Connected education
Preparing for the digital classroom

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Enterprise

The Modern Student – born into a life of technology

Most students in primary and secondary schools have never experienced life without the internet or smartphones. This reality is reflected in the classroom, where digital learning processes and experiences have enhanced traditional textbooks and upended conventional classroom teaching methods. Online lessons, testing and assessments are now part of most curricula. Laptops, tablets and smartphones have become primary instruction tools for students, who adownload an increasing number of online apps to enhance their digital learning experience.

Teachers and lecturers alike rely on robust, reliable Wi-Fi across their campus to access the full range of teaching tools available to them.

The Digital Classroom: Evolution of technology in Education

Changing realities for students and learning

Primary and secondary schools are undergoing a digital transformation, and technology is the driving force for enabling more personalized and dynamic learning experiences for both primary and secondary students. These advances ahave impacted the classroom in a variety of ways:

- **Digital and immersive textbooks.** Today, digital textbooks have displaced paper textbooks in many primary and secondary classrooms. They have advantages over physical books including instant availability, ease of updating and the ability to store many e-books on a single device. However, digital textbooks are in turn being displaced by immersive textbooks that employ interactive technologies, advanced user experience design and gamification to enhance instruction, make learning more engaging and address differing learning styles.

- **Game-based learning.** Game-based learning blends video game technology and online learning tools to make teaching and training more engaging. These technologies can also be designed to take advantage of virtual and augmented reality to increase student engagement and content retention.

- **Blended learning and the flipped classroom.** The blended learning model combines classroom and online learning to give students more control over the time, pace and place of their instruction. The importance of blended learning is now second to the flipped classroom model, in which students watch video lectures on their own and then attend class for discussions and collaborative activities.

- **1:1 student-to-device ratios.** Many educational institutions have made the commitment to a one-to-one ratio between students and devices. IThis is shifting to a one-to-many paradigm where different tasks require different devices, and students need access to laptops, tablets, Chromebooks and smartphones, depending on the project.

- **Digital testing.** Online testing and assessment technology helps teachers and administrators more accurately and meaningfully measure student achievement. Digital testing can provide detailed insights into the success of learning methods and offer detailed metrics and analysis for developing remediation solutions. These platforms provide visibility into how individual students interact with online content, enabling ongoing monitoring of individual learning.

- **Predictive assessment capabilities.** At the cutting edge of assessment technologies is the development of predictive assessment capabilities that can track student proficiency without actual testing. By monitoring how individual students interact with educational content and relating that data to past test scores, advanced analytics platforms can make predictions about the progression of students without subjecting them to constant testing. The same platform can also provide teachers with targeted recommendations and relevant lessons to address the needs of individual students.

- **Bring your own device.** With the bring-your-own-device (BYOD) movement, students and teachers bring their private devices to the network. This may be a boon in districts that can't afford to equip classrooms with a variety of devices, but implementing BYOD securely and effectively can present challenges. Many K-12 IT networks weren't designed to support a diversity of devices and protocols, and the school's underlying infrastructure must be sound enough to support multiple disparate devices and networks while guaranteeing interoperability and security.

- **IoT/Smart/STEM devices** like 3D printers, projectors, smart boards and virtual reality headsets bring a new dynamic to the class, offering hands-on experiences, more engaging learning environments and simplification of teacher tasks.

The role of technology

Advanced technology in K-12 districts creates new ways for students to learn, and changes how teachers plan and deliver lessons. It also provides the digital tools for school administrators to simplify operations, better comply with regulations and deliver a safer environment for students and teachers.

An important capability of technology is to enable user mobility. Mobility requires connectivity anywhere, and goes beyond offering Wi-Fi in the classroom: Seamless connectivity needs to be provided everywhere in the school, including science labs, gymnasiums, libraries and outdoor facilities. Wi-Fi networks must extend across the entire school property, but they also need to deliver good performance to support higher densities of wireless users with bandwidth-hungry applications, especially in the classrooms due to one-to-one/BYOD learning initiatives, digital testing and new immersive learning applications.

Is your network ready?

Digital learning requires a WLAN infrastructure that can handle a large influx of mobile devices and the bandwidth-hungry applications running on them. There are several things you can do to prepare for this:

- **Plan for density:** Students often bring multiple mobile devices to school. Adding teacher devices, classroom tools like projectors and printers and all sorts of new IoT devices means planning for density is planning for success.

