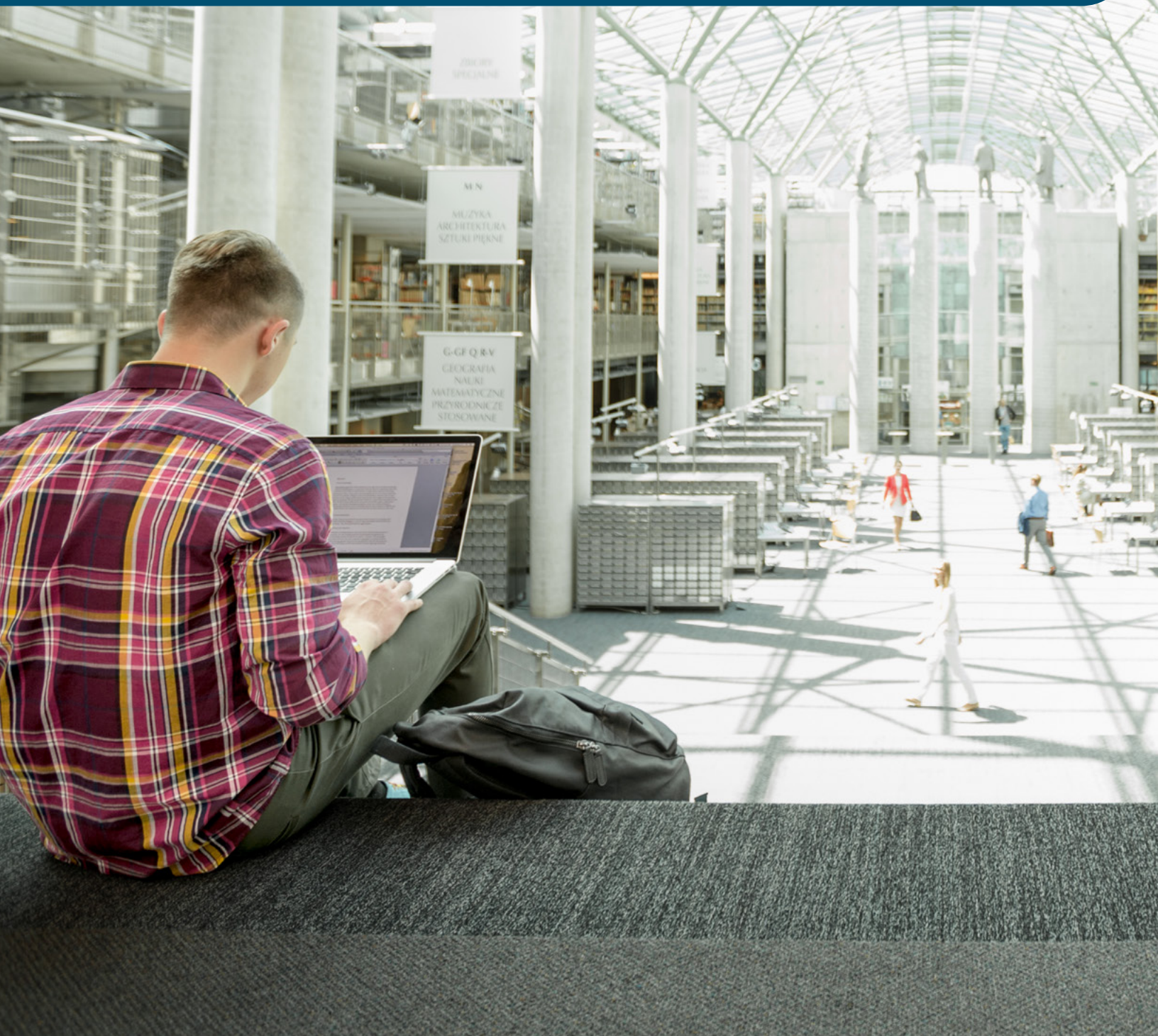
White paper

Creating an Intuitive Campus

Innovation in higher education through collaborative solutions



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The call to action for Unbounded Learning

Higher education in the United States has a distinguished past and an intriguing future. With great challenges and great opportunities looming, many institutions of higher education are at critical junctures. Forced to respond to growing economic pressures while serving an increasingly diverse population of students who have high expectations for their learning environments, these institutions must evolve efficiently and effectively.

