

The 21st Century Learning Environment: Next-generation Strategies for Higher Education

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Executive Summary

The Internet has already enabled the transformation of higher education by streamlining campus administrative processes, enhancing facilities such as dorms and classrooms, enabling digital libraries, expanding access to distance learning, and creating more-engaging learning environments through video and simulations.

Even so, many institutions are trying to understand how the next generation of Internet technologies will impact their students and institutions. These technologies include Web 2.0, multimedia, virtual presence, gaming, and the proliferation of next-generation mobile devices.

In this paper, the Cisco® Internet Business Solutions Group (IBSG) presents its vision for how higher-education institutions can use these technologies to enable the 21st Century Learning Environment. In this environment, learners have complete access to any higher-education resource, including experts, lectures, content, courseware, collaborative dialogs, information exchanges, hands-on learning, and research—no matter where they are located.

If fully enabled, the 21st Century Learning Environment will blur the line between on- and off-campus experiences and remove barriers to learning and research—greatly improving the quality of education for students globally.

For terms and definitions, see the Appendix starting on page 16.

Drivers of Change in Higher Education

Institutions seeking to understand how the next generation of Internet technologies will impact their students and schools need to be aware of three trends.

1. College-aged students are rapid adopters of new technologies, devices, and applications.
2. Web and social networking technologies enable easier access to increasingly available education content and online expertise, and offer a venue for contributing and sharing knowledge regardless of location.
3. Students are taking more responsibility for their own learning and will increasingly do so as quality content continues to become available on the Web.

Trend 1—Students are rapidly adopting new technologies.

Adults, between the ages of 18 and 26, are often first to adopt new technologies and use them in their daily lives, whether at home, in social activities, or at school.¹

Consider the following findings:

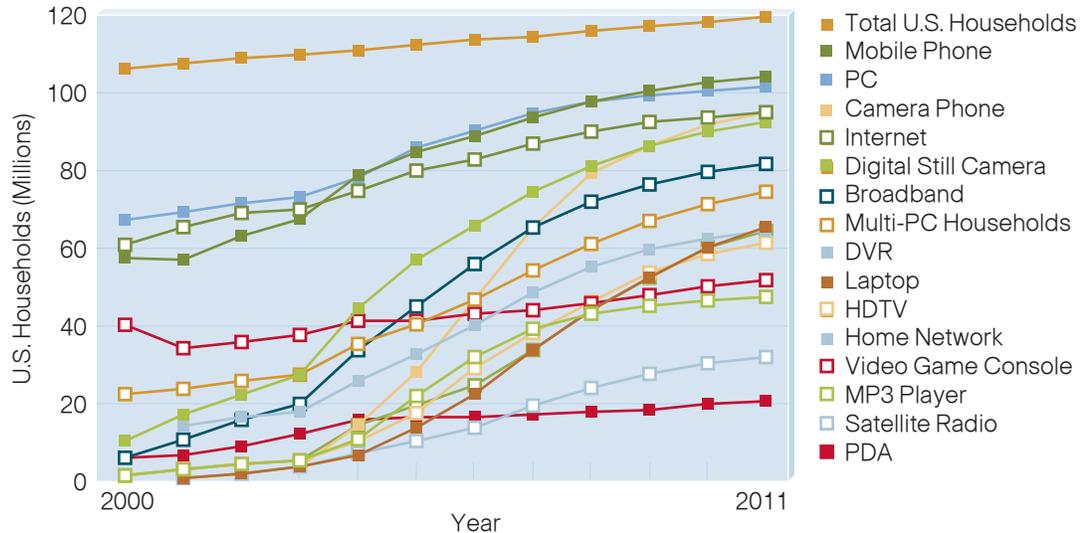
According to a 2007 survey by the National Retail Federation, students and their families will spend about \$12.8 billion on electronics, up about 22 percent from a year ago, fueled by sales of laptops, digital cameras, and cell phones such as Apple's iPhone.²

A recent Pew study noted three out of four young adults download and view Internet videos daily.³

According to Burst Media 2007 surveys, college students spend more time on the Internet than they do using any other media: 33 percent spend more than 10 hours per week online, compared to 16.6 percent who watch TV for more than 10 hours, and 5.5 percent who listen to the radio for that amount of time. Students are also using multiple media formats at the same time.⁴

Information delivery methods are also changing due to rapid adoption of new mobile devices such as smartphones. Today, 93 percent of college students own a cell phone and 58 percent have an MP3 player.⁵ In addition, content distribution venues are actively used. Apple iTunes has over 1 million downloads a day.⁶

It is clear that the digital decade is accelerating. In a 2006 report, Forrester Research predicted use of consumer technologies, including laptops, HDTV, and camera phones, will double by 2011⁷ (see Figure 1). The same report projected broadband use and home networks will triple by 2011.⁸

Figure 1. Higher-education Institutions Must Understand and Keep Pace with Technology Adoption⁹

Source: Forrester Research, 2006

Trend 2—Web and social networking technologies enable easier access to content and the ability to collaborate with others in real time.

