

capital, it can be designed, created, and assessed, and thus it has a market value. In the postindustrial information age, the market for intellectual capital is now worldwide.

Colleges and universities seek to internationalize their operations—through distance-education programs, branch campuses abroad, and international faculty and student exchanges—for a variety of reasons, not the least of which is the need to develop a workforce that is sensitive to and can be successful within today's global marketplace. Increasingly global economic and scientific networks, aided by political alliances and telecommunications, are having a dramatic impact on higher education in the United States. How U.S. colleges and universities respond to internationalization will ultimately determine whether the United States remains the most dominant player on the worldwide higher education landscape.

—William W. Hoffa and James JF Forest

**See also:** Distance Education; International Student and Faculty Participation in Higher Education; Internet in Higher Education; Privatization; Student Exchange and Study Abroad

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## Internet in Higher Education

The Internet, arguably one of the most significant communication tools developed since the invention of the printing press more than five centuries ago, presents some of the greatest challenges and opportunities faced by higher education in the last several decades. The impact of the Internet weaves through the entire fabric of the academic enterprise, which includes teaching, learning, research, scholarly collaboration, administration, planning, and providing access to higher education worldwide. For example, the Internet offers expanded opportunities for student-teacher interaction and collaboration, both within and beyond the confines of a single institution. Colleagues can write papers together remotely



*Students at the University of Pennsylvania during an internet guided lecture. (Poinet)*

without geographic limitations, and in the case of distance learning, educator and student are freed from the physical constraints of the classroom and from preset times for classroom and office hours. However, the existence of the Internet also poses a series of threats and risks to the higher education community, for it brings to the forefront fundamental issues of governance, control, privacy, and access. Nonetheless, educators and scholars of the twenty-first century will need to work together to discover how they might best take advantage of this information-sharing system, because the Internet is a tool that will be used by more and more people all over the world, and particularly by those in higher education.

#### ***What Is the Internet?***

The Internet is a global communications network based on wire, fiber optics, satellite, radio, and cable. It is a system of interconnected networks that share a common language of communication standards called protocols. These evolving proto-

cols facilitate the connection and transmission of data through computers and other communication tools, such as hand-held computers, cameras, and other devices. There are a wide variety of applications that have been developed for the Internet that allow for improved communication capabilities. Currently, the most commonly used functions include the ability to send and receive e-mail, share files, connect to Web sites, and conduct videoconferencing sessions.

#### ***A Brief History***

The Internet began as an experiment in the 1960s when the U.S. Department of Defense (DoD) created the Advanced Research Projects Agency (ARPA) in response to the launching of *Sputnik* by the Soviet Union. The goal of the DoD was to create a decentralized network of computers that could withstand wartime disaster. This network, ARPANET, began with four sites: the University of California, Los Angeles; the University of Utah; the Stanford Research Institute; and the RAND Corporation (in Santa Monica, California,

and Arlington, Virginia). By the early 1970s, a handful of research scientists, based primarily at higher education institutions across the country, transmitted their first e-mail correspondence and live chat sessions on computers linked together via ARPANET. By the mid-1980s, with the assistance of the National Science Foundation, a national backbone was developed (NSFNET), which provided a free link to any U.S. research and educational institution. In 1991, the World Wide Web (WWW)—widely known today as simply the Web—was invented, and it has become a global network of nearly 30 million Web sites containing more than 4 billion Web pages. This network allows users to share text, data, images, sound, and video resources.

### ***The Internet's Impact on Higher Education***

The Internet has had a wide-ranging impact on higher education. From the changing environment of teaching and learning to issues of governance and control, few aspects of higher education remain untouched. The Internet poses a set of challenges and opportunities to higher education in terms of present-day Internet activities and behaviors as well as in terms of its future potential impact. Perhaps most significant is the blurring of the line between formal higher education and the lifelong learning process, bringing with it a need for increased access to resources necessary for communication and information sharing.

### ***Teaching and Learning***

Teaching and learning are areas in which the Internet has had perhaps the most visible impact on higher education. Internet technologies, both synchronous (occurring simultaneously) and asynchronous, have been used to supplement regularly scheduled classroom-based courses as well as to provide pure distance-learning courses that require no face-to-face contact between instructors and students. Sometimes distance-learning courses are offered in addition to a college's regular courses, and sometimes distance-learning courses replace a previously classroom-based course. In the late 1990s, an unprecedented event occurred: the creation and accreditation of the

first virtual university, Jones International University, which conducted both its administrative and educational activities via the Internet. A virtual university has no physical classroom space, and all teaching and learning is done primarily via the Internet using Web-based technologies.