It is well documented that economic burdens are mounting for higher education institutions. A recent Ovum ICT Enterprise Insights Survey found that these economic challenges are driving college and university leaders, policymakers, and academics to reconsider how teaching, learning, and research will be delivered for the next generation of students. The survey reports that "the degree to which institutions are able to bring these new models to life successfully will depend, at least in part, on their ability to reallocate scarce resources from commodity functions to those that diffe entiate the core service." The Internet of Things (IoT) will enable institutions to create smarter campuses; of those surveyed, 33.7 percent and 30.6 percent, respectively, cited the ability to improve customer or student services and operational efficiency a key drivers of IoT adoption.

Meanwhile, student demographics are rapidly changing. There is not only more cultural and geographic diversity in student populations, but also more age diversity, with workforce dynamics creating opportunities for lifelong learning. This diverse body of students expects a global education—one not bound by the physical campus and not constrained by traditional class formats such as on-site lectures. Students expect to be able to use their personal technology devices for their coursework, and their campuses to be equipped with state-of-the-art smart buildings, laboratory facilities, tablets, laptops, data centers, and more.

As the future of higher education unfolds, institutions are being forced to rethink their decades- or even centuries-old models of learning, research, administration, and student life. Forward-thinking institutions are replacing traditional approaches in these areas with more collaborative ones made possible through technological advances. These collaborative educational models remove traditional barriers of the classroom and the campus, and allow for stronger, more flexible connections among student , professors, researchers, administrators, and other stakeholders. From students being able to access recorded lectures at the touch of a finger o professors being able to control equipment in their lecture halls or labs from remote locations, new ways of working are changing the face of higher education in the United States.

Tools and capabilities already exist that can aid higher education institutions in becoming more collaborative and that can help them meet new demographic, economic, and institutional challenges.

These tools are currently being tested, deployed, and measured by leading universities, three of which are described in this white paper. In order to thrive in the future, such institutions are thinking ahead to where higher education is going—toward what could be described as a "university without walls"—and how they will get there.

Common speed bumps in higher education

The road to change is often rough and full of detours in the higher education sector. Institutional inertia, built up over decades or even centuries, is prevalent in many higher education settings. Professors, university leadership, and technology decision makers can all be sources of inertia.

Professors often take the "if it's not broken, don't fix it" approach. Skeptical of the impact of technology or innovative pedagogies on their missions, professors are scientists at heart and require empirical evidence to prove the advantages of new ways of teaching and learning. Professors may also have limited resources, time, energy, or interest in testing new teaching and learning methods.

The professors who do see the benefits of using new pedagogies often have to justify their actions to skeptical provosts, deans, boards of trustees, and others in university leadership. Institutions cannot succeed in moving toward the unbounded learning model without firm willingness and a commitment from a university's leadership to invest and take risks.

Another major challenge for institutions in moving to the unbounded learning model is the lack of standardization in technology solutions at most universities. Most universities' information technology services departments started as decentralized support organizations for individual academic departments, with little or no campus-wide oversight. While the voice and data infrastructures at most universities have generally been standardized across campus, most other IT functions have been funded and operated independently on a department-by-department basis. Today, many universities are struggling to integrate the highly diverse range of technology solutions that have developed haphazardly across their campuses over the years. Lack of coordination and integration in technology is costly and prevents institutions from meeting their strategic goals.

