The first year of the 21st century brought with it wrenching changes to America’s political, economic, and cultural landscapes. A new president was inaugurated after a dead-heat election that underscored a deeply divided populace; the longest economic expansion in the history of the American economy came to a grinding halt; and on September 11th our individual and collective sense of security was shattered as we were forced to confront complex economic, religious, and educational issues on a global scale.

The Forum for the Future of Higher Education convened in late September as it does each year for its Annual Symposium at the Aspen Institute. Although the papers presented were the culmination of long-term efforts on the part of Forum Scholars, all inevitably were thrust into the light of the global events that had so recently been set into motion. The Forum’s agenda—focused as it has been since its inception nearly 20 years ago on exploring change and issues affecting the future of the nation’s colleges and universities—took on a new urgency. Perhaps one of the most pressing questions campus leaders must wrestle with today is how colleges and universities can best continue to be relevant and offer solutions to an increasingly complicated and interconnected world.

This report, Forum Futures 2002, summarizes the research presented at the Aspen Symposium to share more broadly the insights gained from the papers given there and the discussions and inquiry they sparked.
FORUM ON THE INTERNET AND THE UNIVERSITY
The Forum on the Internet and the University seeks to understand how the Internet and related technologies can improve the quality and condition of higher learning, as well as the opportunities and risks created by rapid technological innovation and change. Today’s pedagogical and structural sea change in teaching and learning made possible in part by new learning media is perhaps higher education’s best hope to meet the needs of the knowledge economy and the demands of a growing and diverse global population.

Clayton Christensen, professor of business administration at the Harvard Business School, focuses on the effects of disruptive technologies, which change the basis of competition in their field. His theory, developed in the corporate realm, offers key lessons for colleges and universities as well. It is based on the constant pursuit of excellence by both businesses and higher education institutions. As the quality of their products increases, they often surpass the needs of their consumers, leaving a gap to be filled by a disruptive innovation—that is, a product or service of lower quality or performance that more closely matches consumers’ needs. Other features make the innovation appealing as well, such as being cheaper, simpler, and more convenient to use. Early adopters of the disruptive technology or service most often are the least demanding customers in a market.

Christensen believes that in the relentless pursuit of quality the nation’s top business schools have overshot their market. In 2000, the average starting salary for graduating MBAs from leading business schools exceeded $130,000—well beyond the salary structure of mainstream companies. These schools now serve a very small, high-end segment of the market for managers. U.S. corporations have responded with their own disruption: The number of formally organized corporate universities rose from 400 in 1990 to 1,800 in 1999. Eight times as many people are now receiving management training in a corporate context than in MBA programs.

Similar disruptions are occurring at the undergraduate level, where advances in technology and increases in the demand for higher education facilitate focused, low-cost, and profitable private sector entry. Today, over 40 percent of students in higher education are over 25 years old, and the number is growing. Christensen’s research shows that disruptive innovations typically expand the market dramatically at its lower and mainstream tiers, and then migrate inexorably upmarket where, in the case of higher education, they will begin to challenge traditional degree programs. While recognizing the pursuit of excellence as a worthy goal, Christensen advises colleges and universities to guard against becoming out of touch with the mainstream and therefore increasingly irrelevant. He adds urgency to this charge by noting the long list of leading companies that failed in the face of disruptive changes in technology and market structure, including well-known firms such as Digital, IBM, Apple, and Sears.

Mitchel Resnick, associate professor in the Epistemology and Learning Group at the MIT Media Lab, describes how higher education can enhance its primary role in the spread of knowledge by using technology to reframe teaching and learning at all levels. Inspired by the physical objects and activities prevalent in kindergartens—but which give way to abstract formal methods throughout the educational process—Resnick describes his new approach as lifelong kindergarten. A growing body of research shows that people form stronger bonds with knowledge through concrete representations and physical activities, which differ greatly from the abstract approaches favored in traditional curricula.

Resnick focuses on the use of digital manipulatives, objects that expand the range of concepts that children and adults can explore through direct physical manipulation. Small computers embedded in digital manipulatives enable the objects to take measurements, emit light, interact with each other, download programs to control their actions, and so forth. Perhaps the best known of these manipulatives created by Resnick and his colleagues are the programmable LEGOs found in many elementary school classrooms. In addition to the traditional LEGO building bricks, newer pieces such as gears, motors, and sensors can be added and programmed so that children can build, for example, a house with lights that turn on and off at particular times, or with garage doors that open when a car approaches. Other objects include BitBalls,
used at the university level to give students concrete experience with kinematic principles.

