

Michigan Outreach Talk 1.21

Outline

- What is the University of Michigan?
- Images
- Impact
- Recent Examples
- A Time of Change
- UM Focus for 1990s
- We need your help and support!
- Final Comments

Taking Its Lumps

- Concerns of the past few weeks
- Class 1: Universities as big, self-centered, greedy institutions
 - ...Bill Bennett's attacks on "spoiled college students"
 - ...high tuition
 - An attack first begun by the media and then picked up by politicians
 - ...Price-fixing (the overlap group)
 - ...Indirect costs (Stanford's yacht)
- Class 2: Social climate of universities
 - ...Racism on campus
 - ...Drugs on campus
 - UVA, Hash Bash
- Class 3: Intellectual integrity of universities
 - ...Scientific misconduct
 - ...David Baltimore
 - ...Cold Fusion
 - ...Teaching vs. research
 - ...Political correctness

Excitement

- Extraordinary "Go Blue" Michigan spirit is alive and well...
as evidenced by events of the past several months
- Solar Car Race
 - ii) A team of over 100 Michigan students won the solar car race from Florida to Michigan, thereby earning the right to represent the United States in the world competition in Australia this fall.
 - They then went on to finish 3rd in the world...behind factory teams from Switzerland and Honda.
 - An extraordinary performance...for a group of students.
 - But, even more to the point, they helped to develop a technology that may have great impact on our society.
- Genetic Medicine
 - Francis Collins, Howard Hughes Medical Research Institute
 - Applications of molecular genetics to medicine
 - i) Discovery and cloning of gene responsible for cystic fibrosis
 - ii) Discovery of the gene responsible for neurofibromatosis...Elephant's Man disease
 - iii) How to inject normal genetic material into a cystic fibrosis gene and cure it
 - iv) Identified gene responsible for body's inability to handle cholesterol
 - What an extraordinary contribution!
 - Note: 40 years ago, Michigan conducted the clinical trials for the Salk Vaccine...
Jonas Salk was a faculty member at UM!
 - An example of how Michigan research has great impact on our society!
- McCarthy Prize
 - iii) It was announced that two Michigan faculty members had won MacCarthy prizes

prizes, the key prize used to acknowledge creativity and excellence in our society--
No other University won more than one.

- iii) It was announced that two Michigan faculty members, Sherry Ortner and Rebecca Scott, had won MacCarther prize--the key prize used to acknowledge creativity and excellence. They were -joined by a third former Michigan faculty member, Tom Holt, now a visiting faculty member at the University. No other University won more than one.

Computer Network

NSFnet, the major computer network, operated by the University in collaboration with IBM and MCI, passed the milestone of linking together over one million users in the U.S. and around the world...at over 500 sites.

The next stage, the National Research and Education Network or NREN, now stands poised to continue this momentum in the year ahead with strong support building both in the White House and in Congress.

Today in Washington, UM, IBM, and MCI are announcing the formation of a new nonprofit corporation to manage this "interstate highway system" for information transfer.

Note that when Sunrunner was racing through the outback of Western Australia, we were in daily contact through E-mail on the network

World's most powerful laser

Michigan scientists announced the development of the world's most powerful laser--with power equivalent to 40 times the electrical generating capacity of the U.S. (I should note that the science of holography was invented at Michigan!)

And, a week ago, it was announced that Michigan had been selected as a national center for laser research by the National Science Foundation.

International Activities

Teams of Michigan business students spent the summer in Poland, and Soviet Armenia helping these rapidly changing nations in their transition to capitalism.

Bob Zacon announced an agreement in which ISR would help Poland build a counterpart research institute in the social sciences in Warsaw... and now negotiating a similar institute in Moscow.

And the President lent his daughter to Hungary for two years as a Peace Corps volunteer...

Tidbits

A Michigan paleontologist discovered a fossil demonstrating that whales once had hind legs and feet!

The opening of the new Child and Maternal Health Care Center... a \$100 million medical care facility dedicated to providing the best pediatric and obstetrics care in the world... and dedicated by the U.S. Surgeon General, Dr. Tony Novello, a former Michigan resident!

Athletics--American gladiator competition

And while not much happens in athletics during the summer, one of our women engineering students, won the American Gladiator competition...

and one of our alumni--and a former Regent--
Bob Nederlander, succeeded George Steinbrenner
as managing owner of the New York Yankees.
(The second Michigan contribution to the American
Baseball League this year...we lent Bo to run the
Tigers last spring!!!)

And UM football won its 3rd Big Ten championship in a row
with that great last second victory over Ohio State.

Not a bad year thus far! But then, it was rather typical for this
remarkable university.

It provided a healthy and happy reminder that the real business
of the University is in the very capable hands
of our faculty and students and, as always, they
are doing us proud.

Concern

For much of history, the university was a protected enclave
respected well enough but mostly unnoticed and allowed
to go about its business unchallenged and largely unfettered.

What a contrast today, when the university finds itself
considered a key social economic,
political, social and cultural institution.

And we are rapidly evolving into a new post-industrial
society, in which the key strategic resource
necessary for prosperity and social well-being
has become knowledge itself.

In all advanced societies, our future depends to an ever
increasing extent on new discoveries, expert
knowledge, and highly trained people. Like it or not,
universities are our principal source of all three
ingredients. (Bok)

“The solution of virtually all the problems with
which government is concerned: health,
education, environment, energy, urban development,
international relationships, space, economic
competitiveness, and defense and national security,
all depend on creating new knowledge---and hence
upon the health of America’s research universities” (Bloch)

But, ironically enough, our increasingly critical role has
not brought with it increased prestige,
public confidence or respect.

Instead, like so many other institutions in our society
we are roundly criticized by right, left and center
and from even from within
by many faculty, students and staff
for flaws large and small, fundamental and trivial.

The American research university is clearly under attack...
...attacked by parents and students for uncontrolled
escalation of tuition
...they are criticized by governors for financial irresponsibility
...investigated by the Department of Justice for
collusion in tuition and financial aid fixing
...critized by both Washington and their own faculties
for rising indirect costs
...attacked by Congress for alleged conflicts of
interest or providing easy access of foreign firms
to government-supported research
...attacked by legislatures for the tenure system,
...and attack by the left and the right for the quality
of undergraduate education

At just that moment when universities are becoming increasingly
central to the prosperity and security of our nation

We appear to be using the public trust.

What is the University?

Introduction

Michigan has a remarkable ability to touch
our lives...

In those short years that each of us
spent on this campus during our
education, we become a member of
the Michigan family for the rest of
our lives...

And Ann Arbor becomes forever our home...
at least in our hearts...

Traditional Images of Michigan

But just what is this institution,
this force that has had such an impact on our lives?

When we hear the words

“ The University of Michigan”,

We think of those traditional images of any college...

- Great faculty challenging and exciting students in the classroom..
- Students studying in our many libraries
- Scientists toiling away late in the evenings in our laboratories.....stiving to understand the universe
- Scholars pouring over ancient manuscripts in our collections of antiquity

But there are some very special images of Michigan

Ann Arbor on a Saturday afternoon in the fall...

afternoons in the fall as 105,000 fans cram into
Michigan stadium to watch the Wolverines...

...Remember Leroy Hoard's breakaway 67 yard run that
sealed Michigan's exciting come-from-behind victory
over USC in the Rose Bowl...

(or Bo Derek making a surprising appearance at that
pep rally at the Century Plaza...)

...and who will ever be able to forget Rumeal Robinson
stepping to the line in Seattle with 3 seconds
left in overtime and calmly sinking two free throws to
win the national championship against Seton Hall.

