

Higher Education Adopts New Display Technology to Enrich Learning

Advanced solutions for collaboration, communication, and community engagement help schools meet the expectations of digital-first students and faculty.





■ As digital technology permeates society, prospective college students prefer to learn and collaborate digitally, driving more higher education institutions to adopt advanced A/V solutions to better compete for digital-first scholars and expand their total offering.

According to the 2019 Educause ECAR Study of Undergraduate Students and Information Technology¹, students “would like to be more engaged with the material, their instructors, and their peers in the classroom and they see technology as a vehicle for that engagement.”

In higher education, even modest technology enhancements can have a major impact. The Florida State University (FSU) College of Business

is designing and building a new facility on the school’s Tallahassee campus, complete with audiovisual technology meant to better engage students and improve learning outcomes. And while the building is under construction, the technology team has been busy reinventing existing classrooms to understand what works.

“For example,” says Aiden Sizemore, FSU College of Business Director of Academic Technology and Systems, “we’ve installed large confidence monitors into our podiums. It’s a simple thing, but it has made a huge difference.” Being able to see content on-screen right in front of them, rather than turning to see it projected behind them or to one side, allows faculty to better engage students and their subject matter.

Also, in light of a growing trend toward active-learning spaces, the FSU College of Business piloted a collaborative classroom with digital tools meant to foster project-based work.

“Our current building doesn’t have a lot of collaboration space for students,” explains Sizemore, “so we commandeered a room to test out our collaboration lab, outfitted it with a large presentation display and virtual ‘pucks’ that let students wirelessly share

content on a pair of screens. We wanted to see how much use it would get, and I can tell you, it was booked every minute of every day.”

At FSU’s College of Business, that has meant including technologists in the design of its new building to ensure it can support everything needed to deliver the right learning experience — digital displays, electronic whiteboards, collaboration systems, video conferencing and more.

“We don’t know where technology is going in the next five years, but we want to make sure we’re able to change with the times,” Sizemore says. “We’re seeing increased demand for and usage of collaborative tools. Basically, we’re boosting engagement and having a huge impact on how our students learn.”

¹<https://library.educause.edu/resources/2019/10/2019-study-of-undergraduate-students-and-information-technology>





■ Gaining Momentum

According to the 2019 Educause Horizon Report², the transition to tech-enabled, active-learning classrooms and spaces in higher education has gained considerable momentum. “Designing and evaluating spaces that facilitate active learning and collaboration require investments and strategic planning,” said the report’s authors. “Media-rich digital learning platforms, personalized or adaptive courseware and web conferencing tools capable of connecting students and their 1:1 devices are becoming common solutions for blended learning designs.”

In fact, digital technology has come to pervade higher education through a variety of applications, whether it’s classroom display technology to foster collaboration, digital signage for campus-wide health and safety communication, videowall installations for engaging visitors, and branding a school, or ever increasingly — a new genre of electronic sports (eSports) programs for attracting a growing legion of digital athletes and fans.

“You have this growing number of colleges and universities that have made a major commitment to integrating technology into more and more spaces,” says Craig Park, Principal Consultant at The Sextant Group, a leading audiovisual technology consultancy

recently acquired by global engineering firm NV5. “It tends to start in Engineering or STEM- oriented buildings, as well as business schools.” Park’s firm is also in the process of helping FSU’s College of Business integrate technology into its new building. “Many put in technology to mimic the workplaces their students will eventually enter.”

The Sextant Group helped the University of Texas (UT) Southwestern’s medical school reimagine education delivery to large classes³, creating what was, at the time, one of the largest active-learning spaces in higher education. “They realized that to be relevant in the 21st century, they needed to rethink education,” Park says.

The school took a 250-seat lecture hall and created 42 six-student active-learning stations that include a 46-inch monitor, a microphone and a wireless collaboration system for sharing content from students’ mobile devices. Three pairs of screens hang on the walls for facilitating team-based learning among various groups.

“It encourages interdisciplinary conversation so that the way they’d work together in the hospital is the same way they work together in the classroom,” Park says.

In fact, collaborative audiovisual technology stands to benefit higher education departments of all types. It doesn’t replace pedagogy, but rather enhances it.

According to Christopher Faulkner, Ph.D., Assistant Professor, Health Care Sciences/Research, Director of Educational Technology at the UT Southwestern Medical Center, “The Team-Based Learning Center fosters the type of organic conversation you can’t create in a lecture environment, helping our students to learn to communicate more effectively – cross-discipline – as they will in the real world. The AV-over-IP/wireless collaboration technology has been a game-changer, helping our faculty and students to more effectively build and improve those interprofessional relationships.”

