

An honor to be invited by President Natalicio. I've always had great admiration for your president...and have long marveled at her leadership

- Beyond the fact that we both served together for many years on the National Science Board
- Was the fact that we were both appointed as university presidents in the same year, 1988
- And now, 20 years later, I've been a has-been president for over a decade while President Natalicio just keeps on going and going!

Despite being a has-been president, I do find myself invited from time to time to meet again with university leadership groups, using as a "professional 2x4", and my remarks today will be drawn from three plenary talks I gave three such groups:

- Association of American Universities (last fall)
- European University Association (March in Barcelona)
- Association of Governing Boards (and Miller Center)

Now of course whenever any group of university presidents get together, the discussions always begin with the usual topics:

- money,
- students,
- politics,
- and for the unfortunate few, intercollegiate athletics.

I'll begin at this treetop issue level, but with a somewhat different perspective gained from a couple of years of service on the Spellings Commission, created by one of Texas's own, Secretary Margaret Spellings, and chaired by the former chair of the UT Board of Regents, Charles Miller. In fact, I'm going to try to give you the inside scoop on the Spellings Commission study—the National Commission on the Future of Higher Education in America—suggesting what you need to pay attention to and what you can safely ignore!

But then I'll elevate the discussion a bit, taking it out to the L_1 or Lagrange point, one million miles out where Earth appears as "a big blue marble", and where these issues all converge into three themes of the 21st century:

- demographic change,
- globalization, and
- the knowledge explosion.

Finally I will move all the way out to the Oort Cloud, a light year beyond Pluto (where has-been presidents are usually exiled to and from where they can occasionally launch provocative comets inward toward the higher education solar system), and consider several issues that I believe compel us to at least admit into our speculations about the very existence of the university itself a generation or so into the future, at least as we understand it today.

And I'll share with you some of my own speculation about possible futures for the university, which you may regard as coming from the lunatic fringe!

As context let me begin by suggesting that today the United States faces the challenge of achieving prosperity and national security in a hypercompetitive global economy driven by knowledge and innovation.

We have entered an era in which educated people, the knowledge they produce, and the innovation and entrepreneurial skills they possess have become the keys to economic prosperity, public health, national security, and social well being.

- To provide our citizens with the knowledge and skills to compete on the global level, the nation must broaden access to world-class educational opportunities at all levels: K-12, higher education, workplace training, and lifelong learning.
- It must also build and sustain world-class universities capable of conducting cutting-edge research and innovation;
 - producing outstanding scientists, engineers, physicians, teachers, and other knowledge professionals;
 - serving society in countless ways—health care, agricultural extension, economic development, and arts and culture,
 - and building the advanced learning and research infrastructure necessary for the nation to sustain its leadership in the century ahead.

Although one commonly hears strong criticism of higher education from both the media and political front on issues such as cost and performance, recent opinion surveys actually reveal remarkably strong public support for higher education. (Callan and Immerwahr, 2008)

- Public attitudes remain favorable toward characteristics such as the quality of our colleges and universities and their contributions through teaching, research, and public service.
- Both the social and economic values of a college education are perceived as high and increasing.

- Yet there are clouds on the horizon with concerns about rising costs that could place a college education out of the reach of many students and families.

In recent years, numerous studies sponsored by government, business, foundations, the national academies, and the higher education community have suggested that the past attainments of American higher education may have led our nation to unwarranted complacency about its future.

Of particular importance here was the National Commission on the Future of Higher Education, launched by Secretary of Education Margaret Spellings in 2006 to examine issues such as the access, affordability, accountability, and quality of our colleges and universities.

This unusually broad commission—comprised of members from business, government, foundations, and higher education—concluded that

- “American higher education has become what, in the business world would be called a mature enterprise: increasingly risk-averse, at times self-satisfied, and unduly expensive.
- It is an enterprise that has yet to address the fundamental issues of how academic programs and institutions must be transformed to serve the changing educational needs of a knowledge economy. It has yet to successfully confront the impact of globalization, rapidly evolving technologies, an increasingly diverse and aging population, and an evolving marketplace characterized by new needs and new paradigms.”

More specifically, the Commission raised two areas of particular concern about American higher education: social justice and global competitiveness.