...and the Cinderella story of Steve Fisher and his
team "with a mission"

Or perhaps the Michigan of the Big Chill...

The tradition of student involvement helping to awaken the
conscience of a nation...

The Teachins of the 1960s against the war in Vietnam

EarthDay in the 1970s to raise concerns about the
environment

Our celebration of Martin Luther King Day last month
with an educational experience involving thousands
to highlight the importance of tolerance and
mutual understanding

There is Michigan of the Arts

...or Leonard Bernstein celebrating his 70th birthday
in Hill Auditorium with the Vienna Philharmonic...

...or the visits of Ella Fitzgerald or Toni Morrison or
Jesse Norman, Kurt Mazur and the
Leipzig Gewandhaus Orchestra

University Musical Society

Schools of Music and Art

...or the scores of spectacular student productions,
plays, concerts, dances, operas, and, of course
demonstrations and protests, that have enlivened this campus

over the past year.

There is also the caring Michigan as seen by the over 750,000 patients a year who are treated by the UM Medical Center,

Or the Michigan as Silicon Valley East, working closely with Michigan industry and government to build the high-tech infrastructure to create new companies and new jobs to strengthen and diversify our existing industrial base...

...with exotic new technologies such as
integrated manufacturing systems
machine intelligence
optoelectronics
computer networks

...a new \$5 B infrastructure in the southeastern Michigan Michigan area

Or the Michigan which attracts to our state almost a quarter of a billion dollars of federal R&D each year...not to mention many of the world's leading scientists and engineers

Or the Michigan of the "cutting edge", which conducts the research that changes our lives... as evidenced, for example, by announcement earlier this month that a Michigan team had identified and cloned the gene responsible for cystic fibrosis, thereby opening up the possibility of saving thousands of lives every year.

Or Michigan as the University of the World... Long renowned as a truly international center of learning... Whether it be through our great area studies programs the China Center, producing advisors to presidents... Japanese Studies, Southeast Asian Studies Russian and Eastern European Studies

Or our alumni throughout the world...

Or the Michigan of outer space...
...Apollo 15...the Michigan mission to the moon...
...which not only established the first UM Club in space...
...but named a crater after Michigan on the moon.

Or Michigan as the unifying force in our families...
Camp Michigania

And, of course, there is the Michigan as the educator, attempting to provide, in the worlds of one of our first presidents "an uncommon education for the common man" an education as good as any available in the world for all citizens, regardless of race, creed, and socioeconomic background.
to over 340,000 alumni...
150,000 in the state of Michigan alone!

It is important to note these different perspectives of the University because all too often we tend to think of these marvelous and complex institutions in one-dimensional images that reflect only our particular interests or needs of the moment...

...when we read about student unrest on our campus...
...or see Notre Dame run back two kickoffs against us...
...or open the tuition bill for our son or daughter...

In fact, perhaps the best way to think of a university is to recognize that our primary role is "to invent the future"...

...through the knowledge discovered on our campuses...
...and the graduates we educate that can carry forth

this knowledge and apply it to society.

What is Michigan?

The prototype, the flagship, of the large,
comprehensive, public research university which
has served America so well in the 20th Century

With a serious commitment to quality
ranked among the top 10 in virtually everything
it does (not just football and basketball)

Unusual breadth, rich diversity of academic
disciplines, professional schools, social and cultural
activities.....our intellectual pluralism...

Unusual activism of students and faculty
liberal spirit, progressive vision

Extraordinary array of extracurricular activities
performing arts
intercollegiate athletics
Ann Arbor, itself!!!

Well-balanced portfolio

1990 is cross-over year:

Tuition revenue > state support ("private public")

Federal R&D > state support ("national state")

Unusual ability to control our own destiny

The embodiment of the hopes and dreams,
commitment and stewardship of eight generations
of Michigan alumni!

But that is the University of Michigan of
yesterday and today.

What about tomorrow?

Challenges before America

Few realize the the ever-accelerating
pace of change in our nation...and in the world!

Think about it for a moment...

The students we are educating today will spend most of
their lives in the next century...they will be citizens
of the 21st Century...

Our students will inherit a much different America
than you and I have known...

i) It will be future in which our nation becomes a truly
multicultural society, with a cultural, racial, and
ethnic diversity that will be extraordinary in our history
In which those groups we refer to today as
minorities will become the majority population of
our nation in the century ahead...
In which women take their rightful place as leaders
of America...

ii) It will be a future in which America will become "internationalized"...
in which every one of our activities must be viewed within
the broader context of participation in the global community...
Whether through travel and communication, the arts and
culture, the internationalization of commerce, capital,
and labor, we will become increasingly interdependent on
other nations and other peoples.
Further, as the destination of roughly half the world's
immigrants, the United States is rapidly
becoming a "world nation"
with not simply economic and political but strong ethnic
ties to all parts of the globe.

iii) The Age of Knowledge

But there are even more profound changes underway...

Looking back over history, one can identify certain
abrupt changes, discontinuities, in the nature,

the very fabric of our civilization...

The Renaissance, the Age
of Discovery, the Industrial Revolution
There are many who contend that our society is
once again undergoing such a dramatic shift in
fundamental perspective and structure.

Today we are evolving rapidly to a new post-industrial,
knowledge-based society, just as a century ago our
agrarian society evolved through the Industrial Revolution.

In a sense, we are entering a new age, an age of knowledge,
in which the key strategic resource necessary for our
prosperity, security, and social well-being has become
knowledge--educated people and their ideas.

Knowledge will play the same role that in the past
were played by natural resources or geographical location or
unskilled location...

In the knowledge-intensive future that is our destiny
it seems clear that education in general...
...higher education in particular...
...and the research university most specifically
are rapidly becoming the key ingredients determining
the strength, prosperity, and social-well being
of our nation.

Just think of the challenges which cry out for attention

- the plight of our cities,
the development of an underclass
polarization of American society
- greenhouse effect and global change
- international competition
Pacific Rim or Europe 1992
- health care: cancer, heart disease, AIDS
- new frontiers: outer space
or spaceship Earth

But the greatest need of all is for leadership
and this is the University of Michigan's
great contribution to America...
...through its teaching, research, and service
...through its graduates and their achievements

Indeed, leadership is both
our heritage
and our destiny!

Leadership

Examples of how
we are trying to achieve leadership today:

- Of course, Michigan Wolverines
(Rose Bowl and NCAA)
- Research and scholarship
(cystic fibrosis)
- Academic programs
Humanities
Humanities Institute
Social Sciences
ISR
Education
Social Work
Professional Schools
Law
Business
Engineering
Health Sciences
Performing arts

But what about our response to the themes of change:

...pluralism
...globalization
...knowledge?

- 1) The Michigan Mandate
Making UM the model of a multicultural community by learning to link diversity with unity
- 2) International Activities
Current strengths in Asia and Europe
Commitment to Latin America and Africa
(oh, yes,...even Washington)
- 3) "The Electronic University"
> 30,000 computers
(Mac, IBM, Apollo, Sun,...)
Manager of NSFnet
EDUCOM

What do we get for our money

This past year the taxpayers of this state contributed over \$270 million through state appropriations to the University of Michigan.

What did they get in return?