Web 2.0 and social networking technologies are experiencing rapid growth. For example:

- MySpace adds 5 million members a month.¹⁰
- Two new blogs are created every second.¹¹
- The English Wikipedia edition contains more than 2 million user-generated articles.¹²
- YouTube hosts over 6 million videos, growing at about 20 percent every month.¹³
- Flickr contains 3.5 million photos.¹⁴

These technologies are important because they enable active participation in the creation and sharing of knowledge. According to a recent study, students between the ages of 18 and 24 spend 6.5 hours per week on social networking sites, 70 percent use message boards to communicate with friends, 61 percent talk to people online that they have never met in person, and 56 percent send e-mail messages or use instant messaging with their professors for help with assignments. Students today actively participate and collaborate using social networking technologies.¹⁵

“Pervasive use of these tools is already in evidence among students, and this will only grow in the coming months. The social aspects of these audience-centered technologies, firmly established as powerful tools for creative expression, offer great potential to build community in the context of teaching and learning as well.”¹⁶

Trend 3—Students are taking more responsibility for their own learning and will increasingly do so as quality content continues to become available on the Web.

As adoption of new technologies increases, students' ability to access knowledge also grows through search engines such as Google. In fact, more than 90 percent of Internet users employ a search engine for self-education.¹⁷

- 80 percent for medical and health information
- 77 percent to pursue a hobby or interest
- 67 percent to access news
- 60 percent for education-related activity
- 50 percent to watch video or listen to audio
- 50 percent to tour a virtual location
- 54 percent to get educated on politics
- 40 percent to access a blog

Quality content is increasingly being made available by universities through open courseware; digital collections; libraries such as the Library of Congress; museums including the Metropolitan Museum of Art, the Louvre, and the Vatican Museums; research institutes such as NASA and the National Science Foundation (NSF); and even some U.S. zoos (Cleveland, St. Louis, and Alaska). A recent blog by Google indicated that news, blogs, and information are updated within minutes, enabling access to knowledge faster than ever before.¹⁸

A recent study notes that OpenCourseWare, a large-scale initiative by the Massachusetts Institute of Technology (MIT) to provide free, searchable access to course materials for educators, students, and self-learners around the world, receives 2 million visits from users a month.¹⁹ Key users include faculty, students, and independent learners.

The University of California, Berkeley notes the institution had over 2 million podcast downloads from its open content site in the first year. This, too, indicates that self-service learners are taking responsibility for their education and finding learning resources using available technologies.

Challenges for Higher Education

Given these trends, it is clear that students are comfortable with new technologies and expect to use them in the education environment. For students who have grown up with the Internet, the impact is even more profound: they expect institutions and others with whom they interact to use and support these new technologies as well. According to a study of college students published by the Educause Center for Applied Research

(ECAR) in 2006, 64.4 percent agreed that IT in courses improved learning, 40.3 percent said they were more engaged in courses that incorporated IT, 68.7 percent believed IT facilitated prompt feedback from their instructors, and 55.3 percent felt IT helped them communicate and collaborate more efficiently with their fellow students.²⁰

Given this technology-savvy student base, academic leaders must ask:

- How will my college adapt to and use the surge of new technologies to stay relevant?
- How will my institution manage in an environment where students have unlimited access to information, can easily collaborate with others no matter where they are located, and will tap expertise outside the campus walls to enhance and customize their learning?
- How will my campus support self-service learners who challenge the status quo?

According to a 2007 Horizon report, to remain relevant, higher-education institutions will face three critical challenges within the next five years.²¹ They will need to learn to:

1. Assess newer forms of student work using new mediums (video, podcasts, blogs, and portfolios)
2. Take a technology leadership role to enable newer forms of learning and assessment
3. Deliver learning to a variety of mobile and personal devices

In short, they will need to adapt to the 21st Century Learning Environment.

