

PROFILE

Name: Rutgers University
Location: New Brunswick, NJ
Founded: 1766

CHALLENGE

Use technology to help students across different campuses benefit from immersive, connected lecture and instructional experiences.

SOLUTION

Support the Rutgers Immersive Synchronous Lecture Initiative with multiple wide screen, high definition projectors, using Epson[®] Pro L1505UH projectors in synchronous lecture halls across the university's multiple campuses

Like Magic

Rutgers Lecture Halls Create a Truly Immersive Experience

“We’ve created something that, as far as I know, has never been done before: truly immersive lecture halls that make students on different campuses feel that they’re all in the same room.”

That’s Matt Wilk, Associate Director, Digital Classroom Services for Rutgers University, describing the Immersive Synchronous Lecture Initiative completed last year on its New Brunswick and Camden, New Jersey campuses.

To advance that single-room feeling, Wilk and his team designed spaces where, if the professor is not physically present, students see a life-sized image of him or her projected onto a screen in the spot he would normally stand. Students can clearly see classmates at other campuses and hear them as if they were in the same room. If a professor points to the video image of someone in a far end room, the cameras and screens are positioned in such a way that the student feels the professor is really pointing at him.

It’s an amazing illusion, made real through the use of remarkable technology, including high-definition laser projectors from Epson.

In Two Places At Once

Rutgers University, the eighth-oldest college in the United States, is unusually spread out, with students at its New Brunswick-area facilities forced to take busses between classrooms up to ten miles apart.



To help address that issue, and to support shared classes with the Camden campus 30 miles away, Wilk and Assistant Chancellor Paul Hammond set out to design lecture halls that would allow audio and video content to travel rather than people. Yet in doing so, they were very aware that, in many distance learning setups, students do not feel connected to their instructor or their classmates. “They might as well be watching television,” Wilk says.

To create a better lecture hall, Wilk and Hammond worked closely with Sennah Loftus of Voith & Mactavish Architects, Joseph Latessa of collaboration specialists IVCi, and Frost Schroeder of IT integrator Aspire Technology Partners. The team took three key steps.

First, they made sure the rooms themselves are very similar, using the same physical layouts, the same colors, wall treatments, lighting, seating, flooring and design. “We wanted to create highly effective learning spaces that were beautiful, durable and comfortable rooms,” Loftus explains.

Second, the screens are very large and the images very crisp. “If you have someone in the back row wearing a Rutgers t-shirt, you can read it clearly,” Wilk says.

There are seven high-definition images in each room, each ten feet wide, produced by seven Epson Pro L1505UH projectors. Students in the near-end, or “throw” room see the professor live at the podium and, above the podium, three screens. The professor controls what goes on those screens, but in a two-room connection, the outer screens most often show his or her presentation and the center an image of the far-end class. In a class connecting three rooms, the center screen shows the presentation and the outer screens show each of the other student groups.

At the far-end “catch” room or rooms, students also see three images above the podium, but there’s a fourth life-size image of the professor, standing on the spot on the floor where he would normally be.

The design team made this possible by putting two Epson projectors on the center ceiling mount, one above the other, projecting onto an extra-long, custom-built Da-Lite motorized screen. In the “throw” room, the screen drops only halfway down and only the upper projector turns on. In the “catch” rooms, the screen drops nearly to the floor and both projectors activate, creating two 10' wide images, one above the other.

The Epson Pro L projectors are ideal for an application like this, because they deliver 15,000 lumens of color and white brightness¹, and 20,000 hours of virtually maintenance-free operation². “It is really solid technology,” says Latessa. “There’s virtually no maintenance, with no lamps or filters to replace. The projectors start up almost instantly, so if professors are running late, they can just touch the control screen panel and start. As for clarity, color consistency, and efficiency, you really can’t beat laser, and Epson makes quality products they are willing to stand behind.”

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Multiple Cisco SX80 video conferencing codecs work together to handle all communications between the rooms, providing 1080p (60 frame) full high definition video and sound. The combination of the Cisco codec and the Epson projector is what makes the video so compelling.



