy to operate.
- **Maintainability:** In traditional data centers, each critical component is procured from a separate vendor, thereby making it cumbersome to maintain afterwards. And the schools don't necessarily have the trained manpower to handle any issues for every subset of critical infrastructure. However, installation of an integrated solution can ensure continuity of business operations with single system startup, warranty, preventive maintenance and repair.

Future of Education

New technologies such as AI, machine learning and educational software not only augment students' knowledge; they also broaden the role of educators, create philosophical shifts in teaching approaches and reshape the classroom.

With the influx of new learning models, traditional methods of education will evolve in the future. To get a better understanding of where things are heading, see the development of technology in the field of education below.



Technology Adoption by the Educational Institutions

In old times, learning centers used to be large knowledge repositories, stored and indexed in libraries that became the focus of the campus. After the Industrial Revolution, colleges changed their methodology by teaching employees through vocational training to impart more practical and visual understanding of new scientific and technological methods.

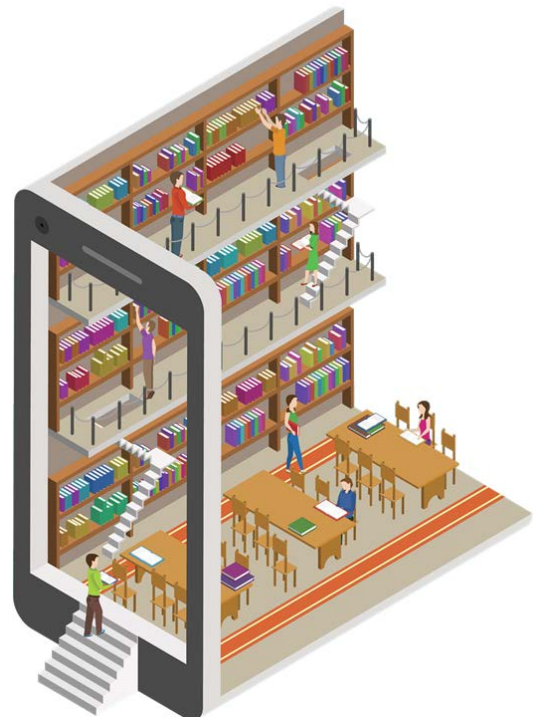
Moreover, as a result of this change in the learning mode, millennials and the general public have also migrated to online tools to gain knowledge. The institutions can therefore make their resources available on cloud, which can be accessed from anywhere. In 21st century, the workplace is transforming once again; what businesses, governments and society seek from education is shifting and technology has made the brick and mortar library far less relevant.

Technology even takes into account all fields of a college or university, not just academia. This would include admissions, record keeping, billing, housing, reporting, compliance, food service, athletic administration, human resources, business office, payroll, IT, fundraising, facilities management and many others.

The effective use of technology in these areas presents untold potential for transforming higher education by introducing substantial efficiencies and dramatic cost reductions in student service.

In addition to efficient administration, universities can concentrate on building laboratories to conduct research on cutting-edge technologies such as mobile learning, learning analysis, open content, 3D printing, virtual and remote laboratories and tablet computing.

One such latest knowledge delivery technology can be 'Smart Data', also referred to as 'Knowledge-as-a-Service (KaaS)' which provides access to tangible knowledge such as how-to, lessons learned, best practices, proven work-flows, case studies, procedural manuals, plans and templates, and knowledge experts.



In fact, the landscape has changed the way innovation momentum is followed. In this high-tech era, global corporations not only employ students based on right-skills, they collaborate significantly with renowned institutions to bring the best inventions on the table, and this journey continues as an academic-industrial partnership model.

For example, Microsoft recently gifted its edge computing services 'Azure Data Box Edge' to the Live Edge Laboratory at Carnegie Mellon University where they design applications to help visually impaired people detect objects or other people nearby. By leveraging these technologies, the institutions can have a significant impact on a human needs.

Vertiv's Address to the Technology

To cater this digital demand in the learning method and also in the institution's administration, it is necessary to set up or upgrade the university's IT infrastructure in line with the existing framework. Driven by the years of research and customer engineering services, Vertiv has designed and developed 'Smart Solutions'—integrated solutions consisting of compact, flexible and reliable high-end technologies.

Vertiv Smart Solutions are available in a variety of formats, such as an integrated rack called a SmartCabinet with a pre-tested configuration of equipment, or a row of equipment called the SmartRow.