“Technology has been changing how we think about teaching and learning,” says Edward Maloney, Executive Director of Georgetown University’s Center for New Designs in Learning and Scholarship (CNDLS). “That’s going to continue to grow and evolve and we need to be reflective, responsible and responsive to those changes.” (Read more in the section, “Georgetown University: Using Display Technology to Support Established Pedagogy.”)

²<https://library.educause.edu/resources/2019/4/2019-horizon-report>

³<https://thesextantgroup.com/portfolio-items/university-of-missouri-kansas-city-bloch-school-of-management/?portfolioID=4550>

■ Collaborative Display Technology Enhances Learning Spaces



One of the most significant changes in higher education is the move from lecture-based teaching to team-based learning, and not only at the scale of the UT Southwestern medical school.

“Active-learning spaces are what we see most universities trying to make as their baseline, standard classrooms,” says Jason Nast of technology integrator CTSI, which works with colleges to implement new systems and designs. The company has been outfitting 27 active-learning classrooms at George Mason University, near Washington, D.C.

“There is no front of the room,” Nast explains. “The teacher station is mobile; there are display screens in different sections of the room; and portable microphones for voice reinforcement.”

The furniture in those spaces is usually mobile and modular. Groups of students arrange themselves around a large, flat-screen display and either connect their laptops directly or

through a wireless intermediary device. Some displays even have built-in support for “casting” content from a variety of mobile devices, allowing students to collaborate however they’re most comfortable. And many have touch screens so students and faculty can annotate presentations on-screen and save the content for later use.

In addition, such active-learning spaces typically incorporate links to a university’s preferred video conferencing platform in order to connect with remote students or lecturers from within the classroom. Especially in light of the recent pandemic, which temporarily shuttered learning spaces at higher education institutions, creating collaborative solutions that can combine physical and virtual modes of interacting is critical to maintaining a rich learning experience. The days of entire classes taking place in the same room are probably behind us. Audiovisual and collaborative technology form the foundation of this hybrid active learning.

“Investing in what can be complicated technology, but designed in a way that you don’t really even notice, creates a seamless experience,” says Molly Chehak, Managing Director of Georgetown University’s CNDLS program. “Someone can easily bring remote speakers into a classroom and the experience is seamless. You can bring in learners who may be remote, but are still part of the class, in a way that is very personal. That makes a good class great.”



■ Large-Format Video Makes a Big Impression

Beyond the classroom, modern audiovisual technology is helping schools communicate in new, impactful ways while also leaving a lasting impression on new and prospective students, university supporters and even members of the community. Increasingly, display solutions as impressive as those seen in malls, athletic arenas and other public spaces can support engaging experiences in higher education. Sometimes they're designed with large, thin TV-style displays; other times they're made of bright, LED signage displays, similar to the kind of display technology used outdoors.

At the University of Missouri, Kansas City, Henry W. Bloch Executive Hall for Entrepreneurship and Innovation, technologists at The Sextant Group designed a massive videowall⁴ for the building's three-story atrium. Comprised of 20 flat-panel displays, the videowall not only communicates the hall's commitment to innovation through digital signage and messaging, but also offers a stunning backdrop for presentations and events.

"It's the university's school of business," says Park, "so there's a stock ticker running along the bottom with live video showing what's going on around campus and within the business school."

A large set of stairs facing the videowall provides a place for students and faculty to meet and socialize, but also serves as seating for guest lecturers and others who want to use the display as their presentation canvas.

"This type of 'wow' wall offers the kind of video showcase that you're seeing more and more of on college campuses. It's bright and visible from outside the building, attracting attention and engaging passersby with the school's mission," Park says.

Such 'wow' walls also show up in large lecture halls as an alternative to video projection systems. The University of Idaho, for example, built such a wall for one of its life sciences classrooms configured for 120 students. The wall consists of nine 55-inch flat-screen displays with very thin bezels, so it appears

as one giant screen. In this case, the advantage of a large videowall is that the types of content it shows — detailed images of cells and organisms, CAD drawings, diagrams and more — are more easily readable by everyone in the room.

"Many institutions have an art budget for new buildings," says Park. "That's one way to fund a videowall, particularly in community engagement centers, with content moderated by student groups."

