

The Future of Higher Education in
the Knowledge-Driven, Global Economy
of the 21st Century

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Creating Knowledge, Strengthening Nations: The Changing Role of Higher Education
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Let me begin by conveying a hearty “Happy Birthday” to the University of Toronto on this, the 175th anniversary of its charter, from its sister university south of the border, the University of Michigan.

Both of our institutions are about the same age (we are in our 185th year), the same size, and the same character as comprehensive, public research universities.

Moreover, there is remarkable similarity between the Province of Ontario and the State of Michigan in size of population, economic base, key economic indicators, and many aspects of our education systems, as evidenced by the fact that we are each other’s largest international trading partner.

Hence it is logical that there should be strong bonds among our institutions, as well as strong mutual interests, with the topic of this symposium as a prime example.

This symposium celebrating the University of Toronto’s 175th anniversary addresses the changing nature of higher education in world increasing dependent upon knowledge and ever more interdependent. This particular session is devoted to a discussion of higher education in the new global economy, a topic which will provide the focus for my own remarks.

Clearly we live in a time of very rapid and profound social transformation,

A transition from a century in which the dominant human activity was transportation to one in which communications has become paramount, from economies based upon cars, planes, and trains to one dependent upon computers and networks.

We are shifting from an emphasis on creating and transporting physical objects such as materials and energy to knowledge itself, from atoms to bits, if you will;

From societies based upon the geopolitics of the nation-state to those based on diverse cultures and local traditions;

And from a dependence on government policy to an increasing confidence in the marketplace to establish public priorities.

More fundamentally, today we are evolving rapidly into a post-industrial, knowledge-based society, a shift in culture and technology as profound as the shift that took place a century ago when our agrarian societies evolved into industrial nations.¹

Industrial production is steadily shifting from material- and labor-intensive products and processes to knowledge-intensive products.

A radically new system for creating wealth has evolved that depends upon the creation and application of new knowledge. In a very real sense, we are entering a new age, an age of knowledge, in which the key strategic resource necessary for prosperity has become knowledge itself, that is, educated people and their ideas.²

Unlike natural resources such as iron and oil that have driven earlier economic transformations, knowledge is inexhaustible. The more it is used, the more it multiplies and expands.

The Skills Race

Yet knowledge can be created, absorbed, and applied only by the educated mind. Hence schools in general and universities in particular will play increasingly important roles as our societies enter this new age.

Today, a college degree has become a necessity for most careers, and graduate education desirable for an increasing number.

The increased blurring of the various stages of learning throughout one's lifetime—K-12, undergraduate, graduate, professional, job training, career shifting, lifelong enrichment—will require a far greater coordination and

perhaps even a merger of various elements of our national educational infrastructure.

We are shifting from “just-in-case” education, based on degree-based programs early in one’s life, to “just-in-time” education, where knowledge and skills are obtained during a career, to “just-for-you” educational services, customized to the needs of the student.

As a result, the student is evolving into an active learner and increasingly a demanding consumer of educational services.

Technology

This transformation into a knowledge-driven society is being driven, in part, by modern digital technologies such as computers, telecommunications, and networks that are reshaping both our society and our social institutions.

These technologies have increased vastly our capacity to know and to do things and to communicate and collaborate with others.

They allow us to transmit information quickly and widely, linking distant places and diverse areas of endeavor in productive new ways.

They allow us to form and sustain communities for work, play, and learning in ways unimaginable just a decade ago.

Yet, while information technology has the capacity to enhance and enrich teaching and scholarship, it also poses certain threats to our colleges and universities. We can now use powerful computers and networks to deliver educational services to anyone, at anyplace and anytime, no longer confined to the campus or the academic schedule.

Technology is creating an open learning environment in which the student has evolved into an active learner and consumer of educational services, stimulating the growth of powerful market forces that could dramatically reshape the higher education enterprise.

Last year our National Academy of Sciences launched a project to understand better the implications of information technology for the future of the research university.³

Let me mention the three primary conclusions from the early phase of this study:

First, we believe the extraordinary evolutionary pace of information technology will not only continue for the foreseeable future, but it could well accelerate on a superexponential slope as characteristics such computing speed, memory, and network transmission speeds for a given price continue to increase by a factor of 100 to 1000 every decade.

To illustrate with an extreme example, if information technology continues to evolve at its present rate, by the year 2020, the thousand-dollar notebook computer will have a data processing speed and memory capacity roughly comparable to the human brain.⁴ Except it will be so tiny as to be almost invisible, and it will communicate with billions of other computers through wireless technology.

