



Higher Ed Tech Guide

2014

AVI  SPL[®]

Creating and Deploying Effective Interactive Classrooms

Interactive classrooms are transforming the modern university. The University of Florida, for example, has changed the dynamics of teaching and learning by incorporating areas that encourage participation and collaboration. In one interactive classroom, desks and tables face each other and pop-up hubs provide connectivity. Projectors and screens display material from student devices connected to the hubs. Meanwhile, the instructor works from a table or from the middle of the classroom, integrating collaboration into the teaching and learning process.

The era of the “sage on the stage” is drawing to a close. Rather than sitting at rows of desks or in auditorium seating, students in today’s interactive classrooms turn learning into a collaborative effort that leads to improved retention and greater long-term impact.

The key to creating collaborative learning opportunities is to equip classrooms with the latest advances in educational technologies. Some of the tools used in this process include interactive displays, wireless presentation equipment, lecture capture systems, and interactive tablets.

In this guide, learn more about creating an interactive classroom, the technologies required, and what features to consider when selecting a particular technology.



This video wall enables Rice University researchers to maximize the value and relevance of their data by creating an immersive environment to explore and tag images from every possible angle.

Benefits of the Interactive Classroom

Classrooms equipped with interactive technologies can offer numerous benefits for students, including:

Improved collaboration - Research shows that problem solving, recall, and understanding are enhanced through collaborative learning opportunities. Collaboration between students not only includes localized small groups, but also global interactions. For example, at Allegheny College in Pennsylvania, a geography instructor arranged for his students to collaborate via video conference with students at an English-language college in Afghanistan. Students in each class prepared detailed reports about the physical and human geography of their towns and exchanged their findings in presentations to each other.

More active learning opportunities - Being actively engaged in the learning process increases student motivation and leads to improved learning outcomes. Interactive technologies increase student engagement by minimizing time spent in passive lecture-based activity. Computers, especially web-based resources, can disseminate basic information more efficiently and more cost effectively than human beings. This information is deliverable in a variety of formats and is accessible at any time. Students can review course material when it is most convenient for them and return to it as often as they need to achieve comprehension and competency.

Greater peer-to-peer learning - Some of the most effective ways to increase student understanding include peer conversations, active inquiry, and authentic debate. The technologies of an interactive classroom make it easier for students to share information, findings, and conclusions. This can take place between small groups within the classroom or globally with peers at other institutions. Within this context, students take more responsibility for their learning and construct meaning themselves, rather than passively absorbing information from a professor. Students work in established groups throughout the semester and are encouraged to work out solutions among themselves while instructors provide direction and feedback on learning concepts and performance. In a collaborative classroom, students work together much like in an office environment where employees collaborate on projects. This type of interactive learning environment helps prepare students for future success in the business world.

Simulations and interactive demonstrations - With innovations like 3-D display technology, students can have a more hands-on learning experience. For example, Rice University recently created the school's first 3-D visualization lab. By projecting data onto a 3-D stereoscopic immersive visualization wall, researchers create realistic renderings of volumes, surfaces, and illumination sources. An optical tracking system allows them to track their position among data and images in three dimensions.

Students see the possibilities in their field in an up-close and engaging way, and institutions are able to be more technologically responsive and competitive in higher education.

Challenges of the Interactive Classroom

While the benefits are extensive and new models of learning are possible in interactive classrooms, there are challenges involved with creating these innovative learning spaces. Some of these include:



IT support - New learning technologies must be explored and integrated into physical and virtual learning environments where the components are dynamic and evolving rapidly. Student academic outcomes continue to gain importance in higher education, and leveraging technology to improve these outcomes is vital. Finding the IT staff to support and sustain these ventures is challenging in a cost-constrained environment.

Locating solutions that require minimal IT support requires research, but the effort will result in long-term benefits. Purchasing equipment with long-term warranties that protect the investment will take some of the burden off of the IT department. Universities can also leverage contract services or managed services for support and maintenance. A vendor experienced in integrating interactive technologies can provide valuable input during this process, including product recommendations to minimize device/software conflicts, achieve cost-effectiveness, and reduce maintenance concerns.



Flexibility - Designing multi-use spaces is a substantial challenge. These spaces need to be simple, flexible, and cost-effective. To meet this need, universities can create classrooms that have breakout areas for peer-to-peer collaboration, as well as space for traditional lectures. Ensure that multiple types of writing surfaces are available for students and instructors. Use interactive displays with the ability to switch between multiple screens to facilitate interaction. Enable students to use their own devices (BYOD), such as phones, tablets, and laptops to collaborate.



BYOD-friendly technology - Students expect interactive classrooms to support the use of their personal devices, but with the rapid evolution of these devices, standardization is nearly impossible. With the wide variety of connectors these devices employ, providing connection points for every conceivable device would be a never-ending task. To make BYOD practical and feasible, provide HDMI inputs with the understanding that faculty and students are responsible for supplying cords and dongles that allow them to connect their own devices. Select core applications and technologies that are accessible to a variety of platforms and devices. Employ wireless capabilities as much as possible to minimize connection issues.



