It is terrifying to speak on the subject of the virtual university, not because the prospect of losing our old forms and formats of education terrifies but because the crow’s nest from which we survey the future is obscured by clouds. I will make three guesses at the forms I see ahead—fears for the institution, runaway information, and optimism. But first let me give a little introduction.

Only three years ago, I wrote a report for the University of California system about academic support services for new campuses. In the report, I was able to formulate a vision of a new environment—which I called an ecosystem—for learning. The old ecosystem was composed of lecture halls and classrooms, the library, faculty offices and student dorm rooms, and the public spaces on campus where faculty and students gathered and did their business of teaching, learning, and research. The new ecosystem would have all of these elements as well as the new electronic environment, based on the network, where faculty and students would also gather to do their academic business.

My vision was of an expansion of the existing academic ecosystem; at the time, it seemed like an exciting expansion. In this system, students and faculty would have more contact than they had had before, and the unfortunate characteristics of mass education—the large, impersonal classes, the physical limitations of interpersonal relationships—would be corrected somewhat by interactions in the electronic environment.

I predicted that the university would be enlarged and enhanced by the new technology, that we would develop better ways to present material in class, that we would devise new types of assignments and new ways to respond to our students’ work, that we would even be able to put unprecedented faculty resources at the disposal of students interested in calling on them. In the University of California system, the notion of a campus department would break down as students became able to consult with faculty at any one of the University’s nine campuses.

It has taken only six months at Penn to make me recognize how limited that vision of the future was. I was thinking about how faculty might use new tools in their classes. Here, I’ve seen the transformation of the class itself. The revolution we are talking about is much more profound than any I have envisaged in the past, and I am uneasy trying to predict its (continued on page 21)
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character or consequences.

We are setting off into a terra incognita. What is an academic course? Who are our students? Who is teaching? When has a student satisfied the requirements for a degree? How do we create and manage information?

So, here is my first guess at the future.

Fears for the institution

The electronic environment threatens to blow away our traditional definitions of the course. The new media of teaching and learning are so much more flexible than the traditional lectures or discussion classes, reading lists, papers, and exams that it is hard to imagine that the notion of the course will not soon be challenged. Today, a course is measured against a reasonably well-understood standard—so many credit units for so many class hours, so many exams and papers, so much reading. But when the majority of communication between faculty and students and among students occurs outside class hours, when students write hundreds of lines of prose or calculations in e-mail discussions of topics, when research is conducted in electronic databases, when a paper might be built up by a group of students writing and editing and adding text and footnotes until it is abandoned to the faculty member, how will we calculate the course then?

We are on the verge of a revolution in the way we define the building blocks of a university education and we do not yet have any idea of how or whether we will be able to integrate the new with the old.

Who will be in our “classrooms”? Already the few courses that have used the Internet to expand the interaction of students and faculty and to make the syllabus and texts of the course available electronically have seen the boundary between student and participant break down. Only registered students are getting academic credit for a course with Internet participants, but many others can join in the class discussions and might even send unsolicited work. I’ve seen cases of students who were rejected from a program sneaking into the program by taking courses through the Internet. Faculty rarely turn away someone who wants to learn from them. The electronic environment provides a new avenue for unauthorized participation in a program, and the time a department has caught on the student can claim to have satisfied many of the requirements for its program.

But even without imagining the most extreme case, we can see that the distinction between students and non-students will fade in our new ecosystem and that the question of who benefits and has a right to benefit from our teaching will become increasingly complicated. This is not all bad, of course. Think of the way alumni will be able to continue their learning and participation in the intellectual life of the university. I see a future in which alumni will stay in touch with faculty as well as with the athletic teams. But will the faculty be able to cope? Will we have to evolve a tough hide to repel the importunate learner, even the brilliant one? What will that do to our sense of ourselves as teachers or to our self-interest as learners, as we are, to a large extent, in our advanced classes?

Once the campus space gains an electronic dimension, the question of who teaches our students will become an issue. Penn has an agreement with Princeton that permits graduate students of each institution to take a certain number of courses at the other campus. Once the Internet becomes an effective medium of teaching, what will stop us from making myriad agreements of this sort? What will stop students from surfing the Internet to find that perfect course in Fulgentius or Martianus Capellanus? What then will it mean to say that students who come to Penn will study with a topflight faculty recruited and promoted by the University?