The Campus Computing Project, in a survey of 557 two- and four-year degree-granting colleges and universities in the United States, found that in 1997 less than 30 percent of higher education institutions offered any distance-learning courses; by 1999, 47 percent of these institutions offered at least one distance-learning course. It is estimated that in 1999 approximately 1 million students took on-line classes. There has also been a rapid increase in the use of the Internet to supplement traditional campus-based courses. In 1996, 15 percent of college courses used some type of Internet resource (such as e-mail, discussion boards, syllabi, lecture notes, or audio files) to supplement face-to-face communication, and in 1999, 39 percent of college courses used Internet resources.

There are those administrators and faculty in higher education who feel there should be a greater focus on the impact of using Internet resources on the pedagogical practices in teaching and learning. Discussions of distance and distributed learning (supplementing face-to-face classroom-based learning) often focus on what it means for an instructor to teach in this type of environment rather than on what the actual outcome is for the student or learner. Overall, a wide array of synchronous and asynchronous technologies are currently available for use in distance-learning classrooms (as well as to supplement traditional face-to-face classrooms). However, because the use of these technologies is a relatively new phenomenon, there is concern that the effects of these technologies on student performance are not well understood and a feeling that they should be studied further before higher education moves to these new technologies on a massive scale.

### ***Research and Scholarly Collaboration***

Many applications that were developed for the Internet early on were created by scientists and

academic scholars for the purpose of collaboration. Over time, new information resources and technologies (such as Gopher, Yahoo! Inc., and Google) were—and continue to be—invented at institutions of higher education. Archiving systems help organize resources that are made available on the Web. Present-day search engines comb through millions of Web pages each day helping researchers locate and share information around the world. Internet applications that facilitate communication and collaboration among researchers include on-line journals, listservs (electronic mailing lists), document sharing, e-mail, discussion groups, chats, and videoconferencing.

Electronic publishing is becoming more widely accepted in several fields of higher education, sometimes replacing printed journals and periodicals, which can take a year or more from inception to printed product. Even traditional print-based publications conduct a variety of their activities via the Internet, including outreach, submissions, reviewing, subsequent drafts, and final edits. Another recent phenomenon is the proliferation of academic conferences and workshops that are held on-line. The advantage of these on-line meetings is that they are not geographically bound; people can participate at their leisure; papers, biographies, and other personal information can be made available; and all communications are electronically stored for easy retrieval at a later date. Researchers and scholars have also begun to form their own virtual communities based on similar academic interests.

The role of the library in higher education has greatly expanded with the advent of the Internet. Libraries have helped make the Internet usable. Researchers can more easily find and retrieve materials that are readily available without flipping through huge volumes of bound indexes. In addition, the inclusion of fully searchable databased card-catalog systems and abstract and full-text on-line periodical databases brings a wealth of new information to the fingertips of researchers in higher education. Now, not only do library professionals—often the first point of access for research and other scholarly pursuits—serve in their traditional role of training people how to solve problems using information-searching tech-

niques, but they also have had to stay ahead of the Internet learning curve in order to provide quality service in this electronic information age.

### *Administration and Planning*

The impact of the Internet on higher education administration and planning has been felt increasingly since the mid-1990s. Today, most—if not all—colleges and universities have some presence on the Web. In this Internet age, an institution's Web site is often the first point of contact for a majority of potential students and conveys much about institutional image. Some sites run Internet applications that allow a potential student to take a virtual campus tour or to file an application for admissions on-line. Higher education institutions invest a great deal of time and money making sure they are accurately portrayed on their Web sites, which serve as print catalogs did in the past. Some institutions now have their entire catalog available only in an electronic format. In addition, an institution's Web site often contains information and resources for faculty, staff, and alumni, for example, an alumni database for employment or internship contacts, personnel forms for staff, and an academic calendar for the faculty.