Educational Impact

- i) an outstanding education of roughly 50,000 students
(80% of them Michigan residents!!!
Including 29,000 undergraduates)
- ii) the production of 12,000 graduates at all degree levels
in all disciplines and professions

Economic Impact

- i) In comparison to the \$270 M invested by the state, the UM attracted to Michigan over \$402 million in federal support--most of which came in the form of sponsored research contracts and student financial aid, and medical care.
- ii) Further, the students attracted to our programs contributed roughly \$300 M additional dollars to tuition and fees...
- iii) In addition, the auxiliary activities of the University contributed another \$800 M to the state's economy...
- iv) Or \$1.7 billion, in all -- a multiplying factor of six-fold

Economic Development

- i) But far beyond that, we estimate the true economic impact of the University multiplies its state appropriation by at least a factor of ten or more...
- ii) For example, the UM's engineering programs--supported in part by the Research Excellence Fund, are credited as a key to the recent growth of a \$5 billion industry in industrial automation in the southeastern Michigan area.
- iii) Each year the University spins off dozens of new companies, creating new jobs and attracting new dollars to our state
- iv) Each year the UM attracts to Michigan new companies...
...as evidenced by the announcement in

Ann Arbor that Philips Electronics has just agreed to site a major \$200 M factory in the Ann Arbor area

- v) Or exciting new ventures such as
...the National Research and Education Network
...CEISIN
- vi) Each year the UM produces thousands of engineers, scientists, business executives, lawyers, teachers,...and all of the other professionals so necessary to compete in the knowledge-based economy which characterizes our world.

Health Care

But of course there are so very many more payoffs from this investment.

Last year, over 750,000 patients were treated in the UM Medical Center...regarded as one of the world's great centers of quality health care.

Indeed, our recent market surveys have indicated that essentially every family in this state at one time or another has had one of their members referred to and treated by our doctors.

Further, the through its activities in medical research continues to have great impact on the people of this state...

...whether it was conducting the clinical trials for the vaccine developed by one of our faculty members, Dr. Jonas Salk...

...or the recent announcement last fall that a UM team of scientists had identified and cloned the gene responsible for cystic fibrosis, neurofibromatosis, and cholesterol intolerance.

I would suggest there is not a person in this room whose life has not been...or will not be touched at one time by our doctors and medical scientists!

Social Change

But there is so very much more...

The University continues to serve as one of the great engines of social change in our state...

Whether it is the Michigan of the Big Chill...

...the long tradition of student activism awakening the conscience of our society

The Teachins of the 1960s against the war in Vietnam

EarthDay in the 1970s to raise concerns about the environment

Our celebration of Martin Luther King Day last month with an educational experience involving thousands to highlight the importance of tolerance and mutual understanding

Or the extraordinary impact of our regional campuses as they educate first generation college graduates

Or the leadership we are providing in addressing the needs of our minority

communities...as evidenced by the Michigan Mandate (hand out)--widely regarded as one of the nation's most visionary approaches to affirmative action.

It is clear that the public research university...
...an institution for which the University of Michigan is not only the prototype, but perhaps also the flagship...
...touches the lives of a great many people in a great many different ways...

Through education, research, and service...
through health care, economic development, and
...yes...even through a sense of pride in their athletic accomplishments.

Yet as important as these institutions are today in our everyday lives, it is my belief that in the future they will play an even more critical role as they become the key player in providing the knowledge resources...knowledge itself, and the educated citizens capable of applying it wisely... necessary for our prosperity, security, and social well-being.

It has sometimes been said that the best way to predict the future is to invent it.
And perhaps this is the best definition of the role of a major research university such as the University of Michigan: to invent the future, through the knowledge we produce on our campuses, and through the graduates we educate.

And perhaps this is the most important role of all...
...that of preparing Michigan for the future!

The University's Role in a Changing America

Few seem to realize the enormous changes our society is undergoing as it approaches the 21st Century.

Suppose, a year ago, I would have predicted...
...end of communism in Europe
...destruction of Berlin Wall and unification of Germany
...a World Series between the Giants and Athletics...
...halted by an earthquake
...And then predicted that Bo Schembechler would be president of the Detroit Tigers
You would have thought I was nuts!

We are becoming more diverse, more pluralistic as a people. Indeed, almost 90% of the new entrants into our workforce during the 1990s will be people of color, women, or immigrants.

Our economy and commerce are becoming every day more interdependent with other nations as the United States becomes a world nation, a member of the global community -- as this past year's events in China, Russia, and Eastern Europe make all too apparent.

And we are rapidly evolving into a new post-industrial society, in which the key strategic resource necessary for prosperity and social well-being has become knowledge itself.

Indeed, we are entering what might be called an "Age of Knowledge" in which educated people and their ideas will play the role that in the past were played by natural resources or geographical location

or labor pools...
In the pluralistic, knowledge-intensive, global future that is our destiny, it is clear that the quality of and access to
...education in general
...higher education in particular
...and great research universities
such as the University of Michigan
and its sister institutions
most specifically of all...
are rapidly becoming the key factors in determining the strength and prosperity of our state.

The Signs of Change in Michigan

Needless to say, these same challenges of pluralism, of globalization, and of this age of knowledge that is our future will pose great challenges and demand similar changes in our state and our nation. The America of the 20th Century that we have known... was a nation characterized by a rather homogeneous, domestic, industrialized society... But that is an America of the past. Our children will inherit a far different nation... a highly pluralistic, knowledge-intensive, world nation that will be the America of the 21st century. Of course, these themes of the future, the changing nature of the American population... our increasing interdependence with other nations and other peoples... and the shift to a knowledge-intensive, post-industrial society. Are actually not themes of the future ...but rather themes of today... ...in a sense, I have simply been reading the handwriting on the wall... Yet I also fear that few have realized the enormous changes that our society is going through as it approaches the 21st Century. The impact of these changes are already painfully apparent to Michigan's workers and industries. In fact, it is here in Michigan...in the heart of the "Rust Belt" that the impact of these extraordinary changes are most clearly seen... We all know that past decade was a period of great difficulty for our state... Industries of great economic importance to our nation such as steel and automobiles have fallen victim to intense competition from abroad... Plants have closed...we still have many people chronically unemployed...or under employed... There are many indicators of the impact of this transition on our state... Over the past decade, Michigan has slipped badly in several key indicators of quality of life:

- 30th in per capita income
- 41st in overall employment
- 48th in business climate (perceived)
- 48th in high school graduation rates
- 50th in return on federal tax dollars

Oh, we still rank near the top in some things...
For example, we rank...

- 12th in property tax burden
- 14th in teenage unemployment rate

- 13th in incarceration rate (and rising rapidly)
- 13th in percentage of children in poverty
- 10th in infant mortality
- 4th in public aid recipients
- 1st in mortality from major disease

There is still one other category of indicators of some concern, and these reflect our willingness to invest in the future. Michigan ranks

- 37th in support of HE per student
- 45th in support of HE during 1980s
- 40th in support of K-12

It is clear that our state is in the midst of a profound transition...
...from an industrial economy based upon the abundance of natural resources, unskilled labor, and, to some degree, constrained, slowly moving domestic markets...

To a knowledge-based economy, characterized by intensely competitive world markets, rapid change, and--most important of all--educated people and their ideas.

This has not been...and will not be...an easy transition to make.

The truth is that the outcome is still very much in doubt!
producing jobs and improving our quality of life.

Whether we will emerge from this transition as a world economic leader once again...with a strong, prosperous--albeit new--economy

Or whether we will fail to heed the warnings...

...to make the necessary investments and sacrifices today necessary for strength and prosperity tomorrow...

And become an economic backwater in the century ahead.

It is clear that we face a watershed--a fork in the road ahead.

My central theme is that education, broadly defined, will be the pivotal issue in determining which of these two alternative futures will be Michigan's...and America's.

Indeed, I am absolutely convinced that the dominant issue of the 1990s will be the development of our human resources.

Previous economic transformations were closely associated with major public investment in infrastructure such as railroads, canals, electric networks, and highways.

In the coming economic transition, an equivalent infrastructure will be an educated population.