For planning purposes, one can assume that by the end of the decade we will have available infinite bandwidth and infinite processing power (at least compared to current capabilities). We will denominate the number of computer servers in the billions, digital sensors in the tens of billions, and software agents in the trillions.

The number of people linked together by digital technology will grow from millions to billions. We will evolve from “e-commerce” and “e-government” and “e-learning” to “e-everything”, since digital devices will increasingly become our primary interfaces not only with our environment but with other people, groups, and social institutions.

Our second conclusion is that the impact of information technology on the university will likely be *profound, rapid, and discontinuous*—just as it has been and will continue to be for the economy, our society, and our social institutions (e.g., corporations, governments, and learning institutions).

This is a disruptive technology⁵ that will affect all of the activities of the university (teaching, research, outreach), its organization (academic structure, faculty culture, financing and management), and the broader higher education enterprise.

However, at least for the near term, meaning a decade or less, we believe the university will continue to exist in much its present form, although meeting the challenge of emerging competitors in the marketplace will demand significant changes in how we teach, how we conduct scholarship, and how our institutions are financed.

This leads to our third conclusion: Universities should begin the development of their strategies for technology-driven change with a firm understanding of those key values, missions, and roles that should be protected and preserved during a time of transformation.

Procrastination and inaction are the most dangerous courses for universities during a time of rapid technological change.

Universities must anticipate these forces, develop appropriate strategies, and make adequate investments if they are to prosper—indeed, if they are to survive--during this period.

Markets

The weakening influence of traditional regulations and the emergence of new competitive forces, driven by changing societal needs, economic realities, and technology, are likely to drive a massive restructuring of the higher education enterprise.

From our experience with other restructured sectors of the economy such as health care, transportation, communications, and energy, we could expect to see a significant reorganization of higher education, complete with the mergers, acquisitions, new competitors, and new products and services that have characterized other economic transformations.

More generally, we may well be seeing the early stages of the appearance of a global knowledge and learning industry, in which the activities of traditional academic institutions converge with other knowledge-intensive organizations such as telecommunications, entertainment, and information service companies.⁶

In this regard, it is important to remember that most of our institutions were the result of public policy and public investment through actions of governments at the national and regional level.⁷

These policies, programs, and commitments were driven by strong social values and a sense of national and regional priorities.

Yet today, in many nations, including my own, public leaders are increasingly discarding public policy in favor of market forces to determine priorities for social investment.

Higher education today is seen increasingly as an individual benefit rather than a social good.

Public higher education can no longer assume that public policies and investment will shield them from market competition.

Diversity

Yet there are two other themes of change that I believe will be particularly important to the futures of today's graduates, and which have provided Royal Roads University with a remarkable opportunity for leadership.

The first is the increasing importance of diversity in higher education, driven by the dramatic changes occurring in the populations served by our universities and affecting all of the characteristics of our institutions: their academic programs, their broader roles in our society, and their aspirations for excellence.

In many developed nations, demographic change is first thought of in terms of the aging of our populations. Over the next several decades, the

percentage of the population over the age of 60 will grow from 15% to 20% to over 30% to 40% in the United States, Europe, and parts of Asia. Already we are feeling the consequences, as our national priorities increasingly focusing on the concerns of the elderly (e.g., health care) rather than the needs of the young (e.g., education).

Yet on a global basis, half of the world's population is under the age of twenty, with over two billion teenagers on planet Earth, most living in Asia, Africa, and Latin America. Their demand for education will be staggering.

An equally profound demographic phenomenon is the increasing diversity of many of our nations with respect to race, ethnicity, and nationality. For example, in the United States today, women, minorities, and immigrants now account for roughly 85 percent of the growth in the labor force, currently representing 60 percent of all of our nation's workers. Those groups we refer to as minorities—African, Hispanic, Asian, and Native Americans—have already become the majority population in states such as California, Arizona, and Texas. By the late twenty-first century, the United States will become a nation of minorities, without a majority ethnic group.

Moreover, women have already become the predominant gender in our nation and our educational institutions (currently comprising over 60% of our enrollments), and are rapidly assuming leadership roles in both the public and private sector.

The full participation of currently underrepresented minorities and women is crucial to our commitment to equity and social justice, as well as to the future strength and prosperity of our societies.

As both a leader of society at large and a reflection of that society, the university has a unique responsibility to develop effective models of multicultural, pluralistic communities.

We must should to achieve new levels of understanding, tolerance, and mutual fulfillment for peoples of diverse racial and cultural backgrounds both on our campuses and beyond.