Enrolled students on technologically advanced campuses have access to a plethora of resources, including on-line registration forms, financial aid applications, class schedules, and calendars of events. The promise of this technology is that the organization of higher education can be further streamlined and made more transparent via the Internet, therefore enabling institutions to better serve the academic and nonacademic needs of their students. For example, students using the Web find it easier to check out library books, schedule classes, pick up financial aid checks, and register in the same afternoon. Information technology can make it easier to use such institutional resources as computing help and library services by streamlining access to them. This streamlining is based on the assumption that if the organization runs more efficiently, then there will be more resources available for instruction and services, which in turn will lead to greater student satisfaction and academic success.

One major hurdle in the utilization of the Internet in higher education is the associated costs. These costs—which include software, hardware, network infrastructure, and information-technology support staff—are often prohibitively expensive for the budgets of higher education institutions. A survey conducted in the late 1990s by the Gartner Group suggested that organizations should have one information-technology staff member for every 50 to 75 users, but information-technology staff members at higher education institutions may support as many as 800 users each.

### ***Governance and Control***

Governance and control are two major challenges that working with Internet-based technologies poses to higher education organizations. Colleges and universities are faced with the prospect of needing to spend hundreds of thousands of dollars on Internet-related products and services, including the infrastructure that provides connectivity to the Internet, actual computers that serve Web pages to the Internet, computer labs and training for students and faculty, and the staff to maintain all of the above. As with any major budgeting and planning efforts, how these decisions are made affects the entire organization.

In terms of distance learning, higher education administrators find themselves having to make decisions about Internet-related technologies in an environment of fast-paced change, rapid obsolescence, and uncertainty. In the past, decisions about technology might have involved less complex decisions, such as how many computers each dorm should have. Today, decisions about distance-learning courseware (the applications that are used for on-line classes)—particularly when selecting tools that facilitate communication and learning—affect the actual essence of how a “classroom” is constructed and require bringing faculty into the decision-making fold. However, there is no real consensus about what types of features—such as the level of interactivity of a particular application—can or should be utilized.

Further complicating the situation is the proliferation of for-profit companies that have re-

sponded to the need for large-scale applications used for distance learning by launching their own applications for commercial use as well as their own on-line courses or virtual universities. The response of many higher education institutions has been to enter the application development business themselves in order to develop their own tailor-made applications. Higher education institutions have also begun to form consortia with other higher education institutions to take advantage of economies of scale as a way of responding to increased competition from the business sector. There are also increasing numbers of partnerships being formed between higher education institutions and for-profit on-line learning providers.

Another recent phenomenon has been the outsourcing of e-mail, courseware, and administrative services to the for-profit sector. There are some people in higher education who view these alliances with for-profit companies as a portent of the commercialization of higher education. Their primary concerns are that faculty will lose control over the product of academic labor and that universities will produce vendors as opposed to scholars. This also raises the question of the role of the expert in higher education. For example, is the expert a person, a syllabus, or a course? Conversely, the Internet has increased entrepreneurial opportunities for the education community at large. It has been estimated that the combination of on-line learning and e-commerce (the selling of products over the Internet), known today as edu-commerce, is an industry with a billion-dollar potential.

### ***A Few Ethical Considerations***

The Internet has brought the issue of intellectual property in colleges and universities to the forefront. Prior to the Internet, faculty developed their own syllabi and course materials, which they kept in a folder in a file cabinet and handed out in class. If a faculty member left an institution, it was assumed that he or she would offer a similar class at another institution using basically the same materials. With the advent of the Internet, some faculty began to develop materials for the Web that were much more sophisticated in

terms of usability. There were interactive chats and discussion rooms, video clips of data collections containing annotated analysis, class lectures, overheads, and other practical and pedagogical tools. In a relatively short period of time, course-related information on the Web required institution-supported hardware, software, and services, unlike traditional classroom materials that might have required no more than a computer and photocopier (if that). The existence of course materials hosted on the institution's Web site began to raise more tangible questions of ownership, questions that had formerly been relegated to the sidelines.

Privacy is also a growing concern for higher education with the arrival of the Internet. As it becomes easier to gather and maintain large amounts of data in Web-based databases, higher education institutions have to look carefully at how and why they use student and employee data. Another concern related to privacy is the fact that the computers that serve as portals to the Internet are equipped with monitoring software that has the capability to monitor use of Web sites. This means that the patterns of use and the Web behavior of those people who access the Internet (for e-mail or general surfing) are recorded and logged. Ultimately, acceptable-use policies need to be made available to the users of the Internet so that administrators of higher education institutions have a more clearly defined function in the monitoring of Internet usage.