The challenges of adopting new pedagogies and technologies in the higher education sector are many. However, higher education has always been, and continues to be, an environment in which innovation can blossom with the proper cultivation. Universities need to step up their efforts to make innovations visible across the institution. When an innovation occurs in one pocket of a university, it needs to be nurtured and promoted so that it spreads across the entire university.

Currently, many institutions are ill equipped to transition to new ways of doing business. Simply buying the latest technologies will not make a university better. The journey requires the proper mix of planning, piloting, training, and marketing of successes that align business goals–such as improved student academic results, increased capture of research grants, and budgetary cost savings–with the programs that an institution prioritizes. For those institutions ready to make the proper investment, the opportunity to provide an even more powerful environment for learning, teaching, and researching is within reach.

This white paper outlines how higher education institutions can effectively deploy collaborative technology solutions to address market challenges, overcome institutional barriers, and transform education.

Beyond the classroom: Blueprint for 21st century higher education

Moving deeper into the 21st century, it is exciting to think of higher education as a blank canvas. Those who shape the future of higher education in the United States are asking meaningful and insightful questions: How can we make our institutions better for our students, faculty, administrators, and communities? How can we transform education to take advantage of exciting new opportunities while preserving what already works well in the system?

These profound questions have served as the basis for big changes at many leading institutions. Our research at institutions ranging from small private colleges to large public universities reveals some patterns in how institutions can successfully deploy new collaborative technologies and implement new pedagogical methods.

This paper outlines what collaborative technologies and approaches work at universities, how universities have effectively deployed these programs and innovations, and the positive effects that have resulted from the new innovations. The impact is described in depth for all major aspects of campus life, including academic, research, student, and administrative life.

Academic: Transforming traditional models of teaching and learning

Many universities and colleges are enjoying great successes and exciting results with the use of new pedagogies enhanced by collaborative technologies. Our research has been focused on institutions in the formative stages of their effort–ones that were either rolling out new pedagogies and technologies as pilot projects or were in their first few years of deployment. Collaborative technologies were being deployed across diffe ent disciplines and in both undergraduate and graduate courses.

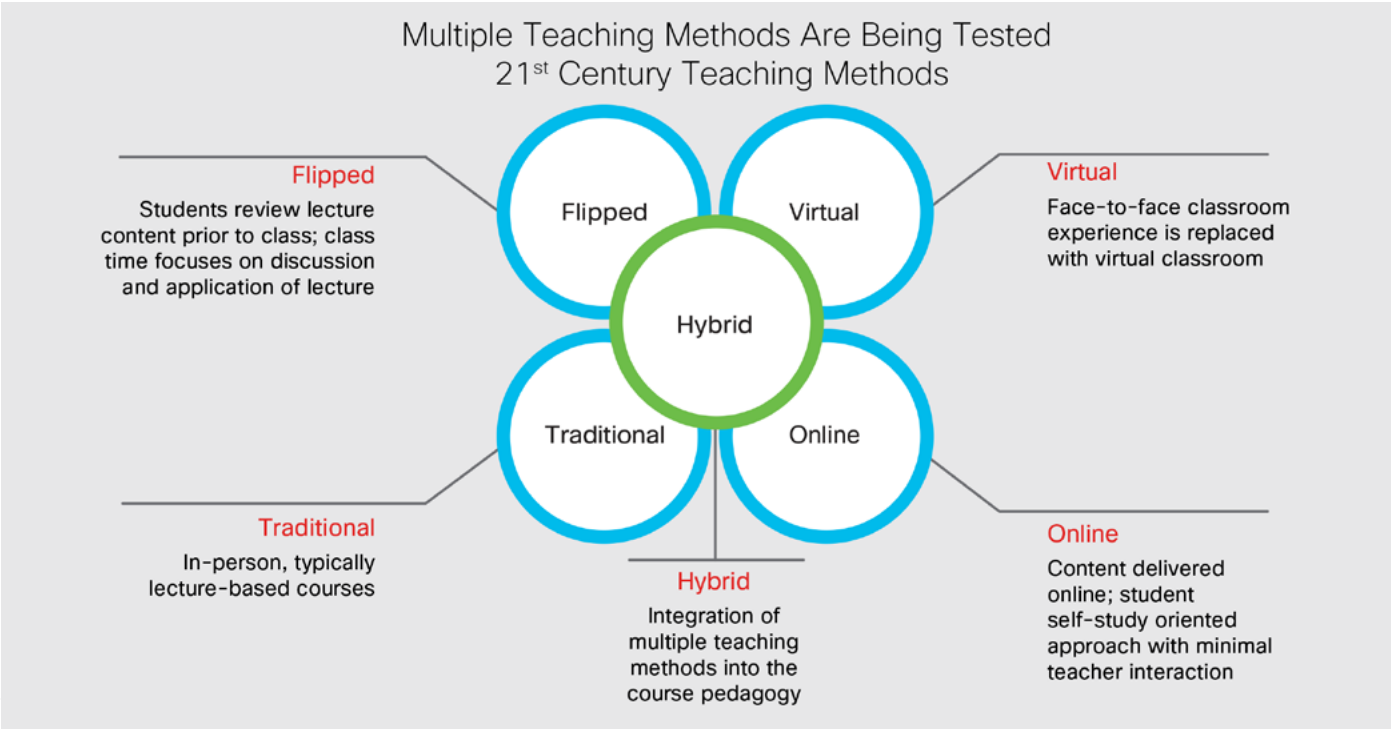
Our research revealed fi e common "archetypes" of teaching methods in the institutions we examined (Figure 1):