⁴<https://thesextantgroup.com/portfolio-items/university-of-missouri-kansas-city-bloch-school-of-management/?portfolioID=4550>

■ eSports Represents a New Frontier

It almost goes without saying that the stadiums and arenas hosting collegiate sports are incubators for technological innovation; from broadcast suites, to very high-definition scoreboards to ubiquitous digital signage. In fact, digital signage is quickly becoming omnipresent throughout campuses. Distributed digital displays, networked so they can be controlled and managed from a central location, have become one of the best ways to communicate information about activities, classes, and more. They're even effective as emergency notification systems.

But there's a new sport on campus drawing considerable technology investment. Esports is all about video gaming writ large. It started primarily as a professional gaming phenomenon, but now colleges and universities are getting in on the game. In 2019, the global esports market exceeded \$1 billion⁵, up more than 25 percent from the year before, and the global audience for esports was half a billion people. Today, more than 170 colleges

and universities belong to the National Association of Collegiate Esports, offering more than \$16 million a year in esports scholarships⁶. Some schools are even introducing esports-related coursework.

The collegiate esports experience runs the gamut. Some schools operate small esports spaces; others have built large-scale arenas in which competitors participate at individual workstations while spectators watch the action on giant video screens. The key technology ingredients include fast, responsive video monitors for gamers, computer workstations or gaming consoles and flat-screen displays so that coaches, teammates and fans can watch.

At the high end of the scale is Full Sail University, which created a purpose-built esports arena⁷ that would also serve as an educational space for events and classes when the school's esports team is not competing. Full Sail's 11,200-square-foot arena can hold 500 onlookers, with rows of

gaming stations and expansive LED displays so that there's not a bad seat in the house.

Other colleges have started smaller, but with the same intent of using audiovisual technology to engage a growing population of prospective students. "There are people out there who are extremely interested in not just playing but watching esports," says Anthony Yang, Assistant Vice President and Chief Information Officer at Caldwell University.

Yang says that recently, when the university's president Dr. Nancy Blattner attended a conference, esports was a hot topic, so Yang and his team began investigating how to make it viable. "Since then, our Overwatch team made it to the conference playoffs in their first semester ever," he says. (Read more in the section, "Caldwell University: Improving the Digital Experience. Embracing eSports.")



⁵ <https://www.reuters.com/article/us-videogames-outlook/global-esports-revenues-to-top-1-billion-in-2019-report-idUSKCN1Q11XY>

⁶ <https://nacesports.org/about/>

⁷ <https://www.avixa.org/insight/CaseStudies/Details/full-sail-university-raises-the-bar-for-esports-venues/>

■ Digital Experiences Lead to Better Learning Outcomes



As students and faculty begin to reassemble safely at institutions of higher education, an evolution toward new technology will continue. Reflecting the digital world from which their students come, colleges and universities are investing in experiences that meet expectations and create a higher level of engagement.

“For example,” says The Sextant Group’s Craig Park, “Students now are enamored with creating and streaming video. Schools are now using new audiovisual technology to create ‘one-button’ studio spaces that are easy to use.”

Describing a project at the University of North Dakota, where the school is piloting a handful of active-learning classrooms, Park says students love them because they use technology to create a team experience.

“I happened to walk into one after hours and there were two groups of four students with

their mobile devices working on a project together,” Park says. “I asked, ‘Why do you come here and not the library?’ And they said it was because the tables and display screens were set up for them to easily use and collaborate.”

Display technology continues to evolve and innovate. As it does, colleges and universities will find new applications and ways to enhance life on campus, whether that means more virtual learning that gathers together students from all over, or virtual reality technology that uses new display solutions to create safe, immersive education experiences. Research firm Futuresource Consulting recently estimated⁸ that the education market would be the biggest buyer of cutting-edge, interactive flat-panel displays (IFPD), snapping up nearly 2 million of the all-in-one collaboration devices in 2020 and 2021.

All of this is in the service of a better learning experience, not technology adoption for technology’s sake. Says Aiden Sizemore at FSU’s College of Business, “Our biggest goal is to make sure we’re not forcing anyone to use a certain technology. It’s there to be assistive, make the process of learning easier and more engaging, and help faculty do their jobs even better.”

⁸ <https://www.futuresource-consulting.com/reports/posts/2019/february/futuresource-interactive-displays-in-the-education-and-corporate-sectors-market-track-worldwide-q4-2018/?locale=e>

■ Spotlight on Georgetown University: Using Display Technology to Support Established Pedagogy

Georgetown University, in Washington, D.C., was founded in 1789 and is the oldest Jesuit Catholic institution of higher education in the United States⁹. It is also among the most forward-thinking universities when it comes to applying new technology to learning. Twenty years ago, Georgetown launched its Center for New Designs in Learning and Scholarship (CNDLS), one of the nation's first higher education programs aimed at bridging pedagogy and technological innovation.

