Montana State Provides Technology-Enhanced Active Learning with Extron XTP Systems

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> Campus Interactive Technology Specialist
> at Montana State University

Montana State University – MSU recently sought to take advantage of the emerging classroom models that support active and collaborative learning. The university created two classrooms based on the Technology-Enhanced Active Learning – TEAL model, which is designed to promote easy and effective team-based learning and enhance problem solving skills. Central to the TEAL concept is the flipped classroom, in which students review recorded and study materials before attending class. In-room time is dedicated to collaborating as part of a small group to complete assignments. The instructor provides guidance and supplemental information, and is available to assist groups struggling with the lesson.

To test the success rate of the new classroom model, two rooms, one in Gaines Hall and one in Wilson Hall, were converted to TEAL classrooms. MSU selected Extron's XTP Systems® for AV signal switching and distribution and TouchLink® touchpanels to enable presentation control. Montana State University has been an Extron campus for roughly 16 years. "We selected Extron products due to their unmatched quality and reliability, and the spectacular support and services provided by their engineers," says Brendon Packwood, Campus Interactive Technology Specialist at the MSU Information Technology Center. "For the TEAL classrooms, we decided on the XTP product line because of its ability to handle a diverse range of signals and power over a single CAT-type cable."

High Performance AV Signal Switching and Distribution

Each room's XTP CrossPoint 1600 matrix switcher is installed along with the sound and control systems in a cabinet-mounted 22U slide out rack. The XTP CrossPoint® is populated with a

combination of XTP CP input and output boards for signal routing to local and remote endpoints. “We needed a solution that would allow us to easily connect and matrix five flat panels, a projector, and 26 unique input sources, and XTP does this for us,” says Packwood.

Features built into XTP Systems, such as SpeedSwitch® Technology, EDID Minder®, advanced system monitoring and control capabilities, and the optional redundant power supply help to ensure high performance and reliable system operation in the heavily used TEAL classrooms. “Historically, the gear and cabling necessary for an application of this scope would have been too bulky, cumbersome, hot, and loud for a teaching space," says Packwood. "XTP allows us to do this with ease, and the entire system only took three days to install."

Student Collaboration

The physical layout of a TEAL classroom is an essential part of the model. Prior to the upgrade of Wilson Hall 1-119, the space was used as a 60-seat classroom with tablet armchairs, conventional instructor podium and whiteboards, and a projection system. Gaines Hall 143 used a similar design. MSU’s TEAL classroom layout services 45 students at five round tables. The seven-foot diameter tables are arranged around the perimeter of the room with the instructor’s workstation in the center. Each table provides seating for nine students in groups of three, effectively reducing the student-to-instructor ratio from 45:1 to 15:1.

An Extron Cable Cubby 300S Furniture-Mountable Enclosure offers AV connectivity for each group’s laptops and mobile devices with HDMI or VGA and audio output. Mounted under each table is the RGB-HDMI 300 A that provides analog-to-digital signal conversion and the SW4 HDMI four input HDCP-compliant switcher, which enables switching between group devices. An XTP T HDMI transmitter at the output of the HDMI switcher provides signal extension to the rack-mounted matrix switcher. Cabling for the tables and workstation is run under the raised floor.

A wall-mounted 46" LCD flat panel display is associated with each table to allow content sharing from student devices. Additional in-room displays include a high definition projection system and a confidence monitor on the instructor’s workstation. XTP SR HDMI scaling receivers installed behind each flat panel display and mounted with the projector accept HDMI, audio, and RS-232 signals, Ethernet, and power over the CATx cable.

Ethernet extension provided through the XTP System allows a TEAL classroom to use a single network connection per table of nine students, rather than pulling 45 individual connections. This reduced total project costs for the university in materials and labor, and helped keep installation on schedule.

To share content using the associated LCD display, each table includes a MediaLink® MLC 104 IP Plus L installed in an SMB 203 L low-profile surface mount box. The controller makes source selection so simple

AV switching, audio, and control equipment is rack-mounted in a cabinet that is positioned in a corner of the TEAL classroom.

that students learn to control the presentation, including volume control, after just a few minutes. The design also allows remote system monitoring and AV control from the instructor workstation.

Flexible Control from the Center of the Room

A flipped classroom design allows the instructor to build on the assigned lecture, enabling clarification of concepts presented in the recorded data or introduction of supplemental material. The instructor's workstation includes a configurable TLP 1000TV 10" Tabletop TouchLink Touchpanel that allows for monitoring and control of presentation and in-room AV devices. It provides simple operation of local sources, including a computer and a document camera. An Extron Cable Cubby 600 enclosure provides power and AV connectivity for a laptop, tablet, or other portable device with digital or analog AV output.

An Extron DVS 605 A scaling switcher accepts digital and analog video signals, converting transmissions to a common HDMI output resolution. Analog audio signals are embedded onto the HDMI signal for an all-digital transmission to the associated display. To share data with

The Extron TLP 1000TV TouchLink Touchpanel enables easy control of the AV system and lighting level to ensure optimal viewing at each table.

the instructor or another table, an XTP T HDMI installed with the scaling switcher sends the content to the XTP CrossPoint matrix switcher. A single network drop to the workstation allows communication between the DVS 605 A and an Extron IPCP 505 IP Link® Control Processor that is rack-mounted with the matrix switcher. The processor provides simultaneous two-way control and monitoring of the various AV devices.

The AV system includes an Extron DMP 64 ProDSP™ digital matrix processor to optimize the audio signals from the XTP System for the room with advanced filtering, dynamics, and feedback suppression. Amplification is provided by an energy-efficient XPA 2001-70V 200 watt amplifier for two pairs of FF 120T Flat Field® Speakers. The low-profile drop-in design of the plenum rated FF 120T not only allows for ease of installation, but offers an exceptionally wide dispersion of 170 degrees to ensure high quality sound at all seats with fewer speakers.

Typically, supplemental content sources are connected at the instructor workstation via the Cable Cubby® enclosure for distribution to the projection system and the five wall-mounted displays. At the touch of a button, the instructor can also share one group's work with another group or with the entire class. When not being used for lessons, the TEAL classrooms are open with all functionality enabled for independent student group work.

Results

Gaines Hall 143 opened with 930 undergraduate students enrolled in 25 classes, including algebra, statistics, business, engineering, education, and geography. Wilson Hall 1-119 opened shortly after to support an equivalent variety of subject matter. The rooms have created a certain amount of excitement among faculty about changing teaching models, and students have also commented positively about the flipped style of instruction.

The TEAL classroom model has proven to be a phenomenal success, facilitating the kind of learning environment and opportunities hoped for by MSU. Success rates are similar to improvements described nationally, with an average of 30% more students receiving passing grades in each subject. For example, 86% of those taking statistics in TEAL classrooms received passing grades at the end of the first semester, while only 56% of those in traditional classrooms received passing grades over the previous six semesters.

"We wanted to offer a technology-rich active learning space on campus with a high level of functionality that would be within a reasonable budget," says Ritchie Boyd, Academic Technology Specialist at MSU. "Equipping our TEAL classrooms with Extron's XTP Systems and TouchLink touchpanels has been a fantastic solution."

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