- **Traditional classroom:** The long-standing, conventional educational format primarily consists of lecturing to students in a classroom and assigning homework to reinforce the lesson. There is generally little time for interaction between students and professors.
- **Flipped classroom:** This type of classroom "flips" the traditional format. Students watch prerecorded lectures on their own time. On-site classroom time is then used for interactive activities that reinforce the lessons from the lecture.
- **Virtual classroom:** Students are not required to attend class in person and can instead attend via desktop video. This format does not substantially change the overall pedagogy of the course.
- **Online class:** Students typically do not interact with the instructor and can complete an online course at their own pace. The enrollment in an online course can be from 10 times to 100 times greater than the size of a traditionally formatted class.
- **Hybrid class:** A hybrid class combines two or more of the above archetypes. For example, a hybrid course could include a flipped lesson plan but could also be virtual, whereby students view the lectures at their own convenience but must participate in real time in a virtual class for interactive activities and discussions.

A lot of previous research and attention has focused on comparing traditional and online courses. There is no doubt that the debate will continue to rage on the advantages and disadvantages of online programs compared to traditional courses.

In this white paper, however, we are focusing on the other three archetypes: flipped, virtual, and hybrid. These models have received less attention but provide an equal, if not greater, opportunity to affect higher education

Figure 1. Five Teaching Archetypes in Higher Education



Flipped classrooms

Our research shows that flipped classrooms—enhanced through an array of collaborative technologies—are having positive effects on both students and professors. The effects of the new pedagogy include more time for professors to interact with students instead of lecturing, improved student performance, and increased student satisfaction. In addition, professors are better able to focus their instruction on key lesson elements. San Jose State University and Wake Forest University offer two examples that demonstrate the benefits of flipped cla srooms:

- San Jose State University (SJSU) was able to greatly improve the pass rates for a difficult introductory course for engineering students by piloting the flipped classroom format.