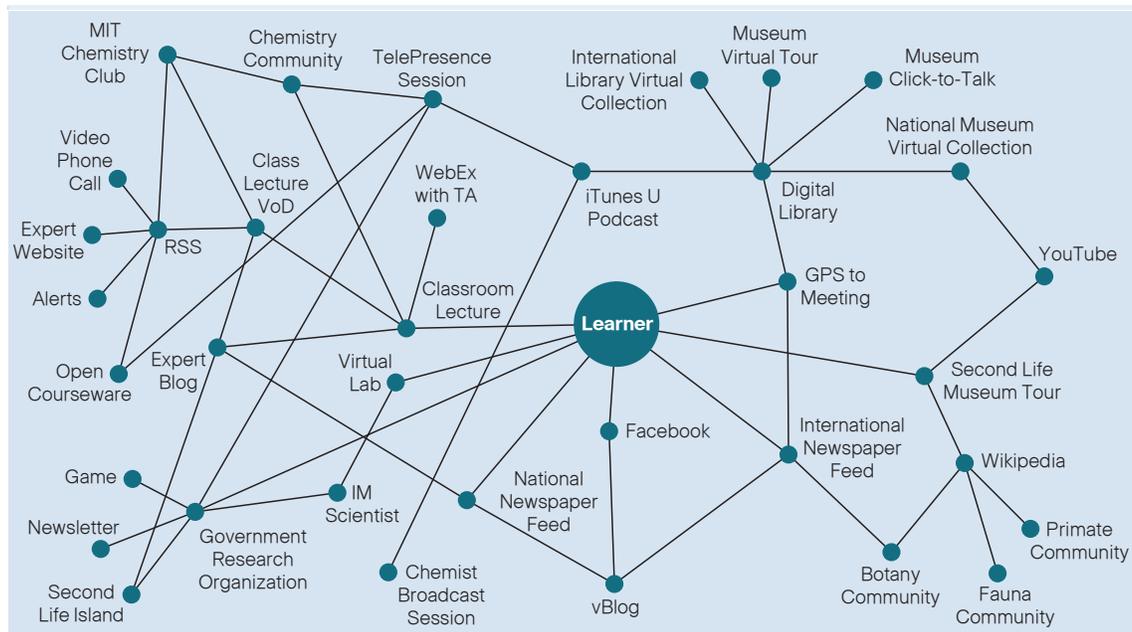
The 21st Century Learning Environment

In the 21st Century Learning Environment, lines are blurred between traditional higher education—where learning takes place in classrooms—and the technology-enriched learning that occurs in multiple locations on and off campus, both physically and virtually.

In the 21st Century Learning Environment, students have a choice about how they learn, which technologies they use, and where they obtain the knowledge they need to be successful (see Figure 2). They also enjoy unrestricted access to all knowledge points, including people, resources, and information, so barriers to learning and research no longer exist.

Most important, the 21st Century Learning Environment already exists. It is up to educators to facilitate use of the environment.

Figure 2. The 21st Century Learning Environment Provides Access to Numerous “Knowledge Points,” Places Where Students Can Find the Information They Need



Source: Cisco IBSG, 2007

An Example: Ashley—The “Biochem” Freshman

Ashley is a biology and chemistry student at a residential college. She is taking Biochemistry 101. As a student who excels in biology, Ashley has already read many of her professor’s books and journals. But while biology comes easily for her, she finds she needs to spend more time with chemistry.

Fortunately, the class is recorded on video and posted to the university’s Website almost immediately after class. Ashley can view the lecture from any of her computing devices: iPod, mobile phone, laptop computer, or desktop PC. As a result, she does not have to take as many notes during class, and can pay more attention to the professor to improve her comprehension.

Ashley is a collaborative learner: she joins the Biochemistry 101 online community, where she shares her notes by posting them to the class Webpage. Through this community, Ashley shares her biology expertise and also advances her understanding of chemistry.

Noticing Ashley's biology expertise, the teaching assistant (TA) suggests that she volunteer to contribute to biology-related Wikipedia submissions as she develops her research interest. The TA also introduces Ashley in a video phone call to a key biology researcher in another country who is seeking students to help with research.

For chemistry, the TA suggests that Ashley use her Xbox to explore a new game that professors at Purdue use to build their students' interest in chemistry.²² During the game, the main character travels through a series of rooms and uses tools that emit acid, heat, or cold to fight aliens. Every room has its own set of chemistry-based challenges students must solve to advance to the next room. As an avid game player, Ashley finds the game a fun way to learn basic chemistry concepts.

Ashley has regular sessions with the TA, who maintains physical and virtual office hours. Ashley receives alerts on her personal digital assistant (PDA) to remind her of the weekly meetings, and also global positioning system (GPS) location information, in case she and the TA are in the same area for a physical meeting.

The TA also holds weekly group sessions in person and online to discuss the course materials and lectures. These sessions are recorded and available as podcasts for students.