- **Assess WLAN bandwidth requirements:** Determine what is required to support instructor teaching styles, including mobile devices. For example, if teachers expect to use video-based teaching aids that stream video to multiple devices, a WLAN network capable of supporting multiple, high-quality video streams will be required. An HD-quality video stream uses 4 Mb/s of bandwidth per user and interactive learning games require multi-megabits of bandwidth per user.

- **Handle bandwidth needs with Wi-Fi 6 or Wi-Fi 7 technology:** Gigabit Wi-Fi devices are already available to students. Adopting Wi-Fi 6 or Wi-Fi 7 technology enables faster data rates and multiple concurrent downstream communications to multiple wireless devices. Wi-Fi 7 also enables concurrent upstream communications. Both technologies provide better support for a higher density of users, devices and applications.

- **Eliminate roaming issues:** As users roam between access points, their devices can get stuck on an AP instead of associating with a closer one that has a stronger signal, which drains battery life and degrades performance. The ideal network infrastructure should eliminate this so that older generation devices or disproportional distribution of users don't drag down the network.

- **Adjust LAN access to support next-generation access points:** Wi-Fi 6 or Wi-Fi 7 APs typically generate an aggregated throughput above 1 Gb/s. To avoid bottlenecks and cabling rework, upgrade to access switches that support 2.5 Gb/10 Gb ports (with PoE) and 10 Gb or 40 Gb uplinks.

Alcatel-Lucent OmniAccess Stellar WLAN

The Alcatel-Lucent OmniAccess® Stellar WLAN product line meets all these demands, and more. Its next-generation access points with distributed intelligence (controllerless) deliver enterprise-grade connectivity, with operational manageability creating a new paradigm in wireless networking that's efficient, secure, simple and affordable. And with our local, personalized approach, a tailored solution can be built to suit every learning environment.

The OmniAccess Stellar WLAN solution offers:

- **Simplicity:** Leveraging the latest technologies, it is simple to deploy and scalable while offering high-speed Wi-Fi
- **Performance:** Distributed intelligent architecture eliminates the controller bottleneck for better performance and high availability
- **User centricity**: Easy connectivity and the leveraging of automatic user profiles provide an exceptional and secure user experience for students, teachers and visitors

- **IoT readiness:** Unique IoT enablement technology allows for secure and automatic connections of any device
- **Analytics capability:** Smart analytics monitor and control applications, help analyze students' behavior and enable proactive network enhancements
- **Unified management:** Native, unified management for LAN and WLAN with a cloud enabled management platform that provides consistent security for wired and wireless users, individual quality of service and even time of day restrictions
- **Cost-effective evolution:** Innovative controllerless technology reduces costs and is easy to expand by simply adding more APs
- **Optional location-based services (LBS):** Enabled by Bluetooth Low Energy (BLE) capabilities in the APs, LBS provides more services to students/visitors such as virtual hall passes or indoor wayfinding, as well as enabling advanced analytics to understand people flow and occupation of school areas

Conclusion

For many students, how a district integrates high performance Wi-Fi into the school environment can be just as important as their favorite classes or the structure of the curriculum. Students today don't remember a time before the internet. They expect an experience like at home, where their devices connect automatically and seamlessly. They expect to be able to connect with any device, anywhere, in and around the school whether it's to communicate, be entertained or to access educational resources.

In addition to student expectations, a school network must also meet the technology requirements of school administration, staff and IT departments. When designing an efficient and cost-effective school network, it is important to:

· **Understand the limits of the existing network:** Objectively analyze and evaluate the capabilities of the existing network infrastructure and plan a gradual upgrade to ensure it meets the expectations of teachers, students, staff and the community

· **Deliver a high-performance network:** Provide a WLAN infrastructure that can handle a large influx of mobile devices and bandwidth-hungry applications

· **Ensure the LAN does not become a bottleneck:** Deploy multi-gig technology in access switches to avoid additional cabling and increase available bandwidth

· **Enable pervasive mobility:** Ensure that all devices coming into the school environment get their share of network resources with connectivity everywhere and the same quality of experience (QoE) over wired and wireless networks by leveraging simplified device onboarding

· **Ensure the network is IoT-friendly:** Simplifying the connection of IoT devices, while keeping the network secure, allows the district to embrace new safety/security devices and automation technologies

· **Allow for simplified operations:** Build and operate a robust network, with a single management system and use virtual networks for unique requirements, rather than separate, dedicated networks.

· **Offer in-depth security:** Provide not only firewalls, but protection at every level for users, devices, applications and the network itself

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