

HIGHER EDUCATION

The future of immersive learning

Facilitating deeper learning with emerging technologies and the power of workstations

Precision 7920



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Virtual reality (VR), augmented reality (AR), multimedia and other technologies are transforming educational models, especially in engineering and creative disciplines such as architecture, visual effects and graphic design. This white paper highlights how university students, administrators, faculty and IT staff can use powerful workstation technologies to support progressive, deeper learning approaches that can facilitate greater student potential and success.



Preparing for success

Students are seeking an education that will prepare them for a quick, seamless transition into a career. Today, this requires more than just learning from outstanding faculty and exposure to modern IT. To achieve their highest potential, students in engineering and creative disciplines require inclusive educational models that seamlessly integrate emerging technologies to facilitate deeper learning that includes collaborative, multi-discipline projects. This shift in education is driven by research that shows students' motivation is directly linked to their ability to make clear connections to their new knowledge and how it affects the real world.¹

University administrators face other challenges. To attract and retain the brightest students and most talented faculty, administrators need to envision and build modern workspaces where students can not only learn using new technologies, but also develop them. This is a critical consideration. While higher-learning institutions have traditionally served as incubators of innovation, technology companies are quickly filling this role too. To evolve educational models so that students and faculty are visionaries and entrepreneurs, universities need workstations that support the applications, development technologies and learning spaces required by students and faculty. At the same time, administrators need to meet business constraints around space, staffing and budgets.

Faculty are also under pressure. They're having to quickly adapt curriculum and instructional models to meet increasing expectations of administrators and students. This includes the use of digital tools to support new student-centered lesson plans and collaborative projects involving peers from other disciplines. The pace of change is especially fast in engineering and creative disciplines, because what's being taught is driven by rapid changes in technologies and workflows. For example, professors need to create lesson plans that incorporate technologies such as 3D modeling, the Internet of Things (IoT), multimedia tools and even AR and VR. At the same time, professors need to teach students how to use these technologies to create next-generation offerings for global industries.

For IT staff, meeting all these requirements is exciting but challenging. They must continually implement, manage and evolve workstation environments to deliver responsive experiences for all users, despite the diversity of applications. For example, engineering students need high-performance 2D and 3D computer-aided design (CAD) tools to design vehicles, robots, buildings and machinery—and then analyze the effectiveness of their creations. Art, media and entertainment students must be able to work on projects that involve high-definition graphics and video, plus soundtracks and lighting. Science students can enlist their peers to help them design or use applications that model massive amounts of data to better understand complex, real-world issues such as weather patterns, water quality and genomics. In addition, IT staff need to ensure that the workstations they deploy today can support emerging tools for AR and VR, as adoption increases.

The trend toward immersive environments including AR and VR

AR applications and environments allow users to overlay digital information on the physical world. Already popular in video games—such as those that let you seek animated characters in your neighborhood—AR gives students a completely new option for learning, experimentation and project creation. Interior design students can project digital replications of furniture and other items to experiment with layouts. Engineering students can see how to use machinery with an AR application that overlays instructions on equipment. Engineers, architects, artists and other designers can draw a picture of something—a car, robot, building or animated character—on a digital surface and then project and analyze their creation using a 3D viewer.

VR applications provide more immersive and experiential environments for students in all disciplines. History majors can explore what life was like in the 1600s by walking through a digital representation of a village or a battle. Medical students can use VR to dissect virtual frogs and operate on virtual patients. Students studying architecture can use VR to test new building designs for areas prone to earthquakes or floods. Working with peers in engineering and creative disciplines, science students can create immersive, virtual depictions of their research—such as the effects of personalized medical treatments on cancer cells to facilitate positive outcomes for people around the globe.

Can't students and faculty run these tools on their own computers?

The performance, storage and display technologies required for many high-performance and design applications are too expensive for most students and faculty to purchase. As a result, universities must determine which technologies they need to provide, and which ones students and staff can run on their PCs, whether desktops or laptops.