Global Sustainability

My final theme, global sustainability, seems a particularly appropriate topic this fall in the wake of the United Nations Global Summit on Sustainable Development in Johannesburg.

As a scientist, I am convinced that there is compelling evidence that the growing population and invasive activities of humankind are now altering the fragile balance of our planet. The concerns are both multiplying in number and intensifying in severity: the destruction of forests, wetlands, and other natural habitats by human activities leading to the extinction of millions of biological species and the loss of biodiversity; the buildup of greenhouse gases such as carbon dioxide and their possible impact on global climates; the pollution of our air, water, and land.

With the world population now at 6 billion, we are already consuming 40 percent of the world's photosynthetic energy production.⁸ Current estimates place a stable world population at 8 to 10 billion by the late twenty-first century, assuming fertility rates continue to fall over the next several decades. Yet even at this reduced rate of population growth, we could eventually consume all of the planet's resources, unless we take action.

Depending on the criteria used, one-eighth to one-half of the world's people are malnourished. Some 14 million children starve to death each year.

It could well be that coming to grips with the impact of our species on our planet, learning to live in a sustainable fashion on Spaceship Earth, will become the greatest challenge of all to our generation. We must find new ways to provide for a human society that presently has outstripped the limits of global sustainability.

This will be particularly difficult for the United States, a nation that has difficulty in looking more than a generation ahead, encumbered by a political process that generally functions on an election-by-election basis, and capital markets that seem to swing violently from boom to bust as each

quarterly earnings statement appears. With just 4.5% of the world's people, we control 25% of its wealth and produce 25% to 30% of its pollution. It is remarkable that the richest nation on earth is the lowest per capita donor of international development assistance of any industrialized country.

Ironically, the tragic events of September a year ago might be viewed as a wake-up call, if we view these terrorist attacks not simply as a brief and brutal criminal attack but rather the consequence of more fundamental causes. As the noted biologist Peter Raven put it in a recent address⁹

“The United States is a small part of a very large, poor, and rapidly changing world, and we, along with everyone else, must do a better job. Sustainability science has a good deal to say about how we can logically approach the challenges that await us, but the social dimensions of our relationships are also of fundamental importance. Globalization appears to have become an irresistible force, but we must make it participatory and humane to alleviate the suffering of the world's poorest people and the effective disenfranchisement of many of its nations. As many have stated in the context of the current world situation, the best defense against terrorism is an educated people. Education, which promises to each individual the opportunity to express their individual talents fully, is fundamental to building a peaceful world. Moreover, it is against our common interests that hundreds of millions of women and children, living in extreme poverty, are unable to make the best use of their abilities. Such discrimination, whether we focus on it or not, is morally abhorrent.”

There are 30 million people in the world today who are fully qualified to enter a university but for whom no university place is available. With a decade there will be 100 million of these university-ready people. Most will be in Asia, but many will be in Latin America and Africa, with significant numbers in Europe and even in the U.S. Along with many “lifelong learners”, also poorly provided with higher education and advanced training, they will be demanding access to advanced professional skills in an emerging global knowledge economy.

Yet as Sir John Daniels, former head of the British Open University notes, in most of the world, higher education is mired in a crisis of access, cost, and flexibility. Unless we can

address and solve this crisis, billions of people in coming generations will be denied the education so necessary to compete in, indeed to survive in, an age of knowledge.

Here we must realize that the wealthy nations of the world have a particularly important role to play to assist developing nations in building the educational systems to meet their exploding needs.

Yet the university models characterizing most developed nations seem ill-suited to guiding us out of this global education crisis.

Our colleges and universities continue to be focused on high-cost, low-technology, residential education and on the outmoded idea that quality in education is linked to exclusivity of access and extravagance of resources. Our current concept of the campus-based university could well deny higher education to nearly all of the billions of young people who will require it in the decades ahead.

Transforming the University to Serve a Global, Knowledge Society

These social, economic, technological, and market forces are far more powerful than many within the higher education establishment realize.

A rapidly evolving world has demanded profound and permanent change in most, if not all, social institutions. Corporations have undergone restructuring and reengineering. Governments and other public bodies are being overhauled, streamlined, and made more responsive. Even the relevance of the nation-state being questioned and re-examined in a world in which societies are more inclined to embrace their cultures and traditions than the policies of their governments.

History suggests that the university, too, must change and adapt in part to preserve its ancient values and traditional roles. The status quo is no longer an option.

Some Lessons Learned

So how might one approach the challenge of transforming the university to serve a 21st Century world.