Ashley visits other college Websites and uses open courseware materials to help with her studies, and she subscribes to Really Simple Syndication (RSS) feeds that notify her when new biology and chemistry information is available. She visits the college library on campus, and has access to knowledgeable librarians through the campus call center, instant messaging, the Second Life 3-D virtual world, and the library click-to-talk Website any time she needs them.

Ashley has been assigned two projects for Biochemistry 101 to show her understanding of how biology and chemistry concepts are applied in real life.

For her biology assignment, Ashley decides to visit four key biology museums and report on her findings. She selects museums in Egypt for their marine biology expertise, England for fauna biology, Scotland for primate biology, and Papua, New Guinea, for butterfly biology.

Because she cannot physically go to these museums, Ashley visits their virtual sites, which are different from typical Websites. At each "museum," Ashley accesses the virtual collection and holds click-to-talk sessions with the museum's researchers. Impressed with her questions, the researchers invite Ashley to attend their special multimedia seminars through a dial-in session using the IP phone on her laptop computer.

Ashley decides to present her findings using an ePortfolio format, most likely a mashup with digital storytelling that includes key Flickr photos and a critical analysis of the ways in which biology is applied in real life, using videos and audio clips.

Ashley's chemistry assignment is a bit harder. For inspiration and guidance, she decides to join the college chemistry club on Facebook. Through the social network, she connects with several other women who are working on similar assignments. The women are from different universities but share a common interest in chemistry. They invite Ashley to several interesting events that she would not have known about on her own.

One of the events is a videoconferencing special session with Dr. Roger Kornberg, the 2006 Nobel Laureate for chemistry. To attend the session, Ashley schedules a time to use the campus virtual presence facility.

Ashley is so impressed with Dr. Kornberg that she subscribes to his video blog (vlog). Fortunately for Ashley, the National Science Foundation (NSF) also videotaped one of his recent conference panels. She signs up as an NSF student member to receive alerts about events, newsletters, podcasts, lectures, and symposiums on specific topics of interest.

Later in the week, Ashley meets her college chemistry club in Second Life to visit the campus's new virtual chemistry lab. The class also visits Second Life's Drexel Island to witness molecular docking and talk to researchers about their experiments. The class then tours Nature Island, which is full of chemistry blogs, wikis, and other information. The island also includes a molecule simulator with which visitors can interact.

Ashley is so excited she cashes in some Linden dollars to have her avatar outfitted for the event—because you never know who you might meet at the chemistry social afterward.

For her chemistry assignment, Ashley decides to create a five-minute video on applied uses of chemistry in real-life situations. She wants to do a great job so she can post it to YouTube and see how many hits she can get.

Needless to say, Ashley receives top grades for her work, but most important, she is motivated both to continue with chemistry and to accelerate in biology.

While this example could go on, the purpose is to demonstrate how an academic institution enabled a student to create a personalized learning environment so she could take full advantage of all resources available to her, online and offline, physical and virtual, 24 hours a day, 7 days a week.

In this environment, the student had the opportunity to excel in her subjects, as well as seek assistance with more difficult concepts. She used a variety of tools (gaming, video, online communities, virtual reality, social networks) to support her unique learning style, which resulted in a deeper understanding and interest in both subjects she researched.

Role of Technology

The 21st Century Learning Environment is made possible by the technologies students are already adopting. These include Web 2.0, video, mobile devices, and virtual presence—all connected by the Internet.

This section describes the major technology categories that currently have the biggest impact on higher education, their use in higher education today, and the benefits for higher education learning in the future.

Web 2.0

Web 2.0 is a term used to describe the latest advances in collaborative Internet technologies. It opens the Internet on a social level where everyone is able to edit and add to the information space.²³ In other words, with Web 2.0, users participate in creating knowledge and sharing expertise rather than acting as passive recipients. The Web has become the environment for sharing, collaborating, and exchanging thoughts and ideas.

Web 2.0 in the 21st Century Learning Environment

Blogs, wikis, and RSS feeds have quickly been adopted in classroom environments. For example, Larry Lessig's blog on the Creative Commons²⁴ lets students respond to views posted by Mr. Lessig on current topics in copyright law.

Social networking sites such as Facebook, MySpace, and Bebo have been adopted by a large percentage of college students. In the United States alone, 85 percent of students at supported colleges use Facebook.²⁵ They can join virtual groups based on common interests, see which classes they have in common, and learn about each other's hobbies and interests through their profiles.²⁶ The ever-popular video-sharing site, YouTube, is being used by students and colleges alike to promote their brands. A spinoff called TeacherTube provides a venue for educational content. The Website has the largest number of registered users among college-focused sites, with over 30 million members worldwide.²⁷

Already, Web 2.0 has redefined the ways in which students and researchers collaborate, connect, and learn. Web 2.0 has also changed how universities deliver content. Many institutions have made blogs, wikis, RSS feeds, and social bookmarking integral parts of course delivery and learning collaboration.

