Although it may be a cliché to remark on the inevitability of change, it is imperative that we not only recognize change but also understand it and respond to it before it finally sweeps over us, obliterating and rearranging our world as we thought we knew it. Irreversible change is the predicament of American higher education today. We are, in fact, already awash in a sea change, caught in currents that we barely understand—some so powerful that we feel overcome by them, others so new that we have only begun to recognize them.
Our state of mind notwithstanding, the waves of change in higher education at the end of the twentieth century demanded a full frontal challenge and testing. The result of our response is, of course, unknown, but there is every reason to think that the survivors will be those institutions of higher learning with the courage to reimagine and reinvent themselves and so find a place of intellectual and social relevance on the beachhead of the twenty-first century.

There is, understandably, some reluctance to admit—much less confront—this notion of a sea change in higher education. After all, in the last half of the twentieth century we have enjoyed an era of unprecedented expansion, success, and recognition. At the sunset of this remarkable century, the very words “new millennium” trigger feelings of unease and restless over what the future will bring. Indeed, it is far more reassuring to dwell nostalgically on success, and recognition. At the sunset of this remarkable century, flowered brilliantly in the years following World War II.

For about four decades after 1945, we experienced a “golden age” in American higher education. Private and public research universities expanded at a rapid pace, fed by large infusions of federal and state dollars. Initially fueled by grants provided under the GI bill, student enrollments grew rapidly, and the funtion of research accelerated and sustained an unprecedented expansion of both research and knowledge. Certainly, the University of Wisconsin on its Madison campus built a national and international reputation based on access and affordability, as well as on the quality of its teaching, research, and outreach.

The vastly expanded scale of public research universities challenged their traditional mandate to develop an appropriate balance among the various components of their mission as they tried to reach out to many more people. At the same time, this was an era of both intense disciplinary specialization of academic programs and research and growing functional specialization in administration and student services. Public research universities expanded at a rapid pace, fed by large infusions of federal and state dollars. Initially fueled by grants provided under the GI bill, student enrollments grew rapidly, and the funtion of research accelerated and sustained an unprecedented expansion of both research and knowledge. Certainly, the University of Wisconsin on its Madison campus built a national and international reputation based on access and affordability, as well as on the quality of its teaching, research, and outreach.

The University of Wisconsin–Madison captured these concerns by listing the needs of the university:

• The need for a broader understanding of the university’s educational mission
• An enhanced sense of the university as a community fostering the development of new knowledge in the increasingly technologically driven society
• An improved resource allocation among competing needs
• A process for setting clear goals and priorities by colleges and schools within the university
• A better management of enrollments to fit the university’s strengths

In my judgment, our responsiveness to these needs has been underestimated. Universities began to turn considerable research capabilities inward. We developed the graduate surveys, pushed assessments, sought feedback via focus groups, and enlisted a more systematic involvement of faculty and staff through governance systems.

Many of our responses to concerns about the quality of undergraduate education were directly focused on the curriculum and the learning experience itself. Efforts to increase the use of active and inquiry-based methods in research and in the use of instructional technology were especially productive. We created undergraduate research fellowships, providing opportunities for students to pair with faculty and engage in original research. We redesignesseed residence halls as “learning communities” by linking them to specific curricular themes. Contemporary experiment of Alexander Meiklejohn’s experimental college ideas that had briefly flourished before World War II. And using a combination of public and private funds, we vastly improved residential and distance educational opportunties by enhancing student access to computers and e-mail. The result was profound improvement in students’ access to faculty and staff.

But where were the accolades for all this? Why was the silence so deafening? Simple. We were doing what students, parents, and others believed we should have been doing all along. We were simply catching up with their most basic expectations. It was not that we were unrecognized; it was that they were expected. This “silence of the marketplace” had the right effect: it reenergized our commitment to undergraduate education.

This was all well and good, but even as we addressed these basic concerns about undergraduate education in the larger context of the major public research university, we were taking shape around us, building into a new tidal wave far larger and more forceful than the issues we had confronted in the 1980s and 1990s and, in their converging subtilet and complexity, even more difficult to deal with.