The actions we must take today...

...and the investments we must make...

...will clearly determine our capacity to respond to this future...

UM Focus for the 1990s

Medical Science

Information Technology

The Role of Information Technology

Because it is also clear that the knowledge infrastructure of our world provided by information technology will be of increasing importance in the years ahead...

...a technology that not only provides a lever for the mind...

...multiplying our talents and extending our intellectual span...

...but provides the tools of interaction that allow us to overcome the barriers of space and time and unite as students, teachers, and scholars...

...indeed, as a people...in ways we never dreamed possible...

At Michigan we have been convinced

for some time that the computer has evolved far beyond simply a tool for scientific computation or information processing.

It is now a robust technology absolutely essential for the support of all knowledge-based activities...and knowledge-based organizations such as universities, corporations, government.

Hence it was natural that several years ago, we would accept the challenge of embarking on a great adventure, to turn this University into a gigantic laboratory--an experiment in the development and application of this technology--in our efforts to build a University for the 21st Century.

A Case Study: The "Electronic" University

Our goal was rather simple:

To build the most sophisticated information technology environment of any university in the nation...an environment that would continually push the limits of what could be delivered in terms of power, ease of use, and reliability to our students, faculty, and staff.

We sought a distributed intelligence, hierarchical computing system linking personal computer workstations, superminicomputers (and, more recently, minisupercomputers) mainframe computers, function specific machines, library access, a host of various servers, and gateways to international networks and facilities such as the NSF SCC, national data centers, etc.

Managed to recruit people with the vision and energy to make this a reality...

Doug Van Houweling
Lynn Conway
Carolyn Autry-Hunley
Doug Hofstadter
Randy Frank
Burt Herzog

To create the organizational structures...

ITD
Information Technology Division
CITI
Center for Information Technology Integration
CMI
Center for Machine Intelligence
Cognitive Science and Machine Intelligence Lab
NSFnet (IBM, MCI)
NSF Supercomputer centers
NASA, Internet, National Research and Education Network
MITN

And to build the partnerships with the leading information technology companies throughout the nation and the world.

Underlying Philosophy

- i) Determined to stay always at the cutting edge...
...but with a very strong service focus
- ii) Determined to remove all constraints...
...no limits whatsoever on student and faculty use
- iii) Multivendor environment
...choosing whatever technology was the most powerful
- iv) Relied heavily on "fault-tolerant" nature

of University community to develop an entrepreneurial culture...a "go-for-it" philosophy!

Today...

- i) roughly 3,000 public student workstations (funded through \$220-\$400/y fee... gives us \$10 M/year of venture capital to play with)
- ii) roughly 30,000 workstations
- iii) student purchase plan... MacTruck -- truckload sales...
- iv) robust networking... digital wire plant... LANs...
- iv) one of the largest installations of mainframes in the world... all networked together into an institution-wide file system
- v) 80,000 users on system
- vi) UM has become the focal point in efforts to build the "interstate highway system" of information exchange...with EXPRES, NSFnet, internet, MITN,...coordinate access to NSF SCCs... National Research and Education Network

Some Observations

Yet, we have only begun to scratch the surface in the development and application of this incredible technology.

Here in Ann Arbor, we view information technology as providing both the infrastructure and the linkages among these themes of change...
...our growing pluralism
...our growing interdependence with the global community
...and our growing dependence on knowledge as key to our futures.

We believe we are even now riding the "fourth wave" in the use of information technology...where the computer becomes not simply just an information processing tool, but rather a medium of communication, cooperation, and collaboration...facilitating entirely new intellectual endeavors...

Personal computing to "interpersonal computing"

As the result of the rapid spread of personal computers and computer networks, and the development of new insights into human cognition and group behavior, we are at the threshold of a major shift in the underlying paradigms and uses of information technology.

This is important, since many in our society continue to view the computer as a symbol of the de-personalizing nature of modern science and technology.

Yet, if ever there was a tool for empowering the individual, it is information technology.

This is truly a liberating force in our society, not only freeing us from the mental drudgery of routine tasks but linking us together in ways we never dreamed possible...overcoming the constraints of space and time.

In part, it is our challenge, collectively, as educators, scholars, leaders of business and government...to build greater public understanding and support for this extraordinary tool...

...so key to our nation and the world as we

prepare to enter the "Age of Knowledge"
that is our future...

Just as it is to higher education as together we face the
challenge and adventure of building the
University of the 21st Century!

Internationalization

The Challenges to Michigan

Certainly we have a long ways to go in this
country to know what we need to know to
participate fully as members of our human
family. American knowledge of other
languages and cultures is abysmally
inadequate. By every measure we fall short
educationally of the knowledge and skills it
will take to do business, work cooperatively
on common problems or advance our
common ideals for humanity.

Too many of our graduates have never
been exposed to a foreign language or visited
a foreign country. Many have not had a
chance to feel the texture of life in another
era or another culture through literature
and poetry or film. Some cannot locate
Mexico or Egypt on a map.

Despite the intellectual richness of our
campus, we suffer still from the insularity
and ethnocentrism that is the heritage of a
country that for much of its history has been
insulated from the rest of the world and self
sufficient in its economyperhaps even
self absorbed

Consequently, we must reexamine the way
in which we foster, manage and promote
the international dimension of our
educational mission.

- We must strengthen the international
component of our teaching and scholarship
so that it pervades the liberal arts
curriculum and that of the professional
schools.
- We must be mindful that knowledge is
not tied to geographic regions; rather the
knowledge revolution is a world wide
phenomenon and science speaks a universal
language
- We must be open to the challenge and
excitement for our intellectual work in the
disciplines that results from the infusion of
other experiences and perspectives of other
regions, cultures and traditions.

We must ensure that our students are
prepared with an understanding of how the
rapidity of modern communications and
ease of travel will change the texture of their
lives.

Above all, we must enable our students to
appreciate the unique contributions to
human culture which come to us from
other traditions.....to communicate.. to
work.. to live.. to thrive..in multicultural
settings whether in this country or

anywhere on the face of globe.

U of M: The University of the World

Therefore a key priority for the University of Michigan for the future is to build on the foundation of strength in international studies we have in placeand to remain in the forefront of international educational programs in languages, study abroad, faculty and student exchanges, international research collaboration. Indeed, increasingly, I believe it is the infusion of international perspectives into our disciplines and professions that will be critical.

Education, however strongly rooted in a state or nation, is a universal institution just as the language of science and scholarship is a universal language.

We occasionally attempt to develop slogans to represent key strategic thrusts...

...the University of America...or America's University

But perhaps a better slogan is

The University of Michigan:

A University **of** the World...and **for** the World...

After all, as President Marion Burton stated over a half-century ago...

"The function of the State University--of Michigan---is to serve the state and through the state to serve the nation and the world."

A World Nation

Global Change

The Michigan Mandate

The Michigan Mandate

That is what we are trying to do at the University of Michigan.

We are trying to change our makeup and our culture, to bring all ethnic groups into the life of our institution.

People sometimes ask me why the University has made this commitment to change, why I have made this change a cornerstone of my Presidency.

The reasons are simple.

First and foremost, it is morally right.

Second, we see this commitment as the cornerstone of our capacity to serve a changing nation and a changing world. America today is rapidly evolving into one of the most diverse, multicultural societies on earth...

The America of the 21st Century will be a nation without a dominant ethnic majority--and to serve this changing nation, institutions such as the University of Michigan must also change.

And third, for the University to achieve excellence in its fundamental missions of teaching and scholarship, it is clear we must reflect the growing diversity of America and the world itself among our people and our activities.

To this end, over the past three years we have been developing and committing ourselves to a new agenda we call the Michigan Mandate.