From my own experience as a battle-scarred veteran of leading change in one of our nation's largest public universities, let me suggest a somewhat different set of issues.

Values

It is important for any effort aimed at institutional transformation to always begin with the basics, to launch a careful reconsideration of the key roles and values of the university that should be protected and preserved during a period of change.

For example, how would an institution prioritize among roles such as educating the young (e.g., undergraduate education), preserving and transmitting our culture (e.g., libraries, visual and performing arts), basic research and scholarship, and serving as a responsible critic of society?

Similarly, what are the most important values to protect? Clearly academic freedom, an openness to new ideas, a commitment to rigorous study, and an aspiration to the achievement of excellence would be on the list for most institutions.

But what about values and practices such as shared governance and tenure? Should these be preserved? At what expense?

Subsidiarity and Autonomy

Although the governance of higher education varies greatly, shaped by traditions and culture, there are several general issues that need to be put on the table.

Foremost among these are questions relating to whether our citizens and their governments view the university as a public good benefiting everyone, or instead view education as an individual benefit, benefiting the individuals, the students, that receive it. Do governments view universities as a public investment for the future, or simply another

expenditure, such as spending money on roads or buildings? Is the university a government agency or is it a social institution?

In all of our societies, government is under increasing pressure to demand accountability, but the ways that they demand accountability, while perhaps appropriate for the Ministry of Transportation, may not work for universities.

Although many of the policies and practices characterizing the governance of higher education in the United States are unique to our culture, one that I believe has broader relevance is our belief that universities must have the capacity to control their own destiny, particularly during times of change.

By this I mean not simply granting the faculty traditional perquisites such as academic freedom, but allowing universities far more control over all aspects of their operations, including academic programs, budgets, student selection, and faculty hiring.

That is, whether we consider higher education from the state level, as a system, as individual universities, or as academic departments, one should strive to decentralize both authority and responsibility to the lowest possible level, to those closest to the action in teaching and scholarship.

Centralization is a very awkward approach to higher education during a time of change.

Alliances

The same market forces that drive our colleges and universities to focus on core competencies where they can be competitive also provide strong incentives to build alliances to address the broader and diverse needs of society.

For example, many of our research universities are under great pressure to expand enrollments to address the expanding populations of college age students or growing educational needs of adults, possibly at the expense of their research and service missions. It might be far more constructive

for these institutions to form close alliances with regional colleges and universities to meet these growing demands for educational opportunity with research university faculty developing curriculum and pedagogy while other institutions provide the actual instruction.

Another example would be alliances between liberal arts colleges and research universities that take mutual advantage of the learning-intensive environment of the latter and the vast intellectual resources of the former.

International alliances will become increasingly important, whether through student/faculty exchanges programs such as the Erasmus-Socrates programs and agreements such as the Bologna Declaration or virtual constructs such as the collaboratories made possible by advances in information technology.

More broadly alliances should be explored not only among institutions of higher education but also between higher education and the private sector (e.g., information technology and telecommunications companies).

Differentiation among institutions should be encouraged, while relying upon market forces rather than regulations to discourage duplication.

Experimentation

Many of the forces driving change in higher education are disruptive in nature, leading to quite unpredictable futures. Planning in the face of such uncertainty requires a more experimental approach to university transformation.

In a world of such rapid and profound change, as the future became less certain, the most effective near-term strategy may be to explore possible futures of the university through experimentation and discovery. That is, rather than continue to contemplate possibilities for the future through abstract study and debate, it seemed a more productive course to build several prototypes of future learning institutions as working experiments.

There is a certain irony in the timing of my remarks today. Two weeks ago, I had the honor of presenting the convocation address at yet another Canadian university, but in this case, perhaps your youngest, Royal Roads University, created in Victoria in 1995 on the site of the old Royal Roads military college.

Royal Roads is quite a different type of institution.

- Learner centered rather than faculty centered
- Affordable, cost-effective, and increasingly supported by the private marketplace
- Stressing lifelong learning, with extensive opportunities for adults
- Providing learning environments more compatible with lifestyles and career needs
- Serving global rather than merely regional markets (in fact, over 100 of the graduates at its convocation were from China.
- Utilizing technology to provide anytime-anywhere learning opportunities
- Stressing highly customized learning experiences tailored to a diverse clientele
- Capable of rapid evolution to serve a rapidly changing world

To be sure, Royal Roads University has had several advantages...

A wonderful "Greenfield" site

Visionary leadership provided by its founding president, Gerry Kelly,

And a governing board with strong business experience.