We faculty tend toward authoritarianism in curricular matters, but we will not be able to stand long against the tide of student demand for something more than we alone—the faculty of a particular university—can give. The students who will define excellence will be those who have mastered a few languages and can join classes across linguistic and cultural borders as well as across city and state boundaries.

I predict that the challenges of the new academic ecosystem will engender a period of authoritarianism and xenophobia. Today, faculty in...
research universities tend to define their academic worlds in terms of their disciplines, worldwide communities of interest united by the jet plane and the Internet. Academia seems to be the only place where all politics are not local, and we often complain that faculty have lost some of their old commitment to the local scene.

But today the concreteness of the campus weighs in the balance against this centrifugal force of disciplinary involvement. Tomorrow, the campus will lose much of its natural weight, which consists in the limits of traditional teaching methods and traditional academic units, as the Internet transforms teaching and the faculty expands beyond campus or even local boundaries. In that fluid situation, the first reaction of faculty and their universities will probably be to put their hands over their eyes and assert their authority over their students. The drive for a sense of identity that has always been the foundation of human character will lead us to carve an identity out of the ether. We will assert control over the members of our tribe, and we will at least for a time turn our backs on the promise and possibilities of the new academic ecosystem.

Here, then, is my second guess at the future.

Runaway information

Librarians are losing control of information. For more than a century, we have relied on libraries and their keepers to gather, organize, and make accessible the knowledge that is the foundation of our teaching and research. Looking back from the end of the twentieth century, we can see that this period of high organization with its high priesthood of librarians was really only the last period of the printed book.

In the middle ages, a large library might contain a couple of hundred books. The users of the books knew where they were on the shelves—in the bay of the fourth window of the library, under the statue of the emperor Trajan, and so on. The invention of printing opened a floodgate of writing and publication. The leaders of the Protestant Reformation figured out the power of the new medium immediately, pouring out hundreds of tracts, handbills, and tomes to a wide, middle-class, urban, reading public. The success of the movement was greatly enhanced by the use of the printed word.

But it was only in the nineteenth century that librarians created a system of cataloging powerful enough to manage the vast output of printed work that started in the early sixteenth century. To give you a notion of how recent this development is: Melvil Dewey died in 1931.

The great library systems have had but a brief success. When I wrote that report for the University of California in 1991, I saw the electronic revolution as giving us greatly improved access to our collections of information. I saw that we would soon define the resources of a library not by the size of its collection but by the extent of the materials accessible through its services. I saw the expansion of the collective collection—the virtual collection available to users—by the addition of electronic databases.

What I did not see very clearly then was that the electronic revolution would have no less of an effect on the democracy of knowledge than the printing revolution. Today most successful academics make and disseminate some information independent of the established ways and byways. Even though our process of promotion and financial rewards remains tradition-bound—tied to publication in refereed journals or through recognized presses—our exuberant quest for knowledge and our powerful urge to tell people about what we know are increasingly ignoring tradition. We are using e-mail and electronic bulletin boards. We are creating databases and sending them out to our friends and colleagues.

Much more important, how will we preserve what we are producing?

For 22 years, I have been working on a study of the extant judicial opinions of the twelfth century. The Vatican Press will publish the *Regesta decretalium seculi duodecimi*. Or will it? By the time I finish the work, given the distractions I’ve let myself in for this past decade, I wonder whether I will bother to publish it in the traditional way. Maybe, I’ll just make a disk—the work will be about 10 megabytes—and distribute it to anyone willing to pay the cost of reproduction and shipping.

How will the librarians deal with that? How, now, are they dealing with the burgeoning amount of unofficial knowledge that faculty and students treat as if it were just as good as the official stuff? How, in other words, will we control information, catalog it, make it accessible, judge its quality? Traditional publication is, like a pedigree, an indicator of quality. Are we entering a miasmic swamp of knowledge, produced and disseminated without the benefit of the market forces that control what presses and journals put out?