  With the goal of improving student comprehension and class performance, SJSU leaders flipped the classroom for the College of Engineering's Introduction to Circuits Analysis class. Students were asked to watch selected online educational videos from MIT (through a partnership with content provided by EdX) and complete a quiz before class. Instructors then swapped lectures for lively discussions during class time. The results were convincing: the pass rate for the class surged from 51 percent to 91 percent.
- At Wake Forest University's School of Law, one professor has effectively "flipped" his traditional Socratic pedagogy and improved student performance with the help of collaborative technologies. Blending synchronous and asynchronous methods of instruction, the professor often engages students virtually instead of in person when questioning them in depth about their understanding of the specifics of a case. This has not only improved student performance, but has also allowed the professor to better gauge a student's progress throughout the semester. The professor also shares online videos and web content and connects to remote experts, including working lawyers and judges, to discuss critical cases. Throughout the semester, students can "click to chat" with the professor during virtual office hours. As one law student remarked, "The course feels more like a personal tutorial. More like 'me and the professor.'"

Virtual classrooms

All over the country, virtual classrooms are succeeding in eliminating barriers of time and space so that students who are juggling employment and family responsibilities with their education are not required to drive long distances or move close to a university.

Although online education and virtual classes are sometimes confused for one another, there are clear diffe ences between the two types of education. While most online education is impersonal and faceless, and often has high dropout rates, virtual classes are led by instructors who have personal contact with their students and are adamant about maintaining the same level of discipline, rigor, and academic results as the traditional courses that preceded them. To achieve these results, professors often spend months preparing new lesson plans, evaluating technology options, and reinventing the classroom to work in a virtual environment. In many cases, professors are granted "workload relief" to allow them to invest the proper time into transforming a traditional course into a virtual one. San Jose State University and the University of Nebraska at Omaha provide two successful examples of virtual classrooms:

- One of San Jose State University's most popular business classes is taught by a professor who lives far from campus, and his students are spread across Northern California. Cisco Webex allows this professor to mix traditional and virtual sessions throughout the semester to add flexibility to this class and keep the curriculum on track. The first class is typically held in person, as is the concluding session: an intercollegiate competition in Southern California. The virtual classroom is yielding significant benefits, including reduced travel time and lower travel costs. The professor alone saved $1,250 in gas expenses during one semester. Going forward, the professor hopes to enhance asynchronous communications with higher-quality video and document-sharing capabilities, such as with Webex Teams.
- The University of Nebraska at Omaha has successfully used virtual solutions to extend the reach of its Center for Economic Education. The center's mission is to improve the economic literacy of current and future residents of Nebraska and western Iowa by providing educational materials and training programs to teachers of K–12 classes. Reaching full-time teachers is a challenge for

the center, since teachers are spread across a huge geographic area and the center maintains only five locations in Nebraska. The center realized that collaborative solutions could help bridge this gap. By conducting virtual seminars and meetings via Webex, the center has been able to create a closer community and enhance its capabilities to achieve their mission. The center has also begun to conduct their recurring internal meetings via Webex, using video to enhance and maintain relationships with teachers across the state.

Hybrid classrooms

Hybrid courses combine two or more pedagogical approaches to enhance instruction and deliver the right content to the right student at the right time. For example, a hybrid course could include elements of both virtual and flipped cla ses, as well as elements of a traditional classroom experience, such as a requirement that students participate in lab sessions. The University of Nebraska at Omaha and San Jose State University have successfully introduced hybrid courses:

- The University of Nebraska at Omaha's College of Education offers a hybrid course that meets the needs of its postgraduate students. These students must juggle their continuing education at the university with full-time positions as educators as well as with family responsibilities. For content-heavy courses such as School Law, missing even one session can create a significant burden for students.

  To help students in these situations, College of Education faculty have begun using a "lecture capture" format, holding their classes in classrooms enabled with Cisco video conferencing, with live video distribution and capture capabilities. Students who are late for class or cannot attend class in person can dial into the session. Professors also record classes, and external resources are easily brought in through these technology solutions to enrich the class discussions.