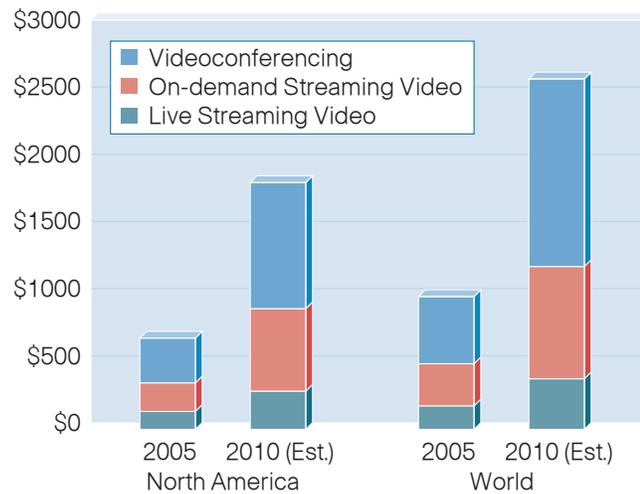
Finally, university libraries are making use of Web 2.0 technologies to distribute information and interact with students and faculty. According to Gartner, Web 2.0 will become mainstream by 2008.²⁸ In many respects, we are already there.

Video

A recent Pew Research study found adults between the ages of 18 and 29 are the most common viewers of online videos (76 percent), compared to users 30 to 49 (57 percent) and 50 to 64 (46 percent). They are also the most “contagious carriers” in the viral spread of online video.²⁹

IDC categorizes video in three groups: live streaming, on-demand streaming, and videoconferencing.³⁰ All three have uses in higher education (see Figure 3).

Figure 3. Projected Spending for Video in Higher Education.



Source: IDC, 2005

Video in the 21st Century Learning Environment

Video has become popular in college settings in a variety of ways: as a means to broadcast lectures and record classroom sessions, as a medium to complete assigned projects, for vlogs, and for instructional purposes.

Most of the data traffic on the Internet today is consumer video content. A 2007 study by Cisco determined that consumer IP traffic, 60 percent of which is video content, will grow at a compound annual growth rate of 58 percent between 2006 and 2011.³¹ Consumer IP traffic will surpass 17 exabytes per month by 2011.³²

Consumer devices, such as cell phones and personal cameras, have made producing a video almost free. Thus, students, in addition to being consumers of content, have become producers as well. As a result, it is becoming the norm for class assignments and presentations to include a video component or to be rendered completely as video.

One of the more popular trends in higher education is podcasting, which can incorporate audio, video, and other content that is distributed to any appropriate device. Using iTunes U, many universities have adopted this framework to deliver course content.

Here are some other examples of video's use in higher education:

- Medical schools connect students to real-time surgeries, stream underwater marine life to classrooms, and connect students with other students using video.
- Video on demand (VoD) enables students to download videos for later viewing, such as a taped class or lecture for personal or group study and discussion.
- Videoconferencing enables students to engage with other classes, guest speakers, and researchers in a two-way format, enabling real-time collaboration and discussions.

Virtual Presence, Virtual Reality, Gaming, and Smart Mobile Devices

While some universities are just beginning to adopt Web 2.0 and video technologies, others are already exploring the next generation of technologies that include virtual presence, virtual reality, gaming, and smart mobile devices.

TelePresence in the 21st Century Learning Environment

Cisco TelePresence is an advanced technology that enables face-to-face interaction among individuals seated at tables in rooms that may be half a world apart. A key benefit of TelePresence is its ability to bring people together in real time without technology difficulties, eliminating the need to travel to an event or classroom.

TelePresence has many uses in higher education:

- **Collaborative research**—Using TelePresence, researchers can easily maintain frequent contact during research cycles, which often involve multiple, globally dispersed teams.
- **Administration and cabinet meetings**—TelePresence enables regular meetings and eliminates travel costs when members are located at a number of campuses.
- **Dissertation defense**—Ph.D. completion requires a rigorous defense in front of a panel of experts who are often flown in for the event. TelePresence eliminates travel costs.
- **Interviews**—TelePresence enables universities to recruit faculty from institutions around the world without the often requisite multiple interviews at the university.
- **Professor's office hours**—TelePresence enables office hours with students who may not be on campus or may be on another campus or near a TelePresence center.
- **Student collaborations**—Using TelePresence, students can collaborate on projects and even work in globally dispersed teams.
- **Distance learning**—TelePresence enables small, focused classes where key students might be taking the course from a variety of locations.