Resnick’s hope is to build a new type of society based on a new approach to education. He describes our transition from the “information society” to the “knowledge society” as we began to realize that the key to change and progress was not so much information but rather how people transform information into knowledge. He moves up this trajectory to the “creative society” with a shift from how much we know to an emphasis on our ability to think and act creatively. If we summon the creative energy to take advantage of the possibilities presented by digital technologies, Resnick believes, we can build the tools that will help us reinvent teaching and learning and, likewise, our future.

John Seely Brown, chief scientist of Xerox Corporation and former director of the Xerox Palo Alto Research Center (PARC), reflects upon the nature of information and knowledge, and the social context of learning. Perhaps the key distinction between information and knowledge is that information is usually considered independent of any particular individual—it can be looked up in a book or retrieved online—whereas knowledge is personally associated with a knower. Knowledge entails understanding and digesting information rather than merely holding it. Thus the resources for learning lie not simply in information, but in the practice that allows people to make sense of it and in the practitioners who know how to use it. Learning is a remarkably social process. Moreover, what people learn about is always refracted through who they are and what they are learning to be.

Among the many important shifts in learning exhibited by today’s technologically savvy students is their bias toward discovery-based learning and action. This tendency signals a shift from learning by receiving information to learning in situ with and from each other. Learning becomes as much social as cognitive, it is concrete rather than abstract, and it becomes intertwined with exploration and judgment. Brown likens knowledge to an iceberg: The tip represents its explicit dimension, and the mass of the iceberg represents its tacit dimension. The explicit has to do with “know-what,” and the tacit has to do with “know-how.” The tacit lives in action—one learns to be by doing things with others.

Universities can transform themselves into social learning organizations that foster students’ progression from the explicit to the tacit by using virtual, Web-based learning opportunities to augment, but not replace, the physical. Online activities such as collaborative science experiments or Web-cast lectures annotated by a community of students can strengthen the learning process. Such activities foster the social, conversational inquiry that builds the cognitive scaffolding to support the acquisition of knowledge. Higher education’s challenge is to capture the unique capabilities of the Web by building creative, new learning environments that best leverage the natural ways people learn.

Woodie Flowers, Pappalardo Professor of Mechanical Engineering and MacVicar Faculty Fellow at MIT, describes his vision of higher education, one that helps meet the enormous educational challenges we confront on a global scale. He contrasts today’s “cottage industry” model—with nearly 3,800 two- and four-year colleges and universities in the United States—with his proposed new media model. By “new media,” Flowers does not mean distance learning or videotaped lectures. Rather, he envisions entertainment-quality, Web-based modules that use animation, voice and video clips, captions, and text—all combined as appropriate in accurate, well-organized, and pedagogically solid productions. Flowers is convinced of the superiority of such a highly produced module over any of the best lectures he has ever given.

Echoing the work of both Resnick and Brown, Flowers notes that a key characteristic of new media educational materials is their shift from merely conveying information about, for example, calculus, to educating students to think using calculus by applying concepts to interactive performances and demonstrations. The enhanced educational benefits of this “learning by doing” approach have
been clearly demonstrated in controlled experiments. Further, the inherent nature of new media materials allows for their continuous improvement. The modules will evolve rapidly because massive amounts of data will be available on how different users learn and on which techniques are effective. Unlike textbooks, modules could undergo literally hundreds of updates or editions. New media materials may best be used for what Flowers calls commodity training, that is, high-enrollment, largely introductory topics taught at the undergraduate level. Further, they could provide access to high-quality learning opportunities for a wide variety of students, the vast majority of whom do not have the luxury of a residence-based higher education.

In technological terms, we are closer to being able to produce the compelling and effective new educational media Flowers describes than most people realize. At this point, what is needed most are commitment and cooperation among institutions to invest in their production, which could exceed $20 million for a set of modules for any particular course. Such a cooperative effort would address the flaws and redundancies in our current higher education model, which seriously reduce its effectiveness and threaten its long-term viability.

Diana Laurillard, professor of educational technology and pro-vice-chancellor at the Open University, UK, believes that today’s teaching methods have not evolved sufficiently for universities to fulfill their missions. Consistent with the themes stressed by other Forum scholars, she advocates a radical shift from the standard transmission model, from teaching what is known to teaching how one comes to know. This entails engagement on many levels for both the individual and the learning community. Students’ active participation with practitioners, working together on common projects, makes them part of the process of creating knowledge.