Some of you may have heard of it. many of you are a part of it.

The fundamental idea of the Mandate is that the University of Michigan must become a leader known for the racial and ethnic diversity of its faculty, students and staff.

A leader in creating a multicultural community

that will be a model for higher education
and a model for the society at large.

We don't believe we can serve this state and this nation,
unless our campus reflects the strengths,
perspectives, talents and experiences of people of color
in everything that we do.

But we know the Mandate is not by itself a magic cure---
that is not going to change our University overnight.

Instead it is a strategic plan,
it sets a direction and points to a destination,

The Mandate evolved over these three years
through literally hundreds of meetings
with people inside the University and outside.

Signs of Progress

Today I can report to you
that the Michigan Mandate is starting to work.

From top to bottom, University decisions are now made
with our goals of diversity as a priority.

In fact, across the nation other colleges and universities
are using it as a guide for their own planning.

There are many signs of progress this Fall...
and this seems to me to be exactly the right occasion
to note our most recent data.

1. Our fall statistics now reveal that we have the largest number of students of color, 6044, in our history, corresponding to 18.2% of our enrollment. This represents a 39% increase in minority enrollments in the first three years of the Michigan Mandate.
2. Moreover, we now have the largest number of Black, Hispanic, Native American, and Asian students at all levels, undergraduate, graduate, and professional, in our history. For example, we have increased Black enrollments by 35% over the past three years to 2,358 students, representing 7.1% of our student body. Hispanic students have increased 56% to 1,055 or 3.2% of our student body.
3. In particular, we have had the most successful recruiting year in our history, with an increase in the past year alone in this year's freshman class of 35% Black, 39% Hispanic, and 23% Native American. In fact 22% of this year's freshman class are students of color.
4. At the graduate and professional level we have also seen remarkable progress:
 - 46% increase in minority graduate students
(55% increase in Black)
 - 36% in minority professional students
(53% Black)

For example, our entering MBA class is 30% minority,
20% Black.

5. □□□ Our graduation rates among students of color are among the best in the nation.
6. During the first three years of the Michigan Mandate we have added 128 new faculty of color to the University, including 62 African American faculty. We are ahead of schedule in our objective of doubling the number of faculty of color on our campus within the first five years of the Michigan Mandate.
this number.

There are many other signs of progress,
ranging from major growth in financial aid
for students of color...

To the opening of our Admissions Office in Detroit
brings us together today.

We have now put in place the people, policies and programs
that will increase our representation of students of color at a rate
that will make our University community fully representative
of the national population during the 1990s.

By now you are probably asking yourself the question,
"If they are making so much progress,
why are we still reading about racial incidents
on so many of Michigan's universities, including
at the University of Michigan?"

The reason is that increasing the numbers
of minority faculty, students and staff
is only the first step in the Michigan Mandate.

If we only needed numbers it would take great effort and resources
but with determination we will get there in reasonable time.

But numbers are the easy part.

We all know that you can have a lot of different people
living in the same locale, working side by side,
shopping in the same stores, going to the same classes.
But that doesn't necessarily mean you have a community.

Just increasing the numbers and mix of people
doesn't mean that you have mutual respect,
that you can work towards common goals.

To have this, you have to have a new kind of community.
At the University of Michigan we are determined to seek
the changes needed to build this kind of community.
That is the hard part of the task ahead of us...
This is the new path we must blaze "in the wilderness".

K-12 Education

Today an unprecedented explosion of
knowledge heralds the onset of a new era.
Since people are the source of new
knowledge, our nation is relying
increasingly on a well-educated and
trained workforce to maintain our
competitive position in the world and our
standard of living at home, as well as to
harness the power of this new knowledge
for the good of our planet and for all of
mankind. Yet, here we are in real
difficulty because we are simply not
educating enough new people to keep our
economy competitive. Further, there are
serious signs that the education of the
present American workforce is seriously
inadequate to meet the demands of the next
century. This has become known as "the
pipeline problem" since it involves the full
spectrum of education, from preschool
through K-12, through higher education, to
lifelong education.

It seems clear that the dominant issue
of the 1990s will be the development of our
people and the education of our youth.
People must be our major focus. It is people,
not equipment or buildings or organizations,
who are the sources of creativity. They
generate the knowledge that makes
innovation possible. They provide the
workforce that leads to our wealth and

makes our society run. They are our researchers and teachers, our leaders and managers and decision makers in a modern technological society.

Today I will focus my remarks on K-12 education because, like the Japanese, I believe that this part of the pipeline is clearly our weakest link, our Achilles' heel. By any measure, K-12 education is in serious trouble. We are indeed a "nation at risk," or to quote a U.S. Senator's observation in a meeting I attended last Wednesday in Washington, "Public education in America is an absolute disaster!"

The United States today spends more on education than any nation on earth, \$328 billion, more than for any public service, including national defense. Yet, functional illiteracy in this nation currently runs between 20 percent to 30 percent, compared to a high of 5 percent in most other industrialized nations. Fully 25 percent of Americans now fail to complete high school. Each year 700,000 students drop out of high school and 700,000 more graduate without functional literacy.

An Example: John Porter, Superintendent of Detroit PS

- ...15,000 in 9th grade
- ...6,600 will graduate (44%)
- ...1,000 are "job ready" (7%)
- ...500 are UM ready (3%)

Our first tendency is to think that K-12 education is merely failing with minorities and at-risk students. However, other comparisons demonstrate that this is not the case and that the weakness of our educational system extends throughout all of our society. Even if we exclude those who drop out, we are presently only educating 15 percent to 20 percent of our students to an intellectual level capable of functioning well in the everyday world. In recent assessment tests it was found that only 20 percent of high school seniors could write an adequate letter. Only 12 percent of high school seniors could take a group of six fractions and put them in order of size. And only 5 percent of high school graduates today enter college ready to begin college level mathematics and science courses or to approach the reading of technical material.

The Failure of Our Universities

While I am taking pot shots at various groups, let me also aim a few as well at higher education. Many of the problems faced by public education these days are our doing. For years in most of our institutions the education of K-12 teachers was ranked among the lowest of our priorities. Indeed,

in some institutions--including the University of Michigan--during the period of serious financial pressure in the early 1980s, we have proposed that our schools of education should be eliminated!

Further, we have perpetuated the smokestack assembly-line approach to education, both in our instructional programs and in our accreditation activities. We have not insisted on the highest standards and best preparation of those we admit to our teacher education programs. And we certainly have not adhered to the highest standards for our own graduates.

What Higher Education Can Do?

Higher education must awaken to its responsibilities for the quality of public education in America. It is clear that we need to reach out more to school districts--working with them and responding to their needs. We need to work with our public schools to experiment with new techniques, new texts, new methods of instruction, new ways of organizing knowledge, and engaging students in the excitement of experimental problem solving.

An important effort in this respect is the new Partnership for a New American Education. This consortium, consisting of the state's three research universities--the University of Michigan, Michigan State University, and Wayne State University--is working closely with state government and the private sector to develop in the State of Michigan a model for higher education in America.

Universities must re-examine our priorities and ask ourselves whether we are not partly to blame and whether each of us should not put a much higher priority on preparing talented graduates for primary and secondary education. In this regard, we must pay particular attention to our own schools of education. Traditionally, these units have had the lowest status of any of our academic units on our campuses. During the 1970s and early 1980s our education schools were regarded as a haven for mediocre students and mediocre faculty. It is ironic that if one looks at the reform movement over the last five years, there is very little mention made of our schools of education. It is clear that our universities need to mount much more effective programs to train teachers, principals, and superintendents.