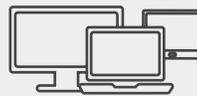
Common limitations of existing lab spaces

To meet the varied technology needs of students and faculty, while also operating within cost, space and resource limitations, universities have typically provided dedicated labs for each department. These segregated spaces worked fine for earlier educational models, but such siloed environments make it harder for students to work on modern projects with peers in other departments. For example, to create a video game, students in engineering, art, music and visual effects need to work together to build a lifelike virtual reality that blends real-time animations and music in a game setting that runs on a gaming console or website. Working independently on the different parts of this kind of project slows productivity, creates frustration and prevents students from learning the collaborative workflows that they'll use at a company when they graduate.



Professional workstations are better suited for:

- VR and AR applications
- Engineering and design applications that require high-performance CPUs, graphics processors and high-definition displays
- Multimedia and graphic content production in gaming, entertainment and broadcasting
- Accessing, analyzing and modeling large volumes of scientific, medical or financial data
- Intense-use learning labs
- Intermediate-to-advanced programming and development projects
- Collaborative spaces



Students' and employees' PCs are better suited for:

- Projects that involve writing, research and calculations based on smaller files and data sets
- Browser-based access to portals and applications
- Entry-level programming assignments
- Email and messaging
- Voice-over-Internet-Protocol (VoIP) calls through Skype and other applications

DELL PRECISION

All-in-One (AiO) featuring
AMD Radeon Pro™

DELL CANVAS

Touch display and visual
workspace



However, building collaborative areas—also called maker spaces—presents new challenges. Universities often have limited real estate to accommodate them. In addition, when students can access numerous high-performance applications on the same workstation, IT staff struggle to pinpoint the optimum device settings to ensure the best average performance for all applications and users. That's because it's impractical for them to continually adjust workstation settings so that all available applications run optimally. Another obstacle is that specific departmental labs often lack the combination of sound systems, graphics cards and other gear required to support collaborative projects. IT staff can augment workstations in collaborative areas using third-party accessories, but this add-on approach can quickly drive up costs and complexity.

The right workstations for the job

Dell provides a comprehensive product and service portfolio that can support university's requirements for emerging technologies and collaborative spaces. Offerings include:

- Dell Precision tower, rack, mobile and all-in-one workstations
- The new Dell Canvas, which provides a completely new kind of touch display and visual workspace
- Dell EMC servers, storage and networking solutions for small- and large-scale configurations
- Dell EMC services for designing, deploying, managing, supporting and funding solutions

All Dell Precision workstations are pre-certified to run professional applications for numerous industries from Microsoft, Adobe, Autodesk, AVID, Dassault Systèmes, SolidWorks—and many other software providers. In addition, all models come with Dell Precision Optimizer software, which automates workstation setup and configuration processes. When a new application launches, Optimizer automatically adjusts

workstation settings to meet the application's unique requirements. These include changes to Intel® Hyper-Threading, the number of CPU cores, processor priority, graphics and power consumption. To further streamline processes for IT staff, this tool can be centrally managed with System Center Configuration Manager (SCCM) or KACE.



The right solutions

Dell delivers a complete portfolio of solutions, including high-powered workstations and peripherals like Dell Canvas that facilitate the most compelling user experiences. The following table provides a high-level summary of the Dell portfolio.



[Learn more](#)

Dell Canvas horizontal touch display and visual workspace

- Revolutionizes design processes by supporting natural two-handed digital interactions using a:
 - Touch screen that facilitates tactile discovery and creative work
 - Pressure-sensing pen and totem—or dial—that allow for intuitive, tactile interactivity with digital applications
- Can be used as a vertical or horizontal surface
- Compatible with any Windows 10 device



[Learn more](#)

Dell Precision All-in-One (AiO) workstations

- VR-ready for content consumption and creation
- Provide an immersive, close-contact workspace with a touch-enabled display and articulating stand for tactile discovery and creative work
- Deliver the power, reliability and architectural benefits of traditional workstations but in a smaller, monitor-sized footprint to provide clutter-free workspaces without the usual constraints of an AIO. Models include:
 - Intel® Core™ and Xeon® processors
 - AMD Radeon™ Pro graphics
 - 10 built-in speakers that deliver 50W per channel
 - 4K Ultra HD edge-to-edge touch display supporting 100% Adobe RGB color
 - ISV certification for numerous applications
 - Dell Precision Optimizer software
- Simplify management and upgrades by offering tool-free access to memory and storage via an easily removable back cover



[Learn more](#)

Dell Precision tower workstations

- VR-ready for content consumption and creation
- Offer a wide choice of industry-leading models with the right-size processors, memory, hard drives and professional graphics cards to meet varied requirements.