The third part of the single-room illusion is provided by a sound system based on Shure MXA910 ceiling array microphones and ceiling-mounted speakers. (There are five arrays of eight mics each in the New Brunswick rooms and six arrays, or 48 mics, in the larger Camden room.)

Because these mics have advanced beam-forming capabilities, a student in any seat can ask questions or participate in a discussion and be heard clearly in each room. “Their voices are amplified, but they do not sound like they’re in a studio or on a speakerphone,” Wilk explains. “It’s a natural sound.” The professor can rely on the ceiling mics or wear a lavalier, he adds. “With the ceiling mics, they do have to speak up a little bit, as you would expect in addressing a group.”

Multi-Discipline

The synchronous lecture halls have appeal across disciplines at Rutgers and have been used for classes in health science, economics, plant biology, marketing and theater appreciation.

These rooms work best for larger classes. Each of the New Brunswick rooms can hold up to 140 students, so in combination they tend to be used as a replacement for 200 to 250 seat single-location lecture halls. “We try to cater to the habits and desires of the instructors,” Wilk says. “If they like to use a chalk board, that picks up fine on our cameras, although we prefer they use the document camera, so they can face the class.” Polling systems, which allow professors to gauge the comprehension of their students, are popular at Rutgers, so the design team included a smartphone-based system that works across any distance. “One of our marketing professors starts every class with a question and asks for texted comments. That works really well,” Wilk says.

The synchronous lecture halls are only one part of an effort to moderate the transportation issue at Rutgers. Next year a new

scheduling system will factor in the home locations of students when assigning classrooms. Wilk says the program will help with the scheduling of the new lecture halls as well.

Wilk and his team ask that instructors spend equal time teaching from each location, and that they arrange to have an assistant present in each “catch” room to make sure classes go smoothly, pass out any handouts and administer exams.

Training has been a big part of the success of the program. “We provide instruction in the use of the rooms just before classes start. We also have online tips and ideas, and we provide in-person support, to make sure the professors are comfortable,” Wilk explains. He says the team has also made sure the room controls in these lecture halls are very similar to those in other Rutgers classrooms, so the need for training and support has been minimal.

Reactions From Users

Wilk says that, in the year since the first two lecture halls opened, the team has made several tweaks, for example adding more cameras trained on the students and modifying the layout of the center screen. “We’re having fun with it,” he says. “We’re still fine-tuning the setup to be the best it can be.”

“This was one of the most amazing projects I’ve ever worked on,” Latessa says. “It was fascinating to see it evolve, to see the team work out how to fix the transportation issue, how to create the feel of a single lecture hall, and then how to expand the experience from two rooms to three and beyond.

“It’s blown my mind to see everyone’s hard work come together and to witness the rooms in action,” he adds. “I’ve watched students participate in class and overheard them talking positively about it afterwards. To see the impact the technology is having just makes me smile.”

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“It’s been a success from all kinds of markers and milestones,” Wilk says. “We get good feedback from students and staff, and classes continue to fill.”

“The project was a truly collaborative effort,” Loftus adds. “It was clear from the beginning that each party had the same goal, and the success of the partnership and team can be seen in the success of the rooms.”

Longer term, Wilk says the university is working to develop relationships with other Big Ten universities to share coursework and teach shared classes. The immersive nature of the new lecture halls makes the project that much more appealing. “In a perfect world, we would design a basic room and share it as a package with other schools...actually we’re not that far removed from making that happen now.”

Because the world is not yet perfect, students are still taking busses from class to class in New Brunswick, but not quite as often. “It has been a good solution,” Wilk says. “We’re really excited about it and hope to do more.”

¹ Color brightness (color light output) and white brightness (white light output) will vary depending on usage conditions. Color light output measured in accordance with IDMS 15.4; white light output measured in accordance with ISO 21118.

² 20,000 hours is the estimated projector life when used in Normal Mode. Actual hours may vary depending on mode and usage environment. The Pro L-Series projectors have a limited warranty of three years or 20,000 hours, whichever comes first.