  The impact has been real and transformational. "I have noticed that my students are showing a greater depth of understanding. This is due to their ability to play back video lectures and other content whenever and wherever they want," said one professor.
- The hybrid classroom approach has allowed San Jose State University's College of Science to extend the reach of its renowned genetics program. Thanks to the rollout of a virtual hybrid model that enables students from hundreds of miles away to join classes using Webex technology, the genetics program attracts a large contingent of students from Southern California and around the nation. Some traditional classes are still part of this hybrid program, with a portion of students attending hands-on clinical sessions hosted in Southern California. Course administrators now hope to use collaborative tools to offer remote tutoring and expanded office hours, and to introduce high-quality, immersive video in the classroom using Cisco video conferencing.

Research: Improving collaboration for increased productivity and lower costs

The research capabilities of a higher education institution play a significant ole in the institution's success. As those familiar with the academic realm can attest, a strong research program helps to drive revenue, attract top talent, and enhance the prestige of an institution.

While the success of an institution's research program depends on many factors, effecti e collaboration is always essential. The university research community has thrived for centuries through the sharing of ideas, making collaboration between university researchers and outside experts and peers one of the most critical components of the research process. New collaborative technology platforms are enhancing collaboration, resulting in improved productivity, decreased costs, and acceleration in activities like the grant application process.

For core research activities, new collaborative technologies allow researchers to identify subject matter experts from around the world and then effecti ely connect with them as easily as they would with a local resource to support their effort .

In traditional research programs, the expert would be fl wn in periodically to support the team, adding costs and reducing productivity. With collaborative technologies, the need for in-person meetings decreases.

For the research grant application process, which has traditionally been time consuming and laborious, collaborative technology solutions are being implemented to reduce delays related to complicated scheduling barriers and to avoid the versioning and revision errors that can crop up. Collaborative technologies have also accelerated tedious review cycles.

Wake Forest University provides a strong example of collaborative research in action:

- A leader in computational biophysics research, Wake Forest University complements its team of researchers with experts from the University of California, San Francisco. This cross-country collaboration has been hampered by distance, however, and the team realized that emails and phone calls were not providing enough context to make meetings productive. To counter this, the teams would fly to meet in person periodically, at high cost and with added logistical burdens. Now the team uses collaborative solutions such as Webex to supplement their virtual meetings and replace the need for face-to-face travel. These meetings use collaborative tools such as video, screen sharing, white boards, and even remote control of a desktop—all enhancing the productivity and effectiveness of the meetings.

Our examination of how research is being aided by collaborative technologies has shown great benefit . Institutions need to do a better job of implementing collaborative tools that have proven effecti e in one part of the university on a broader basis, however. As it stands now, a researcher often designs and implements a collaborative technique by himself or herself, and that is where the innovation ends. The researcher's peers within the institution are not exposed to these novel approaches, and the new techniques exist in isolation. A better method would be for an entire department or the whole university to share and adopt collaborative tools that have been successful.

Student life: Using collaboration to create social opportunities and a sense of community

Higher education is a transformational experience for many students. For young adults, entering college, and often living away from their families for the first time, can be an exciting yet stressful experience. Collaborative technology solutions, such as Webex Teams, which facilitates collaborative spaces, provide an avenue to ease this transition and, in some ways, enhance the overall social experience for the student. In our research, we found several key social programs that have been affected by collaborative platforms: student government groups, student onboarding/social development programs, and international study abroad programs.

- **Student government/student groups:** Student body presidents and other student leaders are eager to share new ideas and best practices with their peers at other institutions. Collaborative technologies can help strengthen the bonds among busy campus leaders by allowing them more flexibility to meet remotely, review recorded sessions they could not attend, and develop relationships with little face-to-face time.

- **Student onboarding/social development programs:** These programs help students get acclimated to campus, develop new friendships, and integrate into the campus community. Collaborative technologies allow these programs to reach more students through online or virtual forums and to provide support to students 24/7 through virtual content.
- **International study abroad programs:** Many colleges and universities offer students the opportunity to study abroad for a semester as part of their learning experience. Collaborative solutions allow these students to enhance their experiences in their host countries by reducing their time spent inside a classroom. These solutions also allow students who are studying abroad to take courses at their home universities if those specific courses are not offered in their host country, and to stay connected to their home university through virtual attendance at social events. In addition, collaborative tools allow students and their international sponsors to connect, build, and maintain relationships before and after their time abroad.