The Vertiv SmartRow is a fully integrated data center infrastructure solution equipped with power, thermal management, dry agent fire suppression, infrastructure management and monitoring. It is designed for indoor environments such as small- and medium-sized data centers or computer rooms. SmartRow can store 19-inch rack-mount IT hardware equipment such as server, storage and networking devices. It features cabinets, a closed-aisle cooling system, power distribution and a centralized infrastructure monitoring system.



Smart Solution from Vertiv

The Vertiv SmartRow is a fully integrated infrastructure solution. SmartRow features cabinets, a closed-aisle cooling system, power distribution and a centralized infrastructure monitoring system.

Problems it solves:

- Reduces time and cost of implementation order
- Ensures efficiency and availability with Liebert® iCOM™ controls — manages cooling to optimize IT equipment performance and life
- Enhances performance and anticipates potential problems before they occur with infrastructure monitoring and management appliances and software
- Increases physical security and equipment protection with lockable cabinets and access alerts
- Operates quietly in shared spaces without compromising on physical security, cooling or fire suppression

Solution Benefits

The advancement of a school's digital infrastructure brings the learning mode and educational technology capabilities to a newer height; simultaneously, helping students to explore untapped potential in their chosen career. A few notable benefits include:

- **Flexibility and Online Learning** – Flexible learning procedures provide students the complete control and accountability for their learning, instead of being required to attend a class, they can decide and allocate time for their learning. Online learning means that people can learn at varying paces, depending on their ability and the time they devote to their learning efforts. Given learning materials are delivered to students online, students can plan their learning schedules as they wish and submit homework and examinations online.
- **Better Simulations and Models** – Digital simulations and models can help teachers explain concepts that are too big or too small or processes that happen too quickly or too slowly to demonstrate in a physical classroom. The advanced technology is called 'Digital Twin', which refers to a digital replica of physical assets, processes, people, places, systems and devices that can be used for various purposes.
- **Students database and Results Tracking** – Teachers can monitor individual progress and are encouraged to identify learning goals and differentiate education based on a student's needs. Since everything is saved in the cloud, every student has a digital portfolio where they store all their projects, assessments, notes and can check their grades in the digital diary immediately.
- **E-books** – A digital textbook is a PDF on a tablet that students can carry, and five textbooks are no longer required. Everything's digital. What used to take hours to find in the library, students can find it immediately.
- **Cost Reduction** – Technology has contributed to substantial reductions in costs to access education. Everything is now available online.
- **Social Media in Education** – Allow learners and educators to post thoughts, ideas, and comments in an interactive learning environment. Students can also learn and follow influencers from the post.

Business Case



Background

Many schools are finding that old layouts interfere with emerging needs –forcing new optimization requirements. Placer County Unified School District of California needed to find extra space in its building to construct a conference room and office space. Vertiv found the workspace in Placer County’s old data center by through improved space optimization, using Vertiv’s SmartRow™. Our SmartRow let them condense their data center footprint without major renovations.

Vertiv’s SmartRow is the perfect central data infrastructure solution when space is limited. The compact design and integrated fire suppression system allows SmartRow installation in any space. Not only does it save room, but it also reduces energy consumption by up to 27% compared to a conventional data center design. Our help gave the school district cost reductions and vitally needed space without disrupting vital applications for staff and students alike.

ABOUT THE SCHOOL DISTRICT

The Placer County Unified School District of California serves students in grades K-12 across more than 10 elementary, middle and high schools.

<https://www.placercoe.k12.ca.us>

Case Summary

Location: California, USA

Product/Service: The SmartRow solution is a space-saving, fully integrated row-based data infrastructure that is both energy and spatially efficient.

Critical Need: Placer County Unified School District needed to optimize its old data center to open up space for a new conference room and office area.

Key Aspirations

- Removed original data center and raised floor with perimeter cooling
- Reduced the number of needed cabinets from 12 to only 6
- Installed reliable UPS systems, each running at about 30% load
- Minimized downtime and productivity loss
- Reclaimed excess data center space to allow for additional workspace
- Freed up square footage and reduced overall operational costs

Epilogue

For an educational institution to continue providing world-class learning, it must be a tech-savvy by introducing new business processes and innovative uses of cloud-based technologies that deliver the actionable information on a smartphone, reduce the operating costs in schools and universities and help connect with the masses.

These cost savings would reset the value proposition and perception of education around the world and protect the most critical elements for its purposes. This can occur if leadership in education is enthusiastic about technology and willing to bring smart technologies to solve the lingering business problems which would result higher levels of student success.



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