Finally, our universities really can set the pace for public education in America by simply insisting on far higher entrance requirements and communicating these

clearly to parents and prospective students. In this way, we may be able to generate the necessary pressures for reforms of our public schools.

The Real Challenge

and the Real Solution

Who is to blame for the plight faced by public education in America? Our schools? Our teachers and administrators? Certainly our schools must take strong actions to improve quality and strive harder to operate in a more cost-effective manner. They must be far more willing to embrace change, leaving behind the smokestack, industrial approach to education, and the blue-collar approach to their employees, the teachers. Certainly, too, our teachers and administrators must set higher standards and focus their efforts on education. But it is clear that we must not lay the primary blame for the crisis in public education on the schools themselves. In a sense, our schools have fallen victim to our own inertia. They have been crushed under the weight of a bureaucracy that smothers creativity and true accountability.

What about our public officials? Are they to blame? Once again, it seems clear that many of those in elected public positions have given only lip service to the needs of education, responding with rhetoric or gimmicks when pressed. Yet, here, too, we must not assign primary blame for the crisis in public education to those holding elected office. Indeed, it seems clear that the message is beginning to get through to those in a position to act. Our elected leaders--whether in Washington, or in Lansing, or our local communities--would like nothing better than to make education their highest priority. They would like to become the education governor...or the education party...or the education president. They understand clearly the importance of investing in our human resources and are searching for creative ways to improve the quality of our schools and to provide adequate and equitable financial support. But they also face formidable constraints, since in the end the voters get what they ask for--and face it, folks--the electorate today says no more taxes...no more crime...no more cuts in social services or national defense...and our public officials have no choice but to respond.

No, the real finger of blame for the crisis we face in public education should be pointed at you and at me. We are the ones who fail to demand the highest quality in our educational institutions. We are the

ones who steadfastly resist a tax base adequate to support both our needs and desires and provide an adequate level of support for quality education in the state. We are the ones who block any effective efforts to achieve equitable financing of education in Michigan. We are the ones who are generally too busy to help our own children in their studies or participate in their activities.

We have become consumers of the future, not investors in it.

Something has changed in America. I was brought up in a long tradition in which one's first responsibility was to one's children. My parents took great interest in my study activities. They scrimped and saved for my college education. My wife and I have done the same for our own children. The education of our children always came first, before a new house, a fancy car, an exotic vacation. Obviously, most of you in this audience agree with me about the importance of education, since many of you have also made hard choices and sacrifices.

But what about most of our fellow citizens? What has happened to us as a nation? Today's generation seems different. Perhaps it is that the "me" generation of the 1960s has grown up into comfortable yuppiehood. Perhaps our dilemma is in part due to a generation that has vigorously defended its rights, but failed to step up to its responsibilities. While it is clear that the public gives lip service to education, in the privacy of the voting booth they tell our public officials something quite different: to invest elsewhere--by building roads, or prisons, or football stadiums, rather than educating our youth.

I must say that I find the attitude that we have taken as a society toward our most precious resource, our youth, is both callous and alarming. I, for one, simply cannot accept the excuse that we cannot afford this investment in the educational opportunities we offer our children. To be sure, the immense social needs for welfare assistance, medical care, prisons, and all of the other programs that drain our tax dollars are compelling. However, by choosing to meet these needs with resources taken away from our system of public education, rather than through reforms in our tax structure or political system, we have in reality mortgaged our future by withdrawing the educational opportunities from our youth. We seem to have forgotten the commitments that past generations of

citizens have made to provide us with outstanding educational opportunities. Instead we choose time and time again to deny these to our children and their descendents.

But there is a different way to look at it. The real issue here is not the magnitude of our investment in education, it is rather the priority that we as a community, as a state, and as a nation place on investing on our children. To put it bluntly, we should feel both embarrassed and ashamed for robbing our youth, indeed our future, to pay for our own excesses.

But suppose we take the cynical view that the challenge of responsibility and stewardship will simply not be a compelling enough argument to establish the importance of investing in human capital. There is an even more compelling argument, one suggesting a strong vested interest.

If we do not invest in the youth of today, then it is clear that they will not become a sufficiently productive workforce to keep this nation strong and prosperous in the years ahead. To make this more apparent, let me note that by the year 2000 there will be only three workers to support each retiree, and one of these will be a minority. Therefore, unless we make the investments today, you and I are not going to going to have much to look forward to once we reach the point where we must be supported by this society.

But there is an even more cynical way to look at the challenge of public education. That is to simply evaluate it as one of a series of alternative investments. From this perspective, which do you believe makes more sense: to invest \$3,000 per year to keep a pre-school child on track, to invest \$5,000 a year to achieve a strong K-12 education, to invest \$10,000 per year to sustain a strong college education, or to invest \$25,000 a year to put someone in jail--and then lose the income and taxes paid by this person as a productive member of our society? The answer seems obvious, albeit frequently ignored!

The Need for a New Coalition

Today both our state and our nation face serious challenges that will clearly determine our future prosperity and well-being: the challenge of pluralism, the challenge of participation in a global community, the challenge of the age of knowledge, and the challenge of change itself. As we approach a new century, our state--just as our nation--is undergoing a profound and difficult transition to a new

economic order. Our fabulously prosperous industrial economy is rapidly disappearing, and our challenge for the decade ahead is to take the steps necessary to build a new knowledge-based economy which will be competitive in a world marketplace.

Let there be no mistake about this.

This will not be an easy transition.

Further, the outcome is still very much in doubt.

It seems clear that as we prepare for the age of knowledge, our ability to sustain the strength of our state and our nation, to achieve quality of life for our citizens, will be determined more than any other factor by how we develop, nurture, and educate the most precious of our resources, our people.

If we are to respond, we simply must reorder the priorities of this state and this nation. We must shift away from the temptation to address only the needs and desires of the moment. And instead, we must begin to make some of the key investments necessary for the long term, the investments for our people and our children.

Our educational system is complex and decentralized, with the primary responsibility located at the state and local level. There is no simple solution. It is clear we must push on all fronts to improve the quality of public education. We must weave a strategy of many strands, a strategy that places existing programs in a larger context that establishes a clear sense of direction, develops leadership for the task, and assures continuity of effort. Above all, we must be consistent and persevere.

It is clear that the challenge of public education should not be just the worry of local communities, or state government, or universities. It is everybody's concern! Each of us must step forward and unite to face the challenge of the future. We must work together to build new coalitions, including both the public and private sectors, state government, education, business, and labor, to develop an agenda appropriate to secure the future of our children, our state, and our nation.

Michigan, indeed America, continues to be blessed with abundant natural resources and a people of great strength. But the writing is on the wall. If we are to prosper in an age of knowledge that is almost certainly our future, we must join together now to restore both our public and our personal investments in education, in our people and their ideas, in our children, and

in our future.

□

An Aside

Many were surprised by the results of the
recent elections in Michigan.

In fact, for the last several days, there has
been a good deal of post-election quarterbacking
to understand better what happened...and
who the real winners and losers are.

In this spirit, let me suggest that one of the
really big winners was education:

- i) In district after district, the reform candidates
were elected to the School Board in the
City of Detroit
- ii) Outstanding people won election to the
Boards of our three public universities
and the State Board of Education
- iii) And in the new Governor, John Engler,
we have an leader who has clearly made
education among his highest priority.

Two years ago, Senator Engler announced his
intent to make this party the Education Party in
Michigan.

His actions as Senate Majority Leader have
consistently demonstrated strong support for
education at all levels--K-12 through higher ed
...including protecting education from the serious
budget cuts of last spring.