- Too few Americans prepare for, participate in, and complete higher education. Notwithstanding the nation’s egalitarian principles, there is ample evidence that qualified young people from families of modest means are far less likely to go to college than their affluent

peers with similar qualifications. America's higher-education financing system is increasingly dysfunctional. Government subsidies are declining; tuition is rising; and cost per student is increasing faster than inflation or family income.

- Furthermore, at a time when the United States needs to be increasing the quality of learning outcomes and the economic value of a college education, there are disturbing signs that suggest higher education is moving in the opposite direction. Numerous recent studies suggest that today's American college students are not really learning what they need to learn.

The Commission issued a series of sweeping recommendations to better align higher education with the needs of the nation, including

- Reaffirming America's commitment to provide all students with the opportunity to pursue post-secondary education and calling for a major new engagement of higher education with primary and secondary education;
- Restructuring financial student aid programs to focus upon the needs of lower income and minority students, placing a much higher priority on need-based financial aid programs (particularly the Pell Grant);
- Calling for a new degree of transparency, disclosure, and accountability in areas such as cost structures and educational outcomes in an effort to earn greater public trust and confidence in the commitment of our institutions to the public interest;
- Adopting a culture of continuous innovation and quality improvement in higher education with a much higher priority given to experimentation and innovation;

- Meeting the needs of an innovation-driven nation by increasing investment in areas key to economic competitiveness and national security in a global, knowledge-driven economy; and
- Ensuring that all citizens have access to high quality educational, learning, and training opportunities throughout their lives, essentially establishing lifelong post-secondary education as a "civil right" for all Americans.

It is my belief that while many of the more detailed recommendations contained in the report will likely not survive the current administration, these broader recommendations are sufficiently important and enduring that they are likely to continue to influence the national framework for higher education for some time to come.

Furthermore, because of the cacophony of criticism and speculation following the release of the Commission's report, it is also important to note here what was NOT included as recommendations:

- No standardized testing,
- No tuition price fixing,
- No national (federal) accreditation process,
- No federalization of American higher education,
- And no "No Child Left Behind" and no "Nation at Risk"!!

Yet, while such studies are extremely important and set both the framework and tone for policy development with their stress on performance, transparency, and accountability, they also are limited in scope to present-day concerns.

Perhaps a more visionary perspective is provided by an environmental scan that considers such as the emergence of a knowledge and innovation intensive economy, globalization, changing demographics, and powerful market forces.

More specifically, today we are evolving rapidly into a post-industrial, knowledge-based society as our economies are steadily shifting from material- and labor-intensive products and processes to knowledge-intensive products and services.

- A radically new system for creating wealth has evolved that depends upon the creation and application of new knowledge. But knowledge can be created, absorbed, and applied only by the educated mind. Hence schools in general, and universities in particular, play increasingly important roles as our societies enter this new age.
- Our economies, companies, and social institutions have become international, spanning the globe and interdependent with other nations and other peoples.
- Markets characterized by the instantaneous flows of knowledge, capital, and work unleashed by lowering trade barriers are creating global enterprises based upon business paradigms such as outsourcing and off-shoring, a shift from public to private equity investment, and declining identification with or loyalty to national or regional interests. Market pressures increasingly trump public policy and hence the influence of national governments.
- As the recent report of the National Intelligence Council's 2020 Project has concluded, "The very magnitude and speed of change

resulting from a globalizing world—apart from its precise character—will be a defining feature of the world out to 2020. Globalization—growing interconnectedness reflected in the expanded flows of information, technology, capital, goods, services, and people throughout the world will become an overarching mega-trend, a force so ubiquitous that it will substantially shape all other major trends in the world of 2020.” (National Intelligence Council, 2005)

It is this reality of the hyper-competitive, global, knowledge-driven economy of the 21st Century that is stimulating the powerful forces that will reshape the nature of our society and that pose such a formidable challenge to our nation and our states and cities.