Perhaps the most visible ethical challenge for higher education resulting from the impact of the Internet deals with the issue of student access. There are studies showing that college students from lower socioeconomic classes are less likely to have computers at home and are thereby limited in their ability to do homework and research on-line. Although libraries have been willing equalizers, providing terminals and training for on-line access, there are still many college students who are not able to readily use the wealth of resources on-line, thereby increasing the gap between the haves and have-nots. This gap is often referred to as the digital divide. In addition, the availability of access to Internet-based resources for students with disabilities lags far behind that

of physical access at higher education institutions. Advocates argue that the Americans with Disabilities Act of 1990, which requires that programs and services that are made available for the public must also be accessible to people with disabilities, should also apply to Internet-based resources in higher education.

However, there are also many ways in which the Internet has increased access to higher education. For example, it has made the general services of the institutions more transparent and therefore more accessible (e.g., admission and catalog information on-line). Language translators convert the contents of a Web site to dozens of languages instantaneously. The Internet has been responsible for speeding up the rate of adoption of computers on campus, and it has also been responsible for entire campuses' building a wireless infrastructure; some campuses require all their students to have laptop computers.

### ***Recent Developments and Future Prospects***

There are several recent Internet-based developments that have the potential to alter the higher education landscape. Internet 2 offers a new high-speed connectivity that will help advance the development and use of Internet-based technologies between select research universities. With Internet 2, Internet-based applications that require the transmission of previously unmanageable amounts of data—such as real-time distribution of videoconferencing—are no longer a promise but a reality. As higher education institutions around the world connect to the Internet, the ability to share information and resources more easily may lead to a better understanding of issues from a global perspective. Another recent advancement is the development of wireless Internet connectivity, which—in conjunction with the development of numerous small hand-held computing devices—makes learning with technology something mobile and ubiquitous. This ensures that information and applications used in support of learning have the flexibility to travel with the learner, providing around-the-clock opportunities for learning to occur. This raises the question of

what will happen to traditional campus-based programs (also call brick-and-mortar institutions) when “just-in-time learning” is available. Although these issues are still very speculative because of the newness of widespread use of the Internet in higher education, it is certain that the study of the Internet in higher education will become an expanding area of interest.

—Lisa A. Petrides

**See also:** Access; Administration, General; Alternative Providers of Higher Education; Distance Education; Intellectual Property; Research and Scholarship; Teaching; Technology

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## Ivy League

The phrase “Ivy League” arose as a nickname for eight research universities in the northeastern United States that had a tradition of athletic competition: Brown, Columbia, Cornell, Dartmouth, Harvard, Pennsylvania, Princeton, and Yale. These schools all had very high academic reputations,

and the phrase has come to refer more to their prestige than to their athletic organization. Thus, peer institutions of the original Ivy League members, such as Stanford University or the Massachusetts Institute of Technology, are sometimes described as ivy-level schools. The eight Ivy League schools are set apart from other U.S. postsecondary institutions by their selectivity, tremendous endowments, high cost, and academic reputations.

Ivy League members accept only a small percentage of those who apply. As a whole, they admit only about 18 percent of their applicants. Since most Ivy League universities have small undergraduate populations, typically about 5,000 students, this is an extremely elite cadre of individuals. Although it is a common misperception of Ivy League colleges that minority recruitment and admissions are not a priority, students of color are represented in much the same proportions as at most private institutions in the United States.

Most students admitted to Ivy League schools have exceptional educational credentials. However, these institutions have often received criticism for their practice of “legacy admissions,” that is, extending preferential treatment to applicants who are related to earlier attendees. Legacy applicants usually enjoy a substantially higher acceptance rate than typical applicants, and they are a significant minority of Ivy League students. Although the net result of such practices is unclear, Princeton, for example, characterized only 66 percent of its 2001 class as the most qualified applicants in terms of academics.

Ivy League schools are very costly compared to other U.S. colleges and universities. For the 1999–2000 academic year, the average tuition and fees at these institutions was \$32,020, and all were within \$1,200 of each other. Although financial assistance is available based on a student’s financial need, Ivy League schools do not give merit-based scholarships or grants. For those receiving need-based awards in the 1999–2000 academic year, the average out-of-pocket cost for an Ivy League education was approximately \$17,000 per year. Prior to 1991, Ivy League schools collaborated on their need-based