His strategic plan for education, prepared during
the recent campaign, is a truly remarkable document
demonstrating:

- i) a sophisticated understanding of the
challenges before us
- ii) a visionary, comprehensive, and pragmatic
set of actions designed to deal with
these challenges
- iii) a strong sense of commitment to make
education a top priority of this state
once again.

In fact, his strategy is remarkable similar to the
strategy that I have just laid out for you.

Hence, I believe that we can look upon
last Tuesday's election as an important turning point
for education in Michigan...

And I am firmly convinced that three days ago
we elected in Senator John Engler, a true Education Governor
for Michigan!

Final Comments

We recognize that the choices before Michigan are not easy.
We must address pressing social issues of employment,
health, social welfare, we must meet the important
needs of our citizens today.

But also we must balance these immediate needs with investment
in our future.

We cannot continue to address symptoms of our problems
without addressing their causes.

We cannot bring back the past even if we wanted to
For generations, the people of Michigan sacrificed
so that their children could have a better life.

They had faith in education.
Today we must rekindle that faith
and that commitment to the future.
It is now our generation's turn to demonstrate the same
responsible stewardship and concern.
We must care for our children's future,
for our common good, as much as
we care for our present and individual interests.
Michigan has everything it needs to succeed...
... to once again become the economic leader
of our nation and the world...
IF we can summon the will and the discipline
to pull together and build a brighter future.

The Plan for K-12 Education

Background:

Michigan K-12 system is massive and complex
...562 districts
...\$6.7 billion per year (local, state, federal sources)
...1.5 million students
...82,000 teachers
...7,500 administrators and 65,000 other staff
...State Board, Department of Education (\$40 M)
Experience suggests that top-down efforts are very ineffective.
Better to activate bottom-up forces at the school level
which address educational quality.
Premise: All children can learn more than our schools--
and most parents--currently expect of them.

General strategy

To develop a challenging, coherent, and concrete set of academic standards
to empower local schools to meet those standards, and to hold them
accountable for the achievements of their students.

Key Words:

management by objectives
site-based management
accountability

1. Clear objectives

Develop clear objectives for our schools...
...an ambitious and challenging core curriculum that
focuses on higher order thinking and learning.
Public Act 25 requires this...
...but State Board proposed core curriculum is weak
conditioned by the status quo, and does not meet
the needs of schools for serious and coherent
guidance in raising their educational sights.
...Should follow lead of California and Connecticut.

NOTE: These must not be local standards...

...or Michigan standards
...or even U.S. standards
These must be world standards...
since our children must learn to compete
in a global community

Hence, while educators and parents will be important
in defining these objectives, so too will be
"consumers" such as business, industry, and
higher education.

2. Accurate assessment

Develop methods for accurately assessing student
achievement...which are aligned with objectives.
Here, we have a good tool:
...the Michigan Educational Assessment Program
...but it is strongly resisted by teachers and school

districts

NOTE: Here it may be necessary to create truly independent assessment bodies...perhaps nonprofit corporations governed by boards representing wide constituencies

Telling schools, parents, students...colleges and employers ...and the public...how our schools are doing.

3. Moving to site-based management

Breaking the chains of laws and bureaucracy that bind schools ...allowing them to determine their own strategy for achieving the objectives

We must shift genuine authority and resources to the school level to give principals and teachers new flexibility to try new approaches, reallocate resources, adjust staffing, ...and make their schools work better.

A shift in authority to the school takes control away from state legislators, state officials, local school boards, and central district offices. All of these groups must agree to revoke existing policies that currently constrain school activities, and to forbear from enacting new ones.

Providing strong support:

...improved preparation of professional staff

Michigan teacher education

Dominance of teacher colleges...

...produce 7,000 for 2,000 jobs

...have 3 of to 5 factories in US

Clearly need an overhaul

...curriculum and materials development

Who? Michigan Department of Education?

Nonprofit entities?

...modern management methods

...exemplary practice sites

Michigan Partnership for New Education

Kalamazoo Area Math and Science Center

...school finance reform

Allowing them to implement a variety of options

...parental choice

...alternative certification

...longer school years

...merit teacher reward systems

Special needs:

Bring all children into the 3rd grade with solid skills

in reading and mathematics

...Full funding of Head Start for 4 year olds

...Extended day kindergarten in poor schools

Provide extra support for schools that serve concentrations of poor children

4. Insisting on accountability

...Outcome-based accreditation

...Business actions:

Hiring decisions based on academic performance

...Higher Education]

Minimum graduate requirements (with remedial education

required of those not meeting admission requirements)

...New state authority to take over failing schools

Those schools which are capable of moving toward objectives will be left alone.

Those which cannot will be subject to a number of actions

...alternative management

...consolidation

...financial penalties

Short Form

My Message

Michigan as a state is changing very rapidly...

We are becoming more diverse, more pluralistic as a people. Indeed, almost 85% of the new entrants into our workforce during the 1990s will be people of color, women, or immigrants.

Our economy and commerce are becoming every day more interdependent with other nations as the United States becomes a world nation, a member of the global community --

And we are rapidly evolving into a new post-industrial society, in which the key strategic resource necessary for prosperity and social well-being has become knowledge itself, that is, educated people and their ideas.

Indeed, knowledge will play the same role that in the past were played by natural resources or geographical location or labor pools...

In the pluralistic, knowledge-intensive, global future that is our destiny, it is clear that the quality of and access to

...education in general

...higher education in particular

...and research universities

such as the University of Michigan

are rapidly becoming the key factors in determining the strength and prosperity of our state.

From this perspective, it is important that we not view the public support of higher education as just another expenditure demand on an already over-extended state budget, but rather as a critical investment in our future.

Let me illustrate with just two examples...

Let me give three examples of just the past few months

Genetic Medicine

Medical scientists

Applications of molecular genetics to medicine

i) Discovery and cloning of gene responsible for cystic fibrosis

ii) Discovery of the gene responsible for neurofibromatosis...Elephant's Man disease

iii) How to inject normal genetic material into a cystic fibrosis gene and cure it

iv) Identified gene responsible for body's inability to handle cholesterol

v) Within past several weeks have now discovered the gene responsible for diabetes

What an extraordinary contribution!

Note: 40 years ago, Michigan conducted the clinical trials for the Salk Vaccine...

Jonas Salk was a faculty member at UM!

An example of how Michigan research has great impact on our society!

Computer Network

NSFnet, the major computer network, operated by the University in collaboration with IBM and MCI, passed the milestone of linking together over one million users in the U.S. and around the world...at over 500 sites.

The next stage, the National Research and Education Network or NREN, now stands poised to continue this momentum in the year ahead with strong support building both in the White House and in Congress.

Las fall in Washington, UM, IBM, and MCI are announcing the formation of a new nonprofit corporation to manage this "interstate highway system" for information transfer.

It is clear that the public research university...
...an institution for which the University of Michigan is not only the prototype, but perhaps also the flagship...
...touches the lives of a great many people in a great many different ways...

Through education, research, and service...
through health care, economic development, and
...yes...even through a sense of pride in their athletic accomplishments.

Yet as important as these institutions are today in our everyday lives, it is my belief that in the future they will play an even more critical role as they become the key player in providing the knowledge resources...knowledge itself, and the educated citizens capable of applying it wisely... necessary for our prosperity, security, and social well-being.

Even beyond that:

"The solution of virtually all the problems with which government is concerned: health, education, environment, energy, urban development, international relationships, space, economic competitiveness, and defense and national security, all depend on creating new knowledge---and hence upon the health of America's research universities" (Bloch)

The Particular Challenge Faced by Our State

It is clear that our state is in the midst of a profound transition...
...from an industrial economy based upon the abundance of natural resources, unskilled labor, and, to some degree, constrained, slowly moving domestic markets...