- Today, a college degree has become a necessity for most careers, and graduate education is desirable for an increasing number. In the knowledge economy, the key asset driving corporate value is no longer physical capital or unskilled labor.
- Instead it is intellectual and human capital. This increasingly utilitarian view of higher education is reflected in public policy. The National Governors Association notes that “The driving force behind the 21st Century economy is knowledge, and developing human capital is the best way to ensure prosperity.” (NGA, 2004)
- Education is becoming a powerful political force. Just as the *space race* of the 1960s stimulated major investments in research and education, there are early signs that the *skills race* of the 21st Century may soon be recognized as the dominant domestic policy issue facing our nation.
- But there is an important difference here. The space race galvanized public concern and concentrated national attention on educating “the best and brightest,” the academically elite of our society. The skills race of the 21st Century will value instead the skills and knowledge of most of our workforce as a key to economic prosperity, national security, and social well-being.

- As Tom Friedman stresses in his provocative book, *The World is Flat*, "The playing field is being leveled. Some three billion people who were out of the game have walked and often have run onto a level playing field, from China, India, Russia, and Central Europe, from nations with rich educational heritages. The flattening of the world is moving ahead apace, and nothing is going to stop it. What can happen is a decline in our standard of living if more Americans are not empowered and educated to participate in a world where all the knowledge centers are being connected. We have within our society all the ingredients for American individuals to thrive in such a world, but if we squander these ingredients, we will stagnate." (Friedman, 2005).

Here we face the challenge of rapidly changing demographics.

- The populations of most developed nations in North America, Europe, and Asia are aging rapidly. In our nation today there are already more people over the age of 65 than teenagers, and this situation will continue for decades to come. Over the next decade the percentage of the population over 60 will grow to over 30% to 40% in the United States, and this aging population will increasingly shift social priorities to the needs and desires of the elderly (e.g., retirement security, health care, safety from crime and terrorism, and tax relief) rather than investing in the future through education and innovation.
- However, the United States stands apart from the aging populations of Europe and Asia for one very important reason: our openness to immigration. In fact, over the past decade, immigration from Latin America and Asia contributed 53% of the growth in the United States population, exceeding that provided by births (National Information Center, 2006). This is expected to drive continued growth in our population from 300 million today to over 450 million by 2050, augmenting our aging population and stimulating productivity with new and young workers.

- As it has been so many times in its past, America is once again becoming a nation of immigrants, benefiting greatly from their energy, talents, and hope, even as such mobility changes the ethnic character of our nation. By the year 2030 current projections suggest that approximately 40% of Americans will be members of minority groups; by mid-century we will cease to have any single majority ethnic group.
- By any measure, we are evolving rapidly into a truly multicultural society with a remarkable cultural, racial, and ethnic diversity. This demographic revolution is taking place within the context of the continuing globalization of the world's economy and society that requires Americans to interact with people from every country of the world.

The increasing diversity of the American population with respect to culture, race, ethnicity, and nationality is both one of our greatest strengths and most serious challenges as a nation.

- A diverse population gives us great vitality. However, the challenge of increasing diversity is complicated by social and economic factors.
- Today, far from evolving toward one America, our society continues to be hindered by the segregation and non-assimilation of minority and immigrant cultures. If we do not create a nation that mobilizes the talents of all of our citizens, we are destined for a diminished role in the global community and increased social turbulence.
- Higher education plays an important role both in identifying and developing this talent. Yet many are challenging in both the courts and through referenda long-accepted programs such as affirmative action and equal opportunity aimed at expanding access to higher education to underrepresented communities and diversifying our campuses and workplaces.

- As you may recall, in 2003 Michigan won an important Supreme Court case reaffirming the use of affirmative action in achieving diversity (and trumping the Hopwood case in Texas). Yet three years later our state passed a constitutional amendment (Proposition 2) that banned affirmative action and now is driving down our minority enrollments.

These economic, geopolitical, and demographic factors are stimulating powerful market forces that are likely to drive a massive restructuring of the higher education enterprise, similar to that experienced by other economic sectors such as banking, transportation, communications, and energy.

- We are moving toward a revenue-driven, market-responsive higher education system because there is no way that our current tax system can support the degree of universal access to postsecondary education required by knowledge-driven economies in the face of other compelling social priorities (particularly the needs of the aging).
- This is amplified by an accelerating influence of the market on higher education and a growing willingness on the part of political leaders to use market forces as a means of restructuring higher education in order to increase the impact of the competition.
- Put another way, market forces are rapidly overwhelming public policy and public investment in determining the future course of higher education.

Yet the increasing dominance of market forces over public policy raises two important challenges.