- **One-on-one classes**—TelePresence enables students to take advantage of private music and language lessons even when the professor cannot be in the same room.
- **Cross-campus meetings**—Many universities have a number of campuses. TelePresence eliminates the need for faculty to travel to weekly or monthly meetings.

Virtual Reality and Gaming in the 21st Century Learning Environment

In virtual reality and gaming technologies such as Second Life, There, and Active Worlds, users participate and also communicate with other players in real time, using personalized avatars.

Second Life and gaming can be used a number of ways in college classrooms:

- Meeting an author to discuss his/her book
- Attending a concert with others and sharing real-time insights
- Asking real-time questions of the speaker at a political debate
- Learning about a key subject such as real estate by buying and selling land while touring a property
- Honing entrepreneurial skills by developing a business in virtual reality
- Attending a class in virtual reality one week, and in physical reality the next
- Scheduling office hours or tutoring times with a professor
- Visiting a university science or computer center
- Exploring and visiting global sites, museums, and libraries

Next-generation Mobile Devices in the 21st Century Learning Environment

Next-generation mobile devices such as smartphones and PDAs integrate telephone, camera, video, mass storage, MP3 player, Internet access, and, eventually, presence into one device, enabling learning anywhere, anytime.

For example, the recently available *Apple iPod touch* enables learners to access content and have it with them with the touch of a finger. These next-generation mobile devices show potential for enhanced, multimedia-enriched, and convenient just-in-time learning. Mobile devices have been used to deliver short educational tutorials, important class information, and alerts about exams. In addition, they are used to communicate and to create content including audio, video, and text.

Impact on Higher Education

Higher-education institutions are already seeing the impact of these technologies as they continue to converge, simplify learning, and blur the lines between on-campus, off-campus, and distance-learning environments.

Impact on On- and Off-Campus Environments

The convergence, adoption, and increased use of these technologies will cause enhancements to the physical aspects of the college campus. For example, we have already seen in libraries how physical spaces have opened up substantially as books are stored and collections enhanced with digital resources. These spaces have been updated with video production centers where students can create multimedia content for assignments.

In addition, many libraries now offer research centers where faculty can go for visualization assistance. These centers provide flexible, smart spaces for video viewing and collaboration, and a library archipelago in Second Life. Faculty are also taking advantage of PDAs, the Internet, and multimedia to enhance the classroom experience as well as support administrative needs such as office hours, grading, and field research exploration.

In the classroom, wireless technology and video environments are being used to connect students to experts and other institutions. And campus commons and dorms are being enhanced to support a multitude of student devices.

Off campus, libraries, museums, and research institutes have virtual tours of their facilities and collections; medical institutions and even zoos connect to students through video; and concerts and performances are fully accessible to students. What we are seeing is a merging of resources as communities connect using broadband and provide an abundance of educational resources for learners anywhere.

Impact on Distance Learning

The impact of next-generation technologies on distance learning will be particularly profound. Traditionally, a “distance learner” is defined as a student who is not connected to a campus classroom and is not physically present with a faculty member. This person has full access to campus materials even though he or she may not be on campus at all.

To reach distance learners, higher-education institutions have used alternative methods such as correspondence, online delivery, and TV to close the distance from the campus hub and other resources. Hybrid learning has also become popular for many institutions where students spend part of the time on campus and part of the time using distance education tools.

According to a recent Jupiter Research report, 1.5 billion people will have Internet access in 2011, with the biggest growth in the online population occurring in Brazil, Russia, India, and China.³³ Extrapolated projections from the United Nations and IDP Education Australia indicate that the total demand for higher education in 2025 will be 263 million students, with 170 million coming from China, India, and Asian countries.³⁴ A report by ThinkEquity Partners suggests that for every foreign student who studies in the United States, there are three to five students who would “consume” U.S. education online if given access.³⁵

Quality content and expertise are increasingly available online through digitized library initiatives, open courseware programs, content digitization programs (such as Google Book Search), and virtual museums such as the Louvre and the National Air and Space Museum. Learners are no longer limited to a single source for acquiring and sharing knowledge, and thus the barriers to education that may have previously existed will be eliminated.

Next Steps and Recommendations

Higher-education institutions can proactively create the 21st Century Learning Environment with thoughtful planning.