FOUR CURRENTS OF CHANGE AFFECTING HIGHER EDUCATION AS WE KNOW IT

Convergence of four trends has produced a rapidly changing operating environment of American higher education as we have known it for the past several decades. This convergence is already surging around the basions of public research universities. The four trends—technological, intellectual, fiscal, and demographic—are not independent. No one of them is individually capable of reshaping the landscape of higher education. In the case of intellectual and interrelatedness, they are flowing together in a force powerful enough to test our abililty to create and share knowledge in ways that will be genuinely relevant in the new century.

TREND #1: THE COMMUNICATIONS REVOLUTION

Universities and K-12 schools share the challenge of determining the degree to which the communicatons/information revolution drives integration and what we teach and how we teach our students. We know that some aspects of this revolution have been over- stated. Some of the pedagogical promises have not yet been fulfilled. However, we continue to face our obligation to discern which aspects of this revoluion will ultimately benefit our students and make our institutions more accessible and effective. The revival of these institutional concerns began as iso-
Distance learning and new forms of instructional technology are serving as catalysts in the creation of new learning opportunities, here and abroad. Digital technology continues to blur the distinction between on-campus and off-campus learning. The British Open University has for decades depended heavily on technology—first BBC television and radio and now the Internet and CD-ROMs—to help deliver classes. Closer to home, several universities and new for-profit institutions like the University of Phoenix are filling educational gaps.

Communications and processes of information gathering, retrieval, and analysis are improving at a rapid pace. Advances in computer chip development and memory storage are occurring at awesome speeds. The powerful and immensely popular information superhighway is already inadequate for meeting the needs of the academic research community. Its successor, Internet2, is helping to shape future learning opportunities.

All of the hardware and software innovations and the dramatic improvements in communications methods have potential educational implications. We are faced with a core issue: to what degree will—or should—these innovations drive changes in what is taught or in how it is taught?

Information technology has transformed the way our libraries operate. We can access information from our desktops, and we can search collections locally, across the country, and around the world. To date, however, although instructional technology has produced notable changes in some courses, few academic departments or programs have systematically transformed themselves through the use of new technologies. Indeed, most recognized research universities remain extremely tentative in their strategic responses to the rapid growth of distance learning as start-up ventures.

Historically, universities have developed curricula and teaching methods based strictly on what faculty members believed students should know and how they believed that knowledge should be delivered. However, in public expectations, the impact of instructional technology, competition from non-university-based learning, and the explosion of new knowledge will all, to one degree or another, exert some influence over the process we think of as higher education.

We need to be more cognizant of the differing needs of our students, and we need to offer both courses and learning opportunities that respond to those needs. For example, universities have tended to teach courses in mathematics and foreign languages as though students were pursuing degrees in the subjects. And yet many students may require proficiency, rather than mastery, of such subject areas. By developing multiple learning contexts, we can meet the needs of students who are seeking only a threshold of knowledge in a subject.

Against such examples of new needs and expectations, we face the reality that large-scale systemic change in instructional methods demands massive investments in both technology and training methods. And the constant argument that investments in information technology can save money in the long run is probably exaggerated and is certainly premature.

TREND #2: SHIFTS IN THE INTELLECTUAL DIVISION OF LABOR

Collaboration with scholars across the oceans is something most of our faculty and students take for granted today. Again, thanks largely to the power of the computer and advanced communications technologies, there are few barriers to working with colleagues anywhere on the globe.

Yet faculty on the same campus, colleagues separated by departmental or programmatic boundaries, still face significant organizational barriers to collaboration. When such collaboration succeeds, it is usually due to individual resources rather than institutional intent. Some of our best people seem to find ways to work together, in spite of how hard we seem to work at keeping them apart.

For generations, faculty members have been rewarded for increasingly specialized research within disciplinary or even subdisciplinary intellectual mine shafts. During that same period, disciplinary departments became the dominant element or building block in the organization of universities. This model supported the rapid develop-
mendment of new knowledge and has served society extremely well. Of course, the intellectual division of labor was always a matter of distinguishing the contributions of governmental policy programs, but ironically, many of these programs developed a professional identity that became virtually indistinguishable from that of departments. Most faculty members were rightly convinced that this departmental status was the key to resources and prestige. Thus we have continued to create and then replicate mine shifts within the university structure.