Much more important, how will we preserve what we are producing? We think of libraries as organized repositories of knowledge, but, as the acid paper crisis shows, their greatest contribution to teaching and research may be as preservers of knowledge. Yet, ironically, the electronic...
revolution is putting libraries and librarians, as they come on line, out of the loop.

The age of the paper book and journal is far from over and we will yet fill many libraries before it is, but much of the information we produce and use is never getting into the libraries and when it does librarians have no idea what part of the whole they have got their hands on. This is bound to affect scholarship.

Modern standards of scholarship rely on the assumption that scholars should be able, through their libraries or through bibliographic services, to read all of the relevant literature. The electronic revolution threatens those standards by making it virtually impossible to judge scholarly performance in this respect. We will know whether the argument is sound, the data adequate, and the writing good, but we will not be able to tell whether all of the relevant information is accounted for.

We are entering new oceans of knowledge, and we will either have to develop new charts or to change our expectations of navigation.

My third guess at the future is full of optimism.

Optimism

While I’m in a seafaring metaphor, I should say that I empathize with Columbus—I’m a historian after all—and I am no less optimistic than he was. I think the university will go through some tough times, but I think it will come through them just fine in the end. The university has been one of our stablest and most enduring institutions. It has adapted to change for over eight centuries. It has had its ups and downs; it has been pushed aside at times; but since its invention in the second half of the twelfth century it has never been far from the center of the knowledge industry. It arose in Europe, but it is now dispersed throughout the world.

My optimism about the future stems from a conviction that the university has proven itself to be the world’s most consistent producer of new ideas, and given the stresses we humans are putting on our planet, we will not soon cease to need new ideas. In this respect, the institution’s secret may lie in the union of teaching and research. We make knowledge in many kinds of institutions—government laboratories, industrial laboratories, and, now, on the Internet—but none of these sites of research provides the elemental protection of pure curiosity, of basic research, that the university provides.

The protective shield is, I think, partly a product of the teaching function. Education, as opposed to training, requires the freedom of the wide open range. It is a product of intellectual roaming, of the exploration of new subjects. It is both the result and the producer of the philosophic habit that Cardinal Newman labeled the basic characteristic of the educated person, and philosophy is the theoretical pursuit par excellence. So, if the educational process is philosophical, then the place in which it occurs must be the maker of new ideas.

The youth of the students may also play a part in building the shield that preserves the university. Youth has the luxury of ignoring the practical goal and purpose of knowledge. Youth can be philosophical and can learn the philosophic habit by practice. We all bemoan the narrowing careerism of many of our students—the first university faculty in the twelfth century bemoaned it also—and our disappointment arises from the recognition that our students have a choice. They are young enough to hold off for a few crucial years the awful baying of practical concerns.

Our regret in finding our older students focused on making it in the world is correspondingly mild. We know that, youth gone, they must take the baying seriously and get on with it. Our hopes for their education are not invested so much in the intellectual treks on which we lead them as in what they have and will experience as adults. We hope that they will catch the philosophic habit by some lucky chance as they run through our courses.

But the university will also be preserved and protected by another of its characteristics. It is an institution that satisfies a fundamental condition of knowledge making—face-to-face interaction among the craftsmen of the guild. Intellectual work is social work, notwithstanding the myth of the solitary genius, and the university is a social institution. The Internet can enhance the society of the university and quicken its pace of discovery and invention, but the electronic environment cannot replace physical human society. We humans cannot thrive in a bodiless, frownless, smileless ecology, and our intellectual society cannot be complete without physical interaction. The real university may be enriched and enlarged by the virtual university, but there will always be the real one.

So, the electronic revolution—the birth of the virtual university—will force us to work out some new rules of assessment and to learn some new ways to manage the university community, but so long as society is healthy enough to need educated citizens and new knowledge, it will push us to accomplish these tasks rather than dismantling our institution. If we do manage the multiple and complicated changes coming at us at electronic speed, we will create a university that is even more intensely local than it is now, while its physical boundaries and limitations will have faded into the ether of the net.

Note: This article contains the text of a dinner address presented at the Virtual University conference in January 1995. The conference was sponsored by the SEI Center for Advanced Studies in Management, the Annenberg School for Communication, and the School of Engineering and Applied Science. The Penn Printout version contains a few minor modifications.

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