Wake Forest University provides an example of how collaborative technologies can enhance student life:

- Wake Forest University operates a program called "My Journey" to help ease a student's passage from high school through college, a period during which a series of significant transitions can test a student's character. Multichannel communications, social media capabilities, and other collaborative technologies have augmented the program and help provide students with support that reinforces the notion that Wake is there for them in every step of their personal journey.

Administrative: Using collaborative tools to foster better connections and relationships

The same benefits that esult from the use of collaborative tools in the private sector apply to the higher education sector. Like their private sector counterparts, administrators and staff in higher education benefit om enhanced meeting productivity, reduced travel costs, and improved flexibility through the use of collaborative technologies.

Higher education administrators and staff see some unique benefits as ell. For example, collaborative technologies are helping to connect university leadership to important constituents. University and college leaders–including presidents, provosts, and other high-level administrators–are the chief liaisons to influential alumni and funding sou ces.

For leaders of many institutions, finding time o travel to meet with those constituents in person is extremely difficul Coordinating meetings with busy and influential versight and governance members on the institution's boards of trustees can also be tough. Video capabilities are helping to strengthen bonds between university leaders and their important constituent groups, and collaborative technologies like Cisco Webex and video conferencing are helping improve attendance by board committee members and increasing the productivity and effecti eness of these meetings.

Collaborative technologies are also being used to effecti ely connect students with prospective employers. For students, the last leg of their higher education journey is finding employment. This process can be stressful for students as well as for recruiters from the companies that hope to employ them, as it is challenging for both parties to build a rapport and an understanding of each other's strengths and weaknesses in a live interview that is limited by time. Collaborative technologies enable students to meet virtually with recruiting companies prior to the on-campus visit. This allows each party to make better judgments about "fit," and ultimately helps ensure that both have made the right choice. In addition, collaborative technologies allow companies that cannot travel to a campus because of distance or cost to nonetheless reach out to students who they believe are qualified for empl yment.

The journey to collaboration in higher education

The journey to becoming a "university without walls" is not straight or simple. Institutions must overcome major hurdles –namely academic inertia, funding limitations, IT limitations, lack of leadership buy-in and capabilities, and poor internal marketing of collaborative achievements–on their way to successfully implementing collaborative solutions. When institutions do overcome these obstacles, the results are inspiring.

A common denominator among institutions that successfully implement collaborative technologies is strong, progressive leadership. At the universities we analyzed, the provosts and presidents–aided by strong, savvy IT leaders–were willing to "upset the apple cart" to push their institutions into the 21st century. They were willing to allocate funds and provide incentives for professors to use new pedagogies and collaborative technologies. Many of the leaders outlined a vision and a multiyear strategy for their boards and leadership teams to encourage commitment to these new constructs.

Here's a snapshot of the perspectives of a few educators who are taking the lead with collaborative technologies:

- Dr. Nancy Edick, dean of the College of Education at the University of Nebraska at Omaha, recognizes that her students today are the teachers of tomorrow and ultimately will lay the foundation for 21st century teaching and learning. Given the great responsibility of suitably preparing tomorrow's teachers, Dr. Edick states, "Our students are a step ahead if they are exposed to a wide range of sophisticated collaborative technologies... By embracing an array of effective technology tools, we can better prepare future educators for the 21st century classroom, as well as successfully create future K-12 administrative leaders who will be forward-thinking role models in their schools and communities."
- The former president of San Jose State University, Dr. Mohammad Qayoumi, noted that an atmosphere of experimentation needs to drive the journey toward widespread innovation in higher education. "San Jose State's online initiatives are about far more than a single subject, technique, or campus. Our work is about trying many new approaches, identifying what works, and pushing forward a national conversation on effective ways to infuse the opportunities offered by technology into the way we teach and learn."
- Dr. Rogan Kersh, the provost and chief academic officer at Wake Forest University, credits the establishment of a culture of collaboration as a key factor in the success of his institution. Practicing what he preaches, Dr. Kersh took on as his first project at Wake a program to improve wellness. Said Dr. Kersh, "Instead of applying a [wellness] template, I reached out to the 52 organizations that touched the topic.