Nevertheless, a growing awareness of the limitations of our historic organizational and professional cultures is raising questions. How can we better support the expansion of knowledge that is, increasingly, arising from more than one discipline? Are there improved, more efﬁcient organizational structures that we can use? Are these incentives that would further encourage and reward the cross-fertilization of ideas?

The architecture of the pursuit of knowledge is changing, and although the deconstruction of some of our traditional disciplines has led to an almost individual level of specialization, other disciplines have creatively combined their intellectual power and their focus into larger areas of inquiry. Although we often complain about the impacts of ﬁscal, demographic, and technical shifts on the traditional roles of scholars, changes in the intellectual division of labor may, in my judgment, alter the relationships among these sectors more profoundly than any of the other currents in the sea change around us.

TREND #3: SHIFTS IN THE FUNDING STREAMS

The revenues of American research universities are derived from four distinct sources. First, state appropriations and, to a much lesser degree, tuition have historically supplied the basic institutional support. Second, federal funds, obtained competitively by faculty and staff, largely fuel research programs. Third, philanthropy, provided mainly by private parties, has been an extremely stable part of the university budget, and for the past three decades has provided a signiﬁcant portion of that budget. However, when federal deﬁcit reduction became a political preoccupation of the 1990s, this essential source of ﬁnancial resources was placed in serious jeopardy. Indeed, certain categories of federal support, mainly in the arts and humanities, were sharply reduced. Today they still show no sign of rebounding, in spite of the apparently irreversible expansion of the organizational and institutional compartments of the social, physical, and biological sciences have, however, generated increased levels of federal support. In response to these uncertainties in the levels and areas of federal funding, faculty and staff continue to develop a variety of alternative research funding from industrial and foundation sources.

TRENDS IN THE FINANCING OF RESEARCH IN CONTEMPORARY SCHOOLS

To advance new knowledge and remain accredited, universities require quality faculty and state-of-the-art facilities. Private giving, inside and outside the state or federal, will continue to ﬁnance capital infrastructure improvements. Over the past decade, these private and philanthropic sources have had a dramatic effect on public universities’ capital budgets, once the primary responsibility of government.

A major source of private revenue is the potential economic value of the intellectual property of the faculty. An important assumption is that the faculty and staff have an obligation to the institution that harbors and encourages their work. In return for the intellectual property rights generated by this work, the faculty and staff whose research interests span these commercially viable processes and products either license their intellectual property or lease the universities the rights to pursue their own businesses. Of course, universities must keep these new entrepreneurial activities as close to home as possible.

The impact of private funding of research is being seen in the rise of the multidisciplinary centers. The universities have already raised questions of integrity and identity, as well as some high-disputes over who-what-to-whom. Such arguments are inevitable, and they need to be resolved only to satisfy the parties themselves but also to address the much broader ramifications of this issue on universities and the society we serve. Clear procedures are needed to regulate the relationship between the parties and the university in order to avoid inappropriate inﬂuence and conﬂicts of interest.

Public universities in general have the potential to alter the direction or mission of the university itself. At many public research universities, most of the private support for these mercantile activities with enhanced access to our courses and facilities has forced us all to face the inexorable advance in digital communications.

TRENDS #4: DEMOGRAPHIC SHIFTS AND ACCESSIBILITY

We face today a major concern: questions about access and changing demographic realities. Universities have long been challenged to serve an increasingly diverse population. The stakes on this front are particularly high. If we cannot unwind the constraints that threaten to serve a wider variety of constituencies, we will lose our legitimacy as public institutions. We will not only cease to be the engines of opportunity, but also to exist.

To offer the ﬁnest-possible educational experience, universities must have diverse faculty, staff, and student populations. We have long prided ourselves on the contributions we make to the public good. We must, however, reorient our institutional thinking, for diverse faculties and student bodies who come from countries other than the United States. We have achieved some semblance of an “international diversity.” But we must also value the educational impact of an inclusive student population that encompasses the full range of identities within the United States. We must at home what we have done abroad.

Public universities are responsible for serving society most broadly, in all its magnitude and diversity. Many of our students’ future employers, such as major corporations, are demanding that we educate and produce alumni of diverse backgrounds. These employers operate in a world of diversity, and they will not tolerate a narrow, exclusive environment.