Faculty resistance to learning new technology - Change is sometimes difficult under ideal circumstances, and making the move to interactive classrooms is particularly challenging when faculty members have to change the way they have worked for years. To meet this challenge, reach out to faculty teams and other groups to enlist their help in creating attractive and effective classroom space. Show faculty how the changes might look with practical classroom-based examples. Solicit ideas and input while maintaining the institution's vision of an interactive classroom. Remove older technologies so faculty members are required to use the new technology without the option of defaulting to previous tools and methods.

Four Technologies for the Interactive Classroom

An interactive classroom involves deployment of numerous technologies. However, four technologies in particular will help ensure an effective space that supports collaboration and peer-to-peer learning.

2

Interactive tablets/computers provide collaboration tools to create and present interactive lessons. These devices effectively function as mobile interactive whiteboards. When used in an interactive classroom, their screens are easily shared onto other surfaces while the instructor moves around the classroom. Modifying or annotating the material displayed is a simple process.

4

Lecture capture systems record and archive the content of a lecture, conference, or seminar. Hardware and software are used to capture the audio and video. Other items, such as a slideshow or photographs, can also be incorporated into the recording. Modern lecture recording software supports indexing through Optical Character Recognition (OCR), instant search, real-time video editing, and annotation, along with other advanced features. Lecture capture is used to archive traditional classroom presentations for future use, and it can also create additional reference material to supplement what happens in the classroom. Captured material is distributable via websites or physical media such as DVD's or flash drives. It can also be integrated into a Learning Management System (LMS) and viewed from virtually any type of digital display device.

1

Interactive displays look much like regular flat-panel televisions but have a wide range of additional functions and features. They can typically display images in portrait and landscape mode, and display higher resolution computer images better than standard TVs. They can also offer touch-screen capability, and many support pen input. Screen-sharing software can enable interactive displays to show screens from multiple devices. An instructor with an interactive display can walk around the classroom and choose to display a screen from a student device and then can move effortlessly between devices.

3

Wireless presentation systems serve as interactive presentation gateways for wirelessly connecting content and personal devices to an interactive display system. Users can wirelessly display documents, presentations, photos, and videos from a PC, Mac, smartphone, or tablet directly onto the interactive display system without using cables and without loading drivers on the device. Some systems offer split-screen modes that allow screens from multiple devices to be projected at once for comparison or collaborations.

What to Consider

Numerous factors should be evaluated when selecting hardware and software for an interactive classroom. The decision matrix below highlights the top three factors for each of the four technologies described above. Use the Priority Rank column to rank the features that are most important to you.

 Interactive displays		
Feature	Why it matters	Priority rank
Size of screen	Larger screens offer greater visibility, but the size of the classroom should be taken into account, as an overly large screen could overwhelm the room.	
Size of professor using the display	Consider your users and mount the displays at a height that allows easy access to on-screen controls, as well as to the material being displayed.	
Handwriting capabilities	Legibility is essential, as is minimizing latency in displaying handwriting.	
 Interactive tablets		
Handwriting capabilities	Minimal latency will ensure greater clarity of handwriting.	
Size of tablet	Ensure that tablets will fit comfortably on available lecterns to provide ease of use.	
Software compatibility	Confirm that software packages conform to institutional standards, as well as to hardware in use.	
 Wireless		
Cost	Pricing may vary considerably between systems. Prioritize system capabilities and confirm that essential features are included in a given price.	
Quality	Image quality varies from one system to another. Consider student quality needs and expectations, as well as the level of visual detail in course materials during system selection.	
Functionality	Consider how materials are retrieved, whether through direct network access or from a device interface. Determine whether sequential (one user at a time) or simultaneous (multiple users) access is required.	
 Lecture capture		
Cost	The cost of these systems can be weighted heavily toward either hardware or software. Determine the strengths of your existing or planned infrastructure, then target systems that provide needed capabilities.	
Resolution	Determine if high-definition (HD) resolution is needed to produce acceptable output.	
Storage	Ensure that adequate space is available to store data such as audio and video, and that sufficient resources are available as more users begin using the system. Develop a protocol for cataloging captured materials to provide ease of access.	

Best Practices for Developing Interactive Classrooms

A number of best practices have been established to assist in the development of effective interactive classrooms. These best practices take into account the needs of students, faculty, IT staff, and administrators to help provide user-friendly learning spaces that are efficient and cost-effective. The best interactive classrooms incorporate:



Flexible classroom design

Effective interactive classrooms provide a variety of options for students and faculty to display information, engage in discussion, and perform classwork. Install furniture that is lightweight, moveable, and reconfigurable. Carpet floors will improve sound absorption. Install wheels on chairs to enable easy navigation and access to power and data outlets. Provide an instructor station that is small and mobile, giving the instructor the ability to move about the classroom, assist with discussions, and answer questions. Locate lighting fixtures close to projection screens for easy on/off access. Use indirect lighting to provide soft illumination, and install sensors to automatically turn lighting on or off as needed. Insulate the rooms and install individual climate controls to ensure a quiet and comfortable learning environment. When possible, interconnect classrooms to accommodate variations in class size.