Laurillard outlines a conversational framework for learning based on a continually iterative dialogue between teacher and student and the constant interplay of theory and practice. The transmission model is just one part of this much more complex model for learning as shared understanding. The Open University’s technology-based courses are all designed within the conversational framework. For each subject, the learning objectives of the course—and not the technology—drive the mix of different types of iterative dialogue between teachers and students, and of its practical and theoretical components.

Development of these courses entails an enormous commitment of time and resources, but there is little incentive for faculty to develop them. While research flourishes on our campuses, teaching languishes. Laurillard urges universities to realign research and teaching by adopting a professional approach to teaching that parallels that for research. Until then, generic forms of technology-based courses that can be used across the full range of university curricula may offer a solution. Similar to the generic form of a book, a lecture, or a PowerPoint presentation, the teacher’s task would be to customize the content. Relatively little programmer support would be
necessary because the pedagogical design is already embedded in the generic form. Laurillard offers these forms as an alternative to the individual struggle to discover how best to take advantage of the powerful, but too often overwhelming, array of possibilities technology presents for improving teaching and learning.

Michael Macedonia, chief scientist and technical director of the U.S. Army Simulation, Training, and Instrumentation Command (STRICOM), and J.C. Herz, chief executive officer of Joystick Nation, Inc., describe the potential of entertainment technology to revolutionize teaching and learning. Macedonia reports that the U.S. military culture has accepted computer gaming as a powerful tool for remaking the armed forces in preparation for the new realities of the 21st century. Many commercial games have been modified to develop skills and to build teams, including Atari’s Battlezone for the army, ID Software’s Doom for the marines, and Microsoft’s Flight Simulator for the navy. The navy now issues customized versions of Flight Simulator to all its student pilots. Further, the military considers simulation technology—that is, the creation of virtual experiences for training purposes—as a major strategic capability for the United States.

The Department of Defense’s goal is to leverage the huge investments commercial firms pour into research and development in this field. Microsoft, for example, spent over $2 billion on development of the X-Box alone, far surpassing the U.S. Army’s entire science and technology budget of $1.6 billion.

Herz focuses on the learning potential of networked environments illustrated by online, multiplayer role-playing games (RPGs). The social ecology that drives these networked games offers the opportunity for participants not only to compete, but to collaborate, invent, and construct a networked model for learning and teaching the game. Multiplayer online games actively foster the formation of teams, clans, guilds, and so forth, and allow players to stretch their experiences in new and unexpected directions. Nearly every game comes with a built-in level editor and tools to create custom characters or scenarios. RPGs’ playing fields, or online worlds, persist whether or not an individual player is logged on at any given time. Players move in and out of the game, developing their character over a period of several months or years by overcoming challenges and accruing experience points.

In terms of the speed and volume of learning—the rate at which information is assimilated into knowledge and then synthesized into new forms—the networked ecosystem of online gaming is vastly more dimensional than the 19th century paradigm of classroom instruction. Players learn through active engagement not only with software, but with each other as well. On the other hand, most online activities in higher education—online syllabi, threaded discussions, class e-mail—are not integrated in a coherent way. To be meaningful, the online environment should be structured so that participants actively engage in construction of their learning experiences, and so that students are useful to one another. In this regard, multiplayer online games present a valuable model for higher education as both a means to build a networked learning environment and to leverage the technological skills of 21st century students.
They allow that some responses to unfavorable economic conditions may have more merit than previously recognized. For example, in earlier work they questioned the prevailing institutional response to the recessions of the early 1980s and early 1990s, namely, to defer maintenance and cut library expenditures. Those cuts were criticized as the easy way out—unlikely to generate an uproar on campus despite their long-term consequences. Yet the political value of warding off faculty and student protests should not be underestimated, as it may be crucial to preserving political capital to lay the groundwork for accomplishing broader institutional goals. McPherson and Schapiro also discuss current economic and demographic trends and their possible effects on institutional expenses and revenues, particularly tuition. They conclude with the suggestion that campus leaders anticipate the challenges that lie ahead by preparing estimates of likely impacts on their institutions and by devoting serious thought to contingency plans based on various scenarios. An open, communicative approach throughout this effort will help mobilize community resources and support for the direction ultimately chosen, ideally mitigating what is frequently a contentious and painful process.