Models include:

- Intel® Xeon® and Core™ processors
- NVIDIA® NVS, NVIDIA Quadro® and AMD Radeon Pro™ graphics
- SATA and solid-state drives
- ISV certification for numerous applications
- Dell Precision Optimizer software



[Learn more](#)

Dell Precision rack workstations

- VR-ready for content consumption and creation
- Include 2U models with configurable processor, memory, hard drive and professional graphics card options to meet varied requirements. Models provide:

- Intel® Xeon® processors with up to 22 cores per processor
- NVIDIA® Quadro® and AMD Radeon Pro™ graphics
- Optional 12 Gb/s RAID controllers
- SSD storage

- ISV certification for numerous applications
- Dell Precision Optimizer software



[Learn more](#)

Dell Precision mobile workstations

- VR-ready for content consumption and creation (Precision 7720)
- Provide a wide choice of affordable, industry-leading models with the right-sized processor, memory, hard drive and professional graphics card to meet varied requirements.

Models include:

- 15- and 17-inch options
- 4K Ultra HD touch displays
- Intel® Core™ processors
- SATA and solid-state drives
- NVIDIA® Quadro® and AMD Radeon Pro™ graphics
- ISV certification for numerous applications
- Dell Precision Optimizer software

#1 workstations in North America according to IDC Worldwide Workstation Tracker Q3 2016

Precision 7720 is the world's most powerful 17" mobile workstation

Precision 5520 is the world's thinnest and lightest 15" mobile workstation

Putting it all together to solve your challenges

The following are just a few examples of how universities can benefit from using Dell workstations:

This Dell

Can support

Facilitating

Canvas + Dell Precision workstation

Unique, high-definition work environments that give students a vertical “see” surface for referring to documents and images, and a horizontal, easy-to-use “do” surface for creation and exploration using both hands

- Immersive experiences and deeper learning because students can pull content closer to them and work on it using both hands via a touch screen, pen and totem
- Increased experimentation and creativity
- Faster and more extensive prototyping
- Interactive learning for individuals and groups—such as medical students learning how to perform a surgical procedure using a virtual patient
- Better technology experiences for students and staff, which can help universities attract and retain more students

Dell Precision AiO

Complex and heavy workloads running in environments that require less space, cabling and accessories

- High color and sound fidelity for creative workflows
- Future technology readiness with VR content creation and consumption
- Innovative and premium technology environments that can help universities attract and retain students and faculty
- Time savings for IT staff
- Cost savings

Dell Precision tower workstations

Fast, highly reliable access to any kind of application

- Greater efficiency for students in all disciplines and for all use cases, including IoT, machine learning and big data analytics
- Enterprise-class technologies used by global corporations
- The compute power to innovate

Dell Precision rack workstations

Virtual desktop environments

- Greater efficiency for IT personnel
- Secure, remote access to applications

Dell Precision mobile workstations

On-the-go access to compute-intensive applications, including tools for AR and VR

- Greater efficiency for faculty and administrators
- Convenient, responsive access to technologies, which can help with staff satisfaction and retention

Shaping the leaders of tomorrow

By engaging Dell, universities and colleges can build a bridge from traditional classrooms and labs to immersive, digital-learning environments that facilitate deeper knowledge, experimentation and efficiency—boosting student innovation and outcomes.

[Click here](#) for more information about how Dell is helping higher-learning institutions meet the needs of students, faculty, administrators and IT staff.

To learn more about Dell Precision workstations, [click here](#).



1. The NMC Horizon Report: 2017 Higher Education Edition. © 2017, The New Media Consortium. ISBN 978-0-9977215-7-7.

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