"Georgetown has a long tradition of Ignation pedagogy, based on the 16th-century teachings of Saint Ignatius of Loyola," says Margaret Debelius, Director of Faculty Initiatives at CNDLS. "It's this five-step process of context, experience, action, reflection and evaluation. It still stands to this day, and technology allows us to do those things a little bit differently. It has expanded the ways in which we can engage in inquiry and reflection – things that are central to a Georgetown education."

In 2019, the CNDLS team wanted to reimagine learning spaces through collaborative technology. Working with LG Business Solutions and local technology integrator CTSI, Georgetown introduced to faculty and students a multidimensional

classroom to support small- and large-group exploration, interactivity, distance-learning, and more.

"It's not a typical classroom," explains Andy Bukowski, systems designer at CTSI. "From a professor's perspective, they wanted to have a dual-display setup that could support remote participants on one screen and presentation material on the other. They also wanted a more typical single-display system you might see in a standard classroom. And they wanted to make it so smaller groups of students could gather around several different displays, connect and collaborate."

Flexible Technology for Multiple Teaching Modes

The final design, which first welcomed students and teachers in the fall of 2019, includes a pair of large (75-inch), 4K, interactive LG touch displays at one end of the room, a third 86-inch LG interactive 4K display at the other, and a fourth 86-inch LG 4K display on one side, opposite the classroom's bank of windows. There are Logitech® cameras installed on each wall for connecting directly to Georgetown's Zoom® video conferencing system; Biamp® ceiling speakers and microphone arrays for tracking

speakers in the room and optimizing audio on other ends of a Zoom session; and four Mersive Solstice™ collaboration pods, which users can connect to wirelessly to share content on the room's displays.

"Many Georgetown classrooms have a big stage, a mothership of a desk and a screen that's very clearly a front of the room," says CNDLS Managing Director Molly Chehak. "We took out the stage and the desk so there is no front of the classroom. All the displays can be used by anybody in the room – instructors and students alike. They offer a collaborative space where students can work together on the same screen or multiple screens at one time, comparing, contrasting and collaborating. In a lecture-style situation, a professor can use one or more as a confidence display, or set them up as a gallery walk."

One anthropology professor would start each class in a unified, centralized formation, then students would rearrange the mobile furniture to be physically near one of the room's four displays. "They'd collaborate on a screen, then turn around and present to the rest of the class," Chehak says.

For Georgetown, it's a real-world application of new technology to an active-learning pedagogy. "The professor's presentation is about five or 10 minutes at the beginning of class," Chehak says. "The rest of the class is experiential; it's discovery and inquiry-based learning."

⁹ <https://www.georgetown.edu/who-we-are/our-history>



Transparent, Intuitive Control

Everything in the room is managed through a Crestron® control system and touch panel, specially programmed to be as seamless as possible. According to CTSI, the biggest challenge may have been designing the system to include remote participants who would appear on the LG displays via video conferencing link.

“If you’re familiar with most control systems, you basically need to leave that software to launch a Zoom session. That’s not practical for the people using the room,” says Bukowski. “We worked with Crestron and Zoom to modify the application programming interface and create intuitive buttons, so it felt seamless as the professor transitioned to conferences.”

And with four different large-screen touch displays but only one classroom computer, the control system needed to manage which touch display was controlling the computer at any given time.

“We tried to make this transparent, too,” says Bukowski. “On a graphical map showing the room’s displays, a little thumb icon indicates which touch screen is in control.”

When professors initiate a videoconference, they go to the touch panel, select Zoom, tell the system where they want the remote participants displayed and where they want the presentation displayed, pick the screen with the thumb and then they’re actually controlling it through the LG touchscreen display.

“Typically, a higher education learning space might have one of these configurations in a room,” says Bukowski. “But we worked with the CNDLS team and our partners to make hopping in and out of different collaboration modes very intuitive.”

Faculty has been quick to adopt the classroom technology. When the CTSI and LG teams visited to familiarize users with the installed system, such as the Mersive® wireless collaboration pods, found they were well received by staff members. Because users can connect to the pods from their smartphones and begin sharing content on the room’s LG displays, the learning curve was very minor.

Says Chehak, “The changes we made to the classroom reflect the deep shift in pedagogy and the experience of education. It’s student-centered, collaboration-centered, it’s multifaceted and needs to allow for the outside to come inside, and the inside to go outside. Technology can do that.”