For these reasons, we have to be more effective in our collaborations with the K–12 educational system, in order to help ensure that the high aspirations and plans of the students are from underrepresented groups and who are qualified to attend our universities. Furthermore, we must open our doors to these students. Universities can play a leadership role in the enhance-ment of teacher-training, in the expansion of pre-college programs to K–12 students at various levels, in the support of scholarship and research on K–12 issues, and in the development of direct partnerships with schools and communities to address local needs.

On another related front, educational needs are evolving in response to changes in life cycles and career trajectories. Most people now need to retrain for new skills or update their current skills during the course of their working lives. Older and returning adult students compose a rapidly increasing proportion of our student bodies. This demand for lifelong learning in these populations with enhanced access to our courses and facilities has forced us all to face the inexorable advance in digital communications.

So where does all this leave us? I believe that those of us with roles in the leadership and management of institutions of higher learning, and especially in leading public research universities, have no recourse but to identify, understand, and respond to these currents of change. The communications revolution that is reshaping the intellectual division of labor, the new ﬁscal realities, and the demographic shifts may have varying degrees of inﬂuence. But taken together, in converging currents of tidal proportions, they are causing irreversible change in American higher education.

Because shifts in public opinion and public policy are often cyclical, it may be comforting to the notion that if we just wait long enough, the pendulum will swing back to a more familiar and comfortable position. But this is no pendulum; it is a fundamental shift in our
operating environment, and there is no going back to yesterday. Our efforts to rebalance our mission as well as our way of creating and delivering knowledge will be successful only if we confront these issues and understand the degree to which they will determine our future.

**FINDING A STRATEGIC PATH FROM THE PAST TO THE FUTURE**

These changes have something in common: these complex currents all involve ways in which the modern university is connected, internally and externally. This commonality suggests what I believe to be a strategy for success in higher education.

The “Age of Digital Communication” is driving exponential changes in our capacity to make worldwide connections and to collaborate at any distance. The trends toward the deconstruction and reconstruction of disciplines also create new opportunities for new connections. Changes in the composition of our revenues push us to be more connected and accountable to our traditional sources and, at the same time, force us to reach out to establish new connections and partnerships. Demographic shifts demand improved connections with the growing diversity of American society—with our K–12 school systems as well as with continuous learners of every age.

How we respond to these challenges, and how we seize the opportunities to direct them, will profoundly affect our ability to exert intellectual leadership in the new century. Rather than continuing our efforts to rebalance teaching, research, and service as if they were distinct, separate activities, American higher education must organize our priorities around three interconnected systems of learning: the learning experience, the learning community, and the learning environment.

We must aspire to expand the learning experience well beyond the traditional classroom to include residential learning communities, voluntary service opportunities, enhanced uses of informational technology, and increased field and research opportunities. We must view education as an opportunity to advance not only knowledge but also learning. In this way we are connected to the world we serve. The promotion of the learning community involves the support of improved connections and collaborations across traditional disciplinary boundaries and expanded partnerships with a wide range of external constituencies.

The learning environment conducive to these learning experiences and communities requires the wider application of information technology to improve instruction, administrative services, and external communications.

In this time of uncertain resources, of increased demand for access, of unclear pedagogical changes, and of shifting structures of research, it would be foolhardy to attempt to respond completely and autonomously to all of these currents of change. One institution cannot be all things to all people.

I believe a more viable approach is the development of strategic niches. Appointments of faculty and staff should be responsive to these larger strategic purposes. At the University of Wisconsin–Madison, we have recently initiated a process of “cluster” hires, in which related departments and programs collaborate in the appointment of new faculty and staff based on shared strategic interests. Each participating department receives a position and provides a tenure home but also explicitly connects its recruitment with related programs. On a larger scale, each institution should evaluate its strengths, explore its potential clientele, and then pursue that niche to the fullest. This would require effective collaboration across and within our institutions of higher learning, but the benefits would be great, and they would accrue to the individual institutions and to higher education as a whole.

The survivors in the future landscape of higher education will be those institutions with the courage and determination to understand and to use the currents of change surging around them, to find and embrace their own margin of excellence, and to emerge in the new century stronger than ever before.

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