- Whether a deliberate or involuntary response to the tightening fiscal constraints and changing priorities for public funds, the long standing recognition that higher education is a public good, benefiting all of our society, is eroding.

- Both the American public and its elected leaders increasingly view higher education as a private benefit that should be paid for by those who benefit most directly, namely the students. Without the constraints of public policy, earned and empowered by public investments, market forces could so dominate and reshape the higher education enterprise that many of the most important values and traditions of the university could fall by the wayside, including its public purpose.

Furthermore, while the competition within the higher education marketplace can drive quality, if not always efficiency, there is an important downside.

- The highly competitive nature of higher education in America, where universities compete for the best faculty, the best students, resources from public and private sources, athletic supremacy, and reputation, has created an environment that demands excellence.
- However, it has also created an intensely Darwinian, 'winner-take-all' ecosystem in which the strongest and wealthiest institutions have become predators, raiding the best faculty and students of the less generously supported and more constrained public universities and manipulating federal research and financial policies to sustain a system in which the rich get richer and the poor get devoured. (Duderstadt, 2005)
- This ruthless and frequently predatory competition poses a particularly serious challenge to the nation's public research universities. These flagship institutions now find themselves caught between the rock of declining state support and the hard-place of the predatory rich private universities.
- As we have noted earlier, aging populations are not likely to give higher education a priority for state tax dollars for perhaps a generation or longer. Hence even as states are depending more on their public universities—expanding access to underserved

communities, achieving world-class performance in research and graduate studies key to regional economic competitiveness—state appropriations are declining while demands for higher efficiency and accountability are intensifying.

- In sharp contrast, due both to booming financial markets and favorable federal financial aid and tax policies, many private universities have managed to build endowments so large (at least on a per student basis) that they have become independent of the education marketplace (e.g., student tuition, R&D grants, even private support).
- This creates a serious competitive imbalance in the marketplace for the best faculty, students, and perhaps resources, since the wealth gap between the rich privates and flagship publics is growing ever larger. This is aggravated by the political constraints on public universities that not only limit their flexibility and agility, but also hinder their capacity to compete (e.g., constraints on tuition, affirmative action, technology transfer, and globalization).
- The plight of the public research university is not only a serious challenge to the states but as well as to the nation, since these institutions represent the backbone of advanced education and research, producing most of the scientists, engineers, doctors, lawyers, and other knowledge professionals, conducting most of the research, and performing most of the public service sought by states. It would be a national disaster if the public research university were to deteriorate to the point in which research and advanced education of world-class quality could only occur in the 20 to 30 wealthiest private universities.

Let me now finally move out to my Oort Cloud, and suggest three paradigm changes, just over the horizon, that may be true "game-changers"

Lifelong Learning

Today the shelf life of education provided early in one's life, whether K-12 or higher education, is shrinking rapidly in face of the explosion of knowledge in many fields.

- Today's students and tomorrow's graduates are likely to value access to lifelong learning opportunities more highly than job security, which will be elusive in any event.
- They understand that in the turbulent world of a knowledge economy, characterized by outsourcing and off-shoring to a global workforce, employees are only one paycheck away from the unemployment line unless they commit to continuous learning and re-skilling to adapt to every changing work requirements.
- Furthermore, longer life expectancies and lengthening working careers create additional needs to refresh one's knowledge and skills through.

And, just as students increasingly understand that in a knowledge economy there is no wiser personal investment than education, many nations now accept that the development of their human capital through education must become a higher priority than other social priorities, since this is the only sure path toward prosperity, security, and social well-being in a global knowledge economy.

- Of course, establishing as a national goal the universal access to lifelong learning would require not only a very considerable transformation and expansion of the existing postsecondary education enterprise, but it would also require entirely new paradigms for the conduct, organization, financing, leadership, and governance of higher education in America.

- For example, most of today's colleges and universities are primarily designed to serve the young—either as recent high school graduates or young adults early in their careers. Yet achieving the objective of universal access to lifelong learning would expand enormously the population of adult learners of all ages.
- Traditional university characteristics such as residential campuses designed primarily to socialize the young with resources such as residence halls, student unions, recreational facilities, and varsity athletics would have marginal value to adult learners with career and family priorities.
- Such universal lifelong learning could change dramatically the higher education marketplace, providing for-profit institutions already experienced in adult education with significant advantages.
- Furthermore it seems likely that the only way that such ubiquitous access can be provided to lifelong learning to adults with career and family responsibilities will be through technology-mediated distance learning.