Craig Aase and Gary Krueger, vice president for administration and treasurer, and associate professor of economics, respectively, at Macalester College, began to develop a financial crisis plan for their institution in the summer of 2000, long before recession was a certainty. To capture the effects of a recession on the college’s finances, they analyzed 25 years of Macalester’s financial data to assess the relationship of institutional revenues—endowment, tuition and fees, and gifts—to the nation’s gross domestic product (GDP) and the level of the Dow Jones Industrial average. Their work focused largely on the effects of GDP and the Dow during the recessions of the early 1980s and early 1990s, and enabled them to forecast the college’s net revenues based on various recession scenarios. Macalester’s standing Long Range Planning Committee was charged with developing a plan to help the college make difficult choices in the event of a recession. Working with a model estimating a 10 percent reduction in revenue within four years, the committee developed through an inclusive, collaborative process strategies to address the shortfall. Aase and Krueger emphasize that the real value of this exercise was that it helped raise consciousness among faculty and staff about possible budget cuts should the economy render them necessary. Absent pressure for immediate action, the groundwork for making difficult choices was laid while still retaining the fabric of the college community.

Patrick Callan, president of the National Center for Public Policy and Higher Education, looks at the effects of higher education of a recession from the perspective of state budgetary structures. Unlike any other major developed country, where centralized controls prevail, responsibility for education in the United States lies with each of the 50 states. Public higher education—including funding for student financial aid—must compete with other state services for its share of available funds. Historical patterns suggest that funding for higher education is particularly vulnerable in the current economic downturn, as key state officials tend to view colleges and universities as more fiscally and programmatically flexible than most state agencies, whose programs often have relatively fixed spending levels. Further, the political popularity of the K-12 sector today far exceeds that of higher education. Another key factor affecting higher education’s financial health is growing enrollment demand, estimated to increase some 20 percent between 1999 and 2011. The good news is that the 1990s were the best of times for public higher education, and thus these institutions entered the new millennium in strong financial condition. Yet, even without major economic dislocation,
extraordinary effort will be required on the part of states and institutions to meet the needs of the incoming generation of college and university students, the most racially and ethnically diverse—and the poorest—ever to seek higher education.

Clayton Spencer, associate vice president for higher education policy at Harvard University, assesses the national political context for higher education today. Consistent with previous surveys, recent public opinion polls show that education is one of the top domestic policy concerns, now cited after terrorism and the economy. Despite these results, higher education faces a challenging political context in the coming years because of a number of factors. First, America’s war on terrorism has subordinated all domestic policy issues with the possible exception of the economy. Second, the federal discretionary budget is being squeezed by many forces, including the recession, the expense of the war and security at home, and massive tax cuts. These economic pressures affect revenue sources for all institutions, which are forced to raise tuition more steeply than in recent years at the same time that the political system is deeply skeptical about the cost of higher education. The net result is to render higher education more politically suspect precisely when competition for scarce domestic federal resources is significantly more intense. Finally, higher education faces competition not only from domestic priorities other than education, but also from the emphasis within education on the K-12 agenda.

Spencer outlines a number of approaches to encourage and support sound federal higher education policy making. She advocates pursuit of finite and focused goals, including most importantly that of ensuring access by removing the financial barriers that prevent too many low-income citizens from enrolling in our nation’s colleges and universities.

Diversity holds a key to positive change in higher education, but just how to embrace diversity and make it a fundamental component of the mission of our colleges and universities is a vexing question. Johnetta Cole, president emerita of Spelman College, describes the rapidly shifting American landscape in which ethnicity, race, and gender are continuously transforming our communities in profound and powerful ways. Yet these radical changes in the world surrounding our campuses have not been accompanied by similar radical cultural changes on campus. Moreover, the recent demise of affirmative action has worsened this disconnect and buried higher education in the deepest crevices of what Cole calls the diversity divide.

Cole maintains that white students, faculty, and administrators too frequently view racial issues as individual matters or crises rather than as part of a larger nexus of concerns that deserve careful thought and analyses. Higher education must develop and expand its diversity capacity—that is, its understanding of the intrinsic value of diversity to the task of higher education, as well as its commitment to achieving diversity on campus. Furthermore, given the current demographics of our society, we must move beyond an exclusionary notion of diversity as simply a black-and-white issue. Hispanics, for example, are expected to comprise 25 percent of the U.S. population by midcentury. Cole asks how higher education can embrace diversity in meaningful ways that move us toward developing citizens of the world committed to constructing and participating in a global society. She proposes a holistic approach along many fronts, including a more diverse faculty and a multicultural curriculum. Further, Cole emphasizes the need to disabuse ourselves of the notion that diversity is somehow antithetical to quality. These steps and others will help build the critical mass of positive change that higher education needs to meet the
moral and social challenges our diverse society presents.