Pre-planning

- Regularly survey faculty, administration, and students (incoming and graduating) on their technology needs, uses, and feedback to ensure relevance and opportunities for cross-campus efficiencies.
- Note current consumer trends—what is being adopted and quickly brought to your education environment—because this might indicate ease of use and the ability for the university to adopt the technology rapidly.
- Continually benchmark the use and implications of technologies in a variety of settings to ensure continued knowledge of “how to” cases and deployments and outcomes.

Evaluate

- Assess your environment relative to what others have successfully deployed.
- Assess your campus environment, courses, and educational resources for which processes are working and which ones might be enhanced or simplified with technology.
- Proactively assess how adopted technologies can service your education community.

Experiment and Measure

- Pilot programs, monitor and measure outcomes, establish metrics, and share best practices.
- Try to encourage use of new technologies and solicit feedback. In addition, increase your own understanding of, and familiarity with, technology.
- Reward successful deployments that have netted beneficial results.
- Promote a culture of change, exploration, and experimentation.

Plan

- Develop a comprehensive strategy inclusive of technology planning. Ensure stakeholder inclusion, such as administration, faculty, IT, and students.
- Evaluate what pedagogy and assessment changes or enhancements might need to be made to maximize use of the technologies and outcomes.
- Plan and budget for training. Incoming students and faculty may need technology training.
- CIOs should evaluate the impact of campus technology adoption on their institutions in terms of infrastructure planning, including bandwidth, quality of service, storage, security, budget, IT support, and policy.

Conclusion

The rapid adoption of new Internet technologies is giving learners anywhere (on campus, off campus, distant) a variety of options for how they receive their education. They can take more responsibility for their own personal education and customize their learning based on personal needs.

The Internet has made knowledge and expertise not only available but readily accessible to those who seek it. New technologies also help facilitate access to knowledge, create opportunities for collaboration, and eliminate the lines between learners both on and off campus.

Higher-education institutions are at the forefront of experiencing and facilitating the integration of next-generation technologies, and creating enriched learning that will lead to deeper knowledge, future innovation, and next-generation discovery. Each generation of learners will use more technology than previous generations, and will be more comfortable with selecting and integrating information sources.

Institutions that understand this have a distinct advantage: they can plan now to connect learners to a variety of learning resources made available through modern technologies. Through exploration, experimentation, and acceptance, every institution can become a 21st Century Learning Environment.

Appendix

Terms and Definitions

Active Worlds: The Active Worlds Universe is a community of users who chat and build 3-D virtual reality environments in a virtual territory.

Apple iPod touch: The Apple iPod touch is a portable, wireless media player designed and marketed by Apple Inc. The device features a multi-touch interface that allows users to find and use information more easily. It is the first generation of the iPod line to include wireless access to Apple's iTunes Store (see iTunes U).

Bebo: Bebo is a social networking Website designed to allow friends to communicate in various ways.

Blog: A blog is a Web log or online journal that is frequently updated for public consumption. Bloggers post thoughts and some videos on their sites.

Click to talk: Click-to-talk sessions are a new form of Web-based communication in which a person clicks an object (a button, image, or text) to request an immediate phone call or voice-over-IP (VoIP) connection to speak with another person in real time.

Creative Commons: The Creative Commons (CC) is a nonprofit organization founded by Larry Lessig and devoted to expanding the range of creative work legally available for others to build upon and share. The organization has released several copyright licenses known as Creative Commons licenses. These licenses, depending on the one chosen, restrict only certain rights (or none) to the work.

del.icio.us: del.icio.us is a social bookmarking Web service for storing, sharing, and discovering Internet bookmarks. The company is now part of Yahoo.

Distance education: Distance education, or distance learning, is a field of education that focuses on the pedagogy/andragogy, technology, and instructional systems design that are effectively incorporated to deliver education to students who are not physically "on site" to receive their education. Instead, teachers and students may communicate at times of their own choosing by exchanging printed or electronic media, or through technology that allows them to communicate in real time. A distance education course that requires a physical, onsite presence for any reason, including the taking of examinations, is considered to be a hybrid or blended course or program.

Facebook: Facebook is a social networking Website that was launched in 2004. As of July 2007, the Website had the largest number of registered users among college-focused sites, with more than 30 million members worldwide. The name of the site refers to the paper facebooks depicting members of the campus community that colleges and preparatory schools give to incoming students, faculty, and staff.

Flickr: Flickr is a photo-sharing Website. In addition to being a popular Website for users to share personal photographs, the service is widely used by bloggers as a photo repository. Its popularity has been fueled by its innovative online community tools that allow photos to be tagged and browsed by folksonomic means.