  "By collaborating across these groups, plus using outside experts, together we were able to address the spiritual, physical, and environmental aspects and provide a comprehensive approach to the university." A testament to the power of collaboration.

The unbounded learning "walk before run" approach

Achieving a high level of effecti e collaboration is a complex undertaking, requiring multiple technologies to be brought together to solve an academic, research, social, or administrative need. Appropriate solutions will span multiple sets of constituents with varied familiarity with technology. Given the diversity of the constituents and the array of technical products being brought together to solve a higher-order requirement–from bring-your-own-device (BYOD) endpoints to cloud-based applications to bandwidth-intensive video networking equipment–we do not recommend the "big bang" approach to deployment for most institutions. We've found that the most successful and fast-paced adopters take a step back by first aligning the institution's collaboration program to its long-range strategic plans. This simple step provides tremendous returns–increasing executive sponsorship, gaining budget approvals, accelerating faculty adoption, reducing technical complexities, and creating a single, standards-based approach to collaboration. Our other top-level recommendations are:

1. **Keep It Simple:** User acceptance is critical to success for collaboration solutions. For many institutions, a history of complicated or clunky legacy solutions (for example, legacy videoconferencing that required IT to set up each call, plus poor connection quality) has created resistance to user adoption of new collaboration solutions. With this backdrop, collaboration must work flawle sly the first time and be as simple o use and as ubiquitous as the telephone. To meet these challenges, and maximize future flexibilit , institutions should investigate collaboration architectures that simplify the user experience and provide an open, standards-based platform to create a "plug-and-play" environment while minimizing ongoing vendor management costs and adding vendor accountability to performance.

2. **Prove the value of the solutions:** Academics are scientists at heart and need the reinforcement of data to prove that the journey is worth taking.

3. **Organize for success:** Institutions have limited full-time resources and need a good set of partners–including technical, training, and help desk resources–to support the journey.

4. **Use Marketing 101:** In a college or university setting, the community is often disaggregated, meaning it is difficult o get the word out regarding new technologies or capabilities. Institutions must treat IT programs as product launches and market them effecti ely.

5. **Be aware of the network effect:** Collaboration solutions tightly follow network effect model . This means that, similar to the telephone, the value of collaborative solutions is exponentially proportional to the number of users on the system, and the full value of the solutions will be realized only when the solution is ubiquitous. We have found that most delays in deploying collaboration involve change management or are user-based, rather than technical. Therefore, we believe that a phased approach will actually achieve full impact faster than the "big bang" approach.

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How Cisco can help

In the face of great challenges and great opportunities, higher education institutions are using collaborative technologies to transform the way they operate. Cisco Services help institutions accelerate the transformational journey to unbounded learning. Our team brings together deep industry knowledge, technology expertise, and a structured approach and methodology to increase collaboration's impact on your students, faculty, administrators, and community. As a first s ep, we will provide a two- to three-week assessment to explore your current state of maturity, align your strategic plan with your collaboration plan, identify a few "right" first s eps in the journey, and develop an execution scorecard to assess their impact.

In a changing higher education environment, Cisco offers a proven portfolio of collaborative technologies that can prepare higher education institutions for the exciting future that lies ahead.

For more information

To find out mo e about the Cisco Collaboration solutions for higher education, go to cisco.com/go/education.

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