Nevertheless it is time for the nation to step up to its responsibility as a democratic society to enable all of its citizens to take advantage of the educational, learning, and training opportunities they need and deserve, throughout their lives, thereby enabling both individuals and the nation itself to prosper in an ever more competitive global economy.

- While the ability to take advantage of educational opportunity always depends on the need, aptitude, aspirations, and motivation of the student, it should not depend on one's socioeconomic status.
- *Access to lifelong learning opportunities should be a right for all* rather than a privilege for the few if the nation is to achieve prosperity, security, and social well-being in the global, knowledge- and value-based economy of the 21st century.

The Global University

The emergence of a global knowledge economy is driven not only by pervasive transportation, information, and communications technologies but also by a radically new system for creating wealth that depends upon the creation and application of new knowledge and hence upon advanced education, research, innovation, and entrepreneurial activities.

This past June sixth Glion Colloquium brought together university leaders from around the world in Glion above Montreux, Switzerland to consider the challenges, opportunities, and responsibilities presented to higher education by the emerging global, knowledge-driven economy.

- The VI Glion Colloquium departed from its customary cross-Atlantic dialog by broadening participation to include a global representation, including university leaders from around the world and representing 18 nations and five continents to consider the globalization of higher education.
- Both mature and developing nations are making major investments in building the knowledge infrastructure—schools, universities, research institutes, high-tech industry, cyberinfrastructure, public policies and programs—necessary to achieve prosperity and security in the knowledge economy.

In parallel with these trends, there is a strong sense that higher education is also in the early stages of globalization. Of course there has been a long tradition of higher education through the exchange of students, faculty, and ideas and the development of international partnerships among institutions.

Yet globalization implies a far deeper interconnectedness with the world—economically, politically, and culturally.

- It also requires thoughtful, interdependent, and globally identified citizens.
- Institutional and pedagogical innovations are needed to confront these challenges and insure that the canonical activities of universities—learning, scholarship, and engagement—remain rich, relevant, and accessible.

This is important because all too often in their efforts to achieve international scope, universities from developed nations sometimes adopt a colonial approach, establishing relationships or even campuses abroad in an effort not only to provide international experiences for their students but to tap the intellectual talent of other nations.

- While universities must be responsive to the imperatives of a global economy and attendant to their local responsibilities, they must also become responsible members of the global community, that is, becoming not only universities in the world but also of the world.
- We may even see the emergence of truly global universities that not only intend to compete in the global marketplace for students, faculty, and resources, but are also increasingly willing to define their public purpose in terms of global needs such as public health, environmental sustainability, and international development.
- Note here we are talking about the emergence of “universities of the world and in the world”, universities that not only compete in the global marketplace but define their public purpose in terms of global needs, e.g., global health, global sustainability, wealth disparity and poverty.

Cyberinfrastructure and Exponentiating Technologies

Let me mention briefly several of the datapoints that form the context for my talk:

- Today's students are digital natives, members of the Net Generation, comfortable with using the new technologies for building social communities—instant messaging, blogs, wiki's, virtual worlds, FaceBook, MySpace , Wikipedia, ... (which even their professors use...)
- The Economist now estimates
 - 3.5 billion people have cellphone contracts
 - 1.2 billion with broadband connectivity
- Over 200 universities have already put their the extensive digital assets for their courses on the Web, available for anyone to learn from, including MIT, Yale, Stanford, and the British Open University.
- Google has arranged to digitize the collections of 25 of the world's great libraries, making roughly 60% of the estimated books of the world searchable through their powerful search engines. (Our Michigan library has already digitized over 2 million volumes and should have its entire 8 million library full-text searcheable, with much of it downloadable, within the next two years.)
- And rather than access these vast knowledge resources with passive media such as books, your generation will enjoy 3-D virtual environments such as the World of Warcraft, Second Life, and Croquet in which all of the senses are faithfully replicated to enable human interaction at a distance.