Another source of pressure and tension on campus stems from the clash of academic and market values that accompanies the growing influence of money and business principles on higher education. David Kirp, professor of public policy at the Goldman School of Public Policy at the University of California, Berkeley, discusses trends toward outsourcing and revenue-centered management (RCM) in light of their effect on academic values.

Kirp argues that outsourcing on many campuses has reached the point where the educational mission of the institution itself is in danger of being outsourced. The line between the core functions of higher education—teaching, learning, and research—and peripheral activities is blurry and, indeed, the core functions are at risk. Kirp acknowledges there is no compelling reason for most campuses to operate their own laundries or post offices, and thus in these and many other cases outsourcing makes good sense. He cites, however, the fact that more and more admissions and financial aid functions are being turned over to private firms—one of which serves as the admissions office for more than 40 different schools, recruiting and (subject to approval) admitting students. With regard to teaching, Kirp describes the hiring of part-time, adjunct instructors as the academic equivalent of hiring temp agency fill-ins or day laborers. He notes that more than three in five new full-time academic jobs offer no prospect for tenure—a practice that trades loyalty for survival and saps the academic culture of the institution.

Revenue-centered management (RCM) is the corporate language version of the well-known dictum, “each tub on its own bottom.” Kirp assesses the experiences of the Universities of Michigan and Southern California with RCM and questions the wisdom of running a university according to the principles of a corporate profit center. He cites glaring examples of the triumph of market over academic values on both campuses, largely driven by the need for schools and departments to generate their own revenue. In the end, both institutions drew back from their full-fledged commitments to the tenets of RCM. Today, academic leadership and a vision that encompasses the shared life of the many parts of the institution prevail on both campuses, much to their benefit.

How institutions react to internal and external pressures and adapt to shifts in the environment that sur-

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rounds them is largely a function of their operating structures. Susanne Lohmann, professor of political science and policy studies at UCLA, analyzes structural impediments to change and the conditions that foster flexibility and innovation. Her review of the 900-year history of the university leads her to the conclusion that, other than some limited bursts of intellectual vibrance, for most of its history the university has been characterized by stagnation.

Lohmann identifies the greatest factor inhibiting structural and intellectual progress as intrauniversity hostility to change. For example, the departmental structure of the university and its alignment with the discipline-
based structure of scientific networks contributes to the intellectual ossification of the university. New ideas and method are discouraged from entering the system because job markets and reward systems are controlled by the older generation and structured to promote old ways of thinking. Thus, new structures and ideas typically emerge in the context of new fields of inquiry and new institutions. That is, change occurs through replacement as existing institutions stagnate and new ideas and methods find a home in newly founded fields and institutions.

Lohmann notes, however, that overall the American system of higher education has continuously reinvented itself and is doing so now. She identifies some of the key characteristics that foster the American system’s successful adaptation, including (1) its extreme competitiveness, which promotes performance; (2) its tremendous diversity, which promotes experimentation and innovation; and (3) its political permeability, which promotes its relevance to the outside world. The drawback of such a structure is the daunting array of pressures that modern university leaders face from various sources. On the other hand, the possibilities it presents are seemingly limitless.

**CONCLUSION**

The complex economic, social, and educational issues we face today are not new by any measure; what has changed dramatically is the urgency they bear. American higher education can play a pivotal role in shaping worthy responses to these daunting challenges. The new learning media and methods envisioned and created by the 2001 Forum Scholars have the potential to scale up and meet the burgeoning demand for education in the United States and on a global scale—and to do so on a deeper and more powerful level than traditional methods could make possible.

On the campus level, college and university leaders can help shape learning environments that encourage the open inquiry that is the foundation of greater understanding across our diverse society. Further, campus leaders can preserve higher education’s most cherished values—among them academic freedom and access—by steadfastly supporting their worth in the face of economic and market pressures. Ultimately, the extent to which higher education contributes to forging a better society—one characterized by civility and hope for all its members—will depend upon the commitment and ability of its leadership to creatively fashion new solutions to age-old problems.

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**EDITOR’S NOTE:** The editor wishes to acknowledge the authors who contributed to Forum Futures 2002 and whose work is directly reflected in this foreword. The remainder of this report contains summaries that elaborate on these brief descriptions of the papers presented at the 2001 symposium of the Forum for the Future of Higher Education. —MED