■ Spotlight on Caldwell University: Improving the Digital Experience, Embracing eSports

Caldwell University has been on a roll. In recent years, the liberal arts school of 2,200 students in Caldwell, New Jersey, has seen enrollment increasing, invested \$2 million in federal grants to help establish its Center for Excellence for Teaching, and made news by successfully launching a varsity eSports program¹⁰. At the heart of its recent success has been a commitment to using technology to enhance the higher education experience.

In the Summer, 2019, university officials surveyed their existing classrooms and determined that many of them were in need of an overhaul. With rising enrollment, they decided that the time was right to refresh its learning technologies with solutions that better engage today's digital-native students.

"We decided to invest in technological improvements to some of our classrooms that had aging hardware and software," explains Anthony Yang, Caldwell University Assistant Vice President and Chief Information Officer. "Many didn't have the right kind of environment for where classes are going today.

Some had computers connected to displays, but we wanted to upgrade all those displays and add new control systems. The goal was to create a one-touch process that's as seamless as possible for instructors who need to use technology in the room."

The university has also been in the process of modernizing its buildings through digital signage. With screens around campus, it's looking to implement new communications capabilities that support not only the digital dissemination of campus news, but also emergency notification and other real-time information.

"I want to make our hallways look less like a high school and more like a modern space for education," Yang says. "The next step is to find a solution that can leverage the placement of all of these digital displays and their network connectivity, so that if, for example, there's a weather closing or something worse, we can take over every digital display and instruct people to take action or not."



And then there is the new esports program, made successful in part by the school's commitment to creating a dedicated arena, with large screen displays on which students and faculty can watch the competition. Across the world, competitive video gaming has taken off at the professional – and now collegiate – level.

"Just like collegiate athletics, our program comes out of the demand from prospective students who want to continue to engage in any type of event or game or sport at a competitive level," says Yang. "And there are people out there who are extremely interested in not just playing, but also watching esports."

All told, Caldwell University's embrace of new technology has kept Yang and his staff busy – and they're pleased with the results.

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¹⁰ <https://www.caldwell.edu/about>

A Standardized Visual Experience

To date, Caldwell University has reimagined learning technology in 19 classrooms — all modernized over a single summer. The school has standardized on Crestron controllers, typically installed in podiums, to drive various LG classroom displays, where appropriate, or laser-based projectors in larger spaces. Most rooms have built-in ceiling microphones picking up audio from the class itself and allowing students and faculty to communicate with remote participants through a video conferencing link. Like many universities today, Caldwell has adopted the Zoom platform to help video-enable its students, faculty and learning spaces.

“Whether it’s another student or a guest lecturer who wants to communicate from outside the classroom, we wanted the supporting technology in our spaces, and we wanted it to be easy to use,” says Yang. “Standardization has definitely helped. Now, with a single type of controller, it’s easy for faculty to switch rooms and still have a familiar technology experience. Everything is available at their fingertips.”

Outside the classrooms, Caldwell University is moving to standardize its digital signage experience for better communication and management. Today about 40 LCD screens around campus are used as information displays, but Yang and his team are looking to

turn them into real-time communications devices. Each currently has some type of media player plugged into it, but Yang says a new fleet of signage displays with built-in computing devices could ease management. “We have network control over every digital display, so we can change them on the fly,” Yang says.

Let the eSports Games Begin

In Caldwell University’s Werner Hall, four 55-inch LG 4K digital signage screens serve a very particular purpose: to show passersby in ultra-high definition the eSports competition taking place in the hall’s purpose-built eSports arena.

Inside the eSports space — a redesigned student lounge — there are 12 gaming stations with high-performance LG monitors and a pair of 43-inch 4K LG commercial displays so coaches can monitor matches or practice. The room is split into two sections, with sound isolation materials installed in between to accommodate multiple competitions without noise distracting players in one or the other.

The university learned quickly that to compete at a high level and engage current and prospective students, its eSports program required the right level of

technology performance. eSports is just as competitive as physical sports, and in an eSports arena, fast responses and smooth graphics really matter,” says Yang. “Our arena has the highest spec PCs available, but the raw processing power and graphics delivery only matter if it’s connected to a top-flight gaming monitor.”

Everywhere on Caldwell University’s campus, investment in audiovisual technology — whether for learning, communication, or student engagement — supports the institution’s larger goals. “These things draw students in,” Yang says, “but even more importantly, they help retain them and make sure they graduate.”



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