Imagine what might be possible if all of these pieces could be pulled together, i.e.,

- Internet-based access to all recorded (and then digitized) human knowledge augmented by powerful search engines,
- open source software (SAKAI), learning resources (OCW), open learning philosophies (open universities), new collaboratively developed tools (Wikipedia II, Web 2.0); and

- ubiquitous information and communications technology (e.g., Negroponte's \$100 laptop computer or, more likely, advanced cell phone technology).
- In the near future it could be possible that anyone with even a modest Internet or cellular phone connection has access to all the recorded knowledge of our civilization along with ubiquitous learning opportunities.

Hence, one can imagine that within decades we are likely to see the linking together of billions of people with limitless access to knowledge and learning tools, all enabled by a rapidly evolving scaffolding of cyberinfrastructure continuing to increase in power one-hundred to one-thousand fold every decade.

- Perhaps we are on the threshold of the emergence of a new form of civilization, as billions of world citizens interact together, no longer constrained by today's monopolies on knowledge or learning opportunities.
- And all of this is likely to happen during the lives of today's students...and in fact, during the lives of most of you in this room today.

Whence the University?

It is hard for those of us who have spent much of our lives as academics to look objectively at the university, with its tradition and obvious social value, and accept the possibility that it might change in dramatic ways.

- It is particularly difficult to ignite such discussions among university presidents, who generally fall back upon the famous Clark Kerr quote: "About 85 institutions in the Western World established by 1520 still exist in recognizable forms, with similar functions and with unbroken histories, including the Catholic Church, the Parliaments of the Isle of Man, of Iceland, and of Great Britain, several Swiss cantons, and...70 universities."
- After all, as the saying goes, universities change one grave at a time!

But they do change—eventually, and change quite profoundly in fact!

- But although its roots are millennia old, the university has changed before. In the 17th and 18th centuries, scholasticism slowly gave way to the scientific method as the way of knowing truth.
- In the early 19th century, universities embraced the notion of secular, liberal education and began to include scholarship and advanced degrees as integral parts of their mission.
- After World War II, they accepted an implied responsibility for national security, economic prosperity, and public health in return for federally funded research.

Although the effect of these changes have been assimilated and now seem natural, at the time they involved profound reassessment of the mission and structure of the university as an institution.

- Of course, this ever-changing nature of the university itself is part of the challenge, since it not only gives rise to an extraordinary diversity of institutions, but also a great diversity in perspectives.
- With much the character of the proverbial elephant being felt by the blind men, it is not surprising that discussions involving the future of the university can be difficult.

Yet during one of the workshops the National Academies conducted recently for university provosts, it was noted that in a single generation following the Civil War, higher education in America changed quite radically:

- From the colonial colleges to the Humboldtian research university;
- with the Land Grant Acts creating the great public universities with strong service missions;
- from enrollments of hundreds to thousands of students;
- the empowerment of the faculty.
- Indeed, everything that could change about the university did change during this brief period.

The consensus in several of our workshops has been that we are well along in a similar period of dramatic change in higher education.

In fact, some of the provosts were even willing to put on the table the most disturbing question of all: "Will the university, at least as we know it today, even exist a generation from now?"

Yet we should also remember that for a thousand years the university has benefited from our civilization as a learning community

- where both the young and the experienced could acquire not only knowledge and skills, but also the values and discipline of the educated mind.
-
- It has defended and propagated our cultural and intellectual heritage, while challenging our norms and beliefs.
- It has produced the leaders of our governments, commerce, and professions.
- It has both created and applied new knowledge to serve our society.
- And it has done so while preserving those values and principles so essential to academic learning: the freedom of inquiry, an openness to new ideas, a commitment to rigorous study, and a love of learning.

As Frank Rhodes has observed, "Universities are the engines of economic growth, the custodians and transmitters of cultural heritage, the mentors of each new generation of entrants into every profession, the accreditors of competency and skills, and the agents of personal understanding and societal transformation." (Rhodes, 1999)

- There seems little doubt that these roles will continue to be needed by our civilization.
- There is little doubt as well that the university, in some form, will be needed to provide them.
- The university of the twenty-first century may be as different from today's institutions as the research university is from the colonial college.

- But its form and its continued evolution will be a consequence of transformations necessary to provide its ancient values and contributions to a changing world.