Folksonomy: Folksonomy is the practice and method of collaborative categorization using freely chosen keywords called tags.

iTunes U: iTunes U is a dedicated area within the iTunes Store featuring free content such as course lectures, language lessons, lab demonstrations, sports highlights, and campus tours. It is provided by top U.S. colleges and universities, including Stanford University; University of California, Berkeley; Duke University; and the Massachusetts Institute of Technology (MIT).

Live streaming media: Streaming media refers to the way video and audio files are delivered from a provider to an end user. When files are “streamed,” they can be viewed by the end user at the same time they are being delivered by the provider. This method speeds the viewing process because the user doesn’t have to wait until the entire file is downloaded before viewing it. Streamed video lectures or classes are becoming more and more popular as higher-education tools.

Mashups: A mashup is a Web application that combines data from more than one source into an integrated experience.

Moodle: Moodle is a free software e-learning platform, and is also known as a Course Management System (CMS), Learning Management System (LMS), or Virtual Learning Environment (VLE).

Multimedia: Multimedia is media that uses multiple forms of information content and information processing (e.g., text, audio, graphics, animation, video, interactivity) to inform or entertain.

MySpace: MySpace is a popular social networking Website offering an interactive, user-submitted network of friends, personal profiles, blogs, groups, photos, music, and videos internationally. MySpace is currently the sixth most popular Website in any language and the third most popular Website in the United States.

On-demand streaming: Media content such as video on demand (VoD) is transmitted to the client upon request. Examples of this in colleges include taped classes and lectures that are posted on Websites to download for later review.

Open courseware: Open courseware programs such as Moodle and MIT’s OpenCourseWare (OCW) project, which MIT announced would make the materials for nearly all of its courses available on the Internet, are unprecedented steps toward making knowledge accessible worldwide.

Podcasts: Podcasts are media files distributed over the Internet. They use syndication feeds (see RSS) for playback on portable media players and personal computers. The term “podcast” comes from combining the name of Apple’s portable music player, the iPod, with the word “broadcast” (though podcast technology is in no way dependent upon the iPod).

Quality of service: Quality of service can provide different priorities to various users or data flows, or guarantee a certain level of performance to a data flow, in accordance with requests from the application program or the Internet service provider policy. Quality-of-service guarantees are important if the network capacity is limited, for example in cellular data communication. This is especially true for real-time streaming multimedia applications such as voice over IP and IPTV, because these often require a fixed bit rate and are delay sensitive.

Really Simple Syndication (RSS): RSS is a family of Web feed formats used to publish frequently updated digital content such as blogs, news feeds, or podcasts. Users of RSS content use programs called feed readers or aggregators. Users simply subscribe to the feeds they want. The reader then checks the feeds to see if any contain new content. If so, the reader retrieves the content and presents it to the user.

Second Life (Linden Lab): Second Life is a 3-D virtual world entirely built and owned by its more than 9 million “residents” from around the globe.

Social bookmarking: A bookmarking system or network like del.icio.us enables users to store lists of Internet resources that they find useful. The public can access these lists via a specific network or Website. Users with similar interests can view the links by topic, category, tags, or even randomly.

Social networking sites: MySpace and Facebook are among the most popular social networking Websites. Both offer an interactive, user-submitted network of friends, personal profiles, blogs, photos, music, and videos. The sites are free to users and generate revenue from advertising, including banner ads and sponsored groups.

TelePresence: Cisco TelePresence is a new technology category that uses advanced visual, audio, and interactive technologies to deliver a unique “in-person” experience over the network. TelePresence Meeting solutions—the first products in the TelePresence category—create a “room-within-a-room” environment where life-size images, high-definition resolution, and spatial and discrete audio enable face-to-face meetings around a single, virtual table.

Videoconferencing: Videoconferencing is a method of conducting a conference between two or more participants at different sites by using computer networks to transmit audio and video data.

Virtual presence: Virtual presence means being present via intermediate technologies, usually radio, telephone, television, or the Internet. In addition, it can denote apparent physical appearance, such as voice, face, and body language.

vlogs and vlogging: A video blog, sometimes shortened to vlog, is a blog that comprises video. Regular entries are typically presented in reverse chronological order and often combine embedded video or a video link with supporting text, images, and other metadata.

wiki: A wiki is a collaborative Website that can be directly edited by anyone with access to it. One of the best-known wikis is Wikipedia.

YouTube: YouTube is a popular, free Website that lets users upload, view, and share video clips. Videos can be rated by users. The average rating and the number of times a video has been watched are both published, making it easier for users to sort and view the content that they want to watch. Google acquired YouTube in November 2006.

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More Information

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