Variety of writing spaces

Perimeter walls should have a variety of writing surfaces. Traditional whiteboards permit students and faculty to write key messages and record notes from brainstorming sessions. Make corkboards and magnetic surfaces available to accommodate paper materials and other notes that need to be displayed during class. Plentiful and spacious writing surfaces, including those on student desks and workstations, will also ensure that a class can continue uninterrupted in the event of a connectivity outage.

Redundant technology

Mount multiple electronic display surfaces on several walls. Make screens available for displaying projected images using ceiling-mounted projectors. Multiple wall-mounted flat-panels, 42" or larger, with the ability to shift from side to side will enable small workgroups to display computer-based materials. Choose audiovisual equipment with remote controls to provide easy access to network devices and control displays. Cameras mounted at the front and rear of the classroom will allow for lecture capture and recording of other activities to be distributed for later viewing, as well as provide capacity for teleconferencing.

Good acoustics and sound throughout room

While many flat-panels are also equipped with built-in speakers, ceiling-mounted speakers provide clearer sound and sufficient volume. Speakers should be accessible by remote control, as well as by the instructor workstation. Install ceiling tiles and sound baffles to minimize ambient sound.

Collaboration and BYOD environment and support

Sufficient wireless connectivity is needed to accommodate a classroom full of mobile device users. Whenever possible, select platform-independent applications that are accessible by a wide range of devices and their associated operating systems.

Wireless and hardwired connectivity available

Install hardwired outlets to provide support for ultra-high-bandwidth needs, such as high-definition online video and multi-site videoconferencing. Also include adequate wireless connectivity for low-impact applications and individual device connectivity. Make wall and floor-mounted power outlets plentiful for recharging mobile devices and powering portable equipment.

Faculty training

Provide faculty with research and data on why and how a technology-supported, collaborative approach can improve teaching and learning. Offer training sessions to help educators consider how they would incorporate collaborative technologies into their existing lesson plans. These sessions encourage educators to rethink everything—from which data they project onto walls to how to share student work with the class. Familiarize faculty with the technology used in an interactive classroom, as well as movable tables and chairs and other elements of the space.

Test drive technology

As much as possible, use a hands-on approach when evaluating potential technologies. Engage directly with any technology that might be considered for use in an interactive classroom. Site visits to nearby institutions with existing interactive classroom space can help faculty, students, administrators, and IT staff get an idea of the technologies available to power the classroom, and observe them in use. Identify faculty members with a significant interest in educational technology, and involve them in hands-on testing whenever possible. Ask questions of those currently using these technologies to find out what they like, as well as what they would do differently if given the chance.



Conclusion

Unlike the traditional lecture-oriented room, the interactive classroom emphasizes group learning and collaboration. Research shows that students who actively engage with course material are more likely to recall information later and be able to use that information in different contexts. With this in mind, it is critical that colleges and universities design classrooms that will accommodate a variety of learning activities, including those powered by technology.

The array of available instructional technology choices is daunting. If administrators select the most appropriate technologies and follow best practices for implementation, they can create interactive classrooms that will position today's students for success.

Next Steps

To learn more about AVI-SPL and the range of services they provide for colleges and universities, visit www.avispl.com.



About AVI-SPL

About AVI-SPL. As the world's leading video communications partner, AVI-SPL designs, builds and supports the systems and environments that improve the way a school functions inside and outside the classroom. For colleges and universities, AVI-SPL implements video communications and distance learning solutions that connect students and teachers from around the world. Because we're a technology agnostic partner, AVI-SPL is able to integrate its designs with any devices and systems.

AVI-SPL has a strong history of technological innovation in the higher education sector and works closely with its customers to identify the best solutions for the challenges its customers face. AVI-SPL then partners with component, software and system vendors to create its solutions. As a technology agnostic partner, it is able to integrate its designs with any devices and systems.



About Biamp

Biamp Systems is a leading provider of innovative, networked media systems that power the world's most sophisticated audio/video installations. The company is recognized worldwide for delivering high-quality products and backing each product with a commitment to exceptional customer service. Biamp is improving listening experiences from the Ivy League to West Coast universities and from libraries and law schools to research centers.



About Cisco

Cisco (NASDAQ: CSCO) is the worldwide leader in IT. The company helps businesses seize the opportunities of tomorrow by proving that amazing things can happen when connecting the previously unconnected. Cisco can help you create a connected learning environment that delivers quality education to students.



About Sharp

Sharp is dedicated to improving people's lives through the use of advanced technology and a commitment to innovation, quality, value, and design. From Ultra HD Displays to IGZO technology, to award-winning MFP solutions and to the latest in LED lighting, Sharp has always blazed the trail. Sharp places high value on corporate social responsibility and strong business ethics, and it has won numerous awards for its innovative products.

References

¹ "Technology in Education – Higher Education," Education State University.com, accessed August 15, 2014, <http://education.stateuniversity.com/pages/2496/Technology-in-Education-HIGHER-EDUCATION.html>.

² "Collaborative Learning Space," UNC Charlotte – The Center for Teaching and Learning, accessed August 15, 2014, <http://teaching.unc.edu/learning-resources/articles-books/best-practice/collaborative-learning-spaces>.