But perhaps more significant, it has intentionally chosen to experiment with an array of new educational paradigms which may be better aligned to our changing world than those constraints facing our traditional universities. It is an experiment very much worth following...

Turning Threats into Opportunities

It is important to approach issues and decisions concerning university transformation not as threats but rather as opportunities.

True, the status quo is no longer an option.

However, once we accept that change is inevitable, we can use it as a strategic opportunity to control our destiny, while preserving the most important of our values and our traditions.

Creative, visionary leaders can tap the energy created by threats such as the emerging for-profit marketplace and technology to engage their campuses and to lead their institutions in new directions that will reinforce and enhance their most important roles and values.

One Final Lesson Learned

Oh, yes, there is one final lesson that I must share with you. Upon announcing my decision to return to the faculty after leading this process of transformation as a university president for almost a decade, one of my colleagues handed me a note in which he had written on it a quote from Machiavelli's "The Prince," the medieval book on political intrigue and leadership in the Middle Ages:

"There is no more delicate matter to take in hand, no more dangerous to conduct, nor more doubtful of success than to step up as a leader in the introduction of change, for he who innovates will have for his enemies all those who are well off under the existing order of things, and only lukewarm support from those who might be better off under the new."

To this I could only respond, amen! Leading in the introduction of change can be both a challenging and a risky proposition.

The resistance can be intense and the political backlash threatening.

To be sure, it is sometimes difficult to act for the future when the demands of the present can be so powerful and the traditions of the past so difficult to challenge.

Yet, perhaps this is the most important role of university leadership and the greatest challenge for our universities in the years ahead.

Concluding Remarks

Clearly, in an age of knowledge, higher education will flourish in the decades ahead.

In a knowledge-intensive society the need for advanced education and knowledge will become ever more pressing, both for individuals and for our societies more broadly.

Yet, it is also likely that the university as we know it today, or rather the current constellation of diverse institutions that comprise the higher education enterprise, will change in profound ways to serve a changing world.

But of course, this is just as the university has done so many times in the past.

Our institutions, after all, are one of our civilization's most enduring legacies.

For a thousand years the university has benefited our civilization as a learning community, where both the young and the experienced could acquire not only knowledge and skills but as well the values and disciplines of the educated mind.

Universities have defended and propagated our cultural and intellectual heritage, while challenging our society's norms and beliefs.

They produce the leaders of our governments, our commerce and our professions.

They have created and applied new knowledge to serve our society, and they have done so while preserving the values and the principles so essential to academic learning: freedom of inquiry, an openness to new ideas, a commitment to rigorous study and a love for learning.

And they have done so with a tradition of continual change, to respond to the ever changing needs of the society they serve.

It is my believe that a concerted effort to understand the important traditions of the past, to acknowledge and accept the challenges of the present, and to envision the possibilities

for the future will enable institutions to thrive during today's era of the global, knowledge driven economy.

¹ Peter F. Drucker, "The Age of Social Transformation," *Atlantic Monthly*, November 1994, 53–80; Peter F. Drucker, *Post-capitalist Society* (New York: Harper Collins, 1993).

² Erich Bloch, National Science Foundation, testimony to Congress, 1988.

³ *The Impact of Information Technology on the Future of the Research University*, James J. Duderstadt and William Wulf, Ed. (Washington, D.C.: National Academy Press, 2002)

⁴ Ray Kurzweil, *The Age of Spiritual Machines: When Computers Exceed Human Intelligence* (New York: Viking, 1999).

⁵ Clayton M. Christensen, *The Innovator's Dilemma* (Harvard Business School Press, Cambridge, 1997) xv.

⁶ Marvin W. Peterson and David D. Dill, "Understanding the Competitive Environment of the Postsecondary Knowledge Industry", in *Planning and Management for a Changing Environment*, edited by Marvin W. Peterson, David D. Dill, and Lisa A. Mets (San Francisco: Jossey-Bass Publishers, 1997) pp. 3-29.

⁷ Robert Zemsky, "Rumbling," *Policy Perspectives*, The Pew Higher Education Roundtable, sponsored by the Pew Charitable Trusts, (April, 1997); Robert Zemsky and Gregory Wegner, "A Very Public Agenda," *Policy Perspectives*, Vol. 8, No. 2, Knight Higher Education Collaborative, Philadelphia, (1998).

⁸ Donald E. Osterbrock and Peter H. Raven, eds., *Origins and Extinctions* (New Haven: Yale University Press, 1992).

⁹ Peter H. Raven, "Science, Sustainability, and the Human Prospect", *Science* Vol 297, August 9, 2002, pp. 954-958