To a knowledge-based economy, characterized by intensely competitive world markets, rapid change, and--most important of all--educated people and their ideas.

This has not been...and will not be...an easy transition to make.

The impact of these changes are already painfully apparent to Michigan's workers and industries.

The truth is that the outcome is still very much in doubt!

Whether we will emerge from this transition as a world economic leader once again...with a strong, prosperous--albeit new--economy producing jobs and improving our quality of life.

Or whether we will fail to heed the warnings...
...to make the necessary investments and sacrifices today necessary for strength and prosperity tomorrow...

And become an economic backwater in the century ahead.

It is clear that we have arrived at a fork in the road ahead.

My central theme is that education, broadly defined, will be the pivotal issue in determining which of these two alternative futures will be Michigan's...and America's.

Indeed, I am absolutely convinced that the dominant issue of the 1990s will be the development of our human resources.

Previous economic transformations were closely associated with major public investment in infrastructure such as railroads, canals, electric networks, and highways. In the coming economic transition, an equivalent infrastructure will be an educated population.

The actions we must take today...

...and the investments we must make...

...will clearly determine our capacity to respond to this future...

Clouds on the Horizon

Michigan

1. Numerous studies over the past several years have suggested that Michigan is seriously underinvesting in its "knowledge infrastructure"...by as much as 30% to 40% relative to other states.

2. The challenges faced by K-12 education are apparent. By any measure, K-12 is in serious trouble.

We are "A Nation At Risk"...

Note: it is bad enough that...

10% of Americans are illiterate

25% now fail to complete high school

But in recent years we have learned that in international comparisons of achievement in science and mathematics, our grade school and high school students score at the very bottom of industrialized nations.

The coins of the realm in the age of knowledge will be science, mathematics, and technology...

But most American students are simply not developing these skills.

They aren't even learning the basics...

reading, writing, critical thinking, languages

geography, history, literature, the arts

3. The situation is somewhat different yet no less acute for higher education in our state.

While the quality of Michigan higher education today is still high, the long term prognosis is poor if we continue as we have been in recent years.

Over the past two decades, the State of Michigan has dropped from the position of a national leader (ranked 6th in 1965) in its public support of higher education to among the lowest in the nation.

Let's look at the comparisons for a moment:

Among the states, Michigan currently ranks

i) 33rd in appropriations per student

ii) 37th in appropriations as a percent of personal income

iii) 35th in appropriations as a percent of tax revenue

Further, we not only fall significantly below the national average in our support, but it is clear that we are slipping even farther behind with each passing year:

In fact, the increases we have provided in

our support to higher education now rank

iv) 42nd over the past two years

v) 45th over the past ten years

nearly dead-last among the states.

Whether measured in terms of

state appropriation per student or fraction of our tax dollars directed toward higher ed,

it is clear that in comparison with other states, our present level of public support is simply inadequate to maintain over the long run a system of higher

education that is competitive on a national basis.
We have become consumers of education,
not investors in the future.

Conclusion

We recognize that the choices before Michigan are not easy.
We must address pressing social issues of employment,
health, social welfare, we must meet the important
needs of our citizens today.
But also we must balance these immediate needs with investment
in our future.
If we don't invest in cures, our symptoms will, in time,
become fatal...
For generations, the people of Michigan sacrificed
so that their children could have a better life.
They had faith in education.
Now it is our generation's turn.
We must rekindle that faith
and that commitment to the future today.
We must care for our children's future as much
as we attempt to our present needs and desires.
Education represents one of the most important
investments a society can make in its future...since
it is an investment in its people...

Appropriations

My Message

Michigan as a state is changing very rapidly...
We are becoming more diverse, more pluralistic
as a people. Indeed, almost 85% of the new
entrants into our workforce during the 1990s
will be people of color, women, or immigrants.
Our economy and commerce are becoming every day
more interdependent with other nations as
the United States becomes a world nation,
a member of the global community --
And we are rapidly evolving into a new post-industrial
society, in which the key strategic resource
necessary for prosperity and social well-being
has become knowledge itself, that is,
educated people and their ideas.
Indeed, knowledge will play the same role that
in the past were played by natural resources
or geographical location or labor pools...
In the pluralistic, knowledge-intensive, global
future that is our destiny, it is clear that the
quality of and access to
...education in general
...higher education in particular
...and research universities
such as the University of Michigan
are rapidly becoming the key factors in
determining the strength and prosperity
of our state.

Let me give three examples of just the past few months

Genetic Medicine

Medical scientists

- Applications of molecular genetics to medicine
- i) Discovery and cloning of gene responsible for
cystic fibrosis
 - ii) Discovery of the gene responsible for
neurofibromatosis...Elephant's Man disease
 - iii) How to inject normal genetic material into a

- cystic fibrosis gene and cure it
- iv) Identified gene responsible for body's inability to handle cholesterol
- v) Within past several weeks have now discovered the gene responsible for diabetes

What an extraordinary contribution!

Note: 40 years ago, Michigan conducted the clinical trials for the Salk Vaccine...

Jonas Salk was a faculty member at UM!

An example of how Michigan research has great impact on our society!

Computer Network

NSFnet, the major computer network, operated by the University in collaboration with IBM and MCI, passed the milestone of linking together over one million users in the U.S. and around the world...at over 500 sites.

The next stage, the National Research and Education Network or NREN, now stands poised to continue this momentum in the year ahead with strong support building both in the White House and in Congress.

Today in Washington, UM, IBM, and MCI are announcing the formation of a new nonprofit corporation to manage this "interstate highway system" for information transfer.

Solar Car Race

- ii) A team of over 100 Michigan students won the solar car race from Florida to Michigan, thereby earning the right to represent the United States in the world competition in Australia this fall.

They then went on to finish 3rd in the world...behind factory teams from Switzerland and Honda.

An extraordinary performance...for a group of students.

But, even more to the point, they helped to develop a technology that may have great impact on our society.

What do we get for our money?

This past year the taxpayers of this state contributed over \$270 million through state appropriations to the University of Michigan.

What did they get in return?

Well, there are certain obvious payoffs...

- i) an outstanding education of roughly 50,000 students Including 29,000 undergraduates) (80% of them Michigan residents!!!
- ii) the production of 12,000 graduates at all degree levels in all disciplines and professions

But they got far more for this investment

Dollars:

- i) In comparison to the \$270 M invested by the state, the UM attracted to Michigan over \$300 million in federal support--most of which came in the form of sponsored research contracts and student financial aid.
- ii) Further, the students attracted to our programs contributed roughly \$300 M additional dollars to tuition and fees...
- iii) In addition, the auxiliary activities of the University contributed another \$800 M

to the state's economy...

iv) Or \$1.7 billion, in all -- a multiplying factor of six-fold

Cost/Benefit Implications for Michigan Residents

State spends: \$30 per year per citizen for UM

UM pumps back: \$220 per year per citizen

UM stimulates: \$2,000 per year per citizen

Calc:

1.8 B budget

\$270,000,000 appropriation

9 million citizens

economic multiplier = 10

Job Creation

UM generates 120,000 jobs each year through direct expenditures

Calc:

\$1.8 B budget

\$20,000 per job ==> 90,000

30,000 UM employees

Value of Education

Students spend \$200 per day for UM education

Students will earn \$2,000 per day as a result

Calc:

UM B.S. lifetime earnings: \$3,000,000

HS graduate earnings: \$1,500,000

720 days for B.S. degree

Economic Development

- i) But far beyond that, we estimate the true economic impact of the University multiplies its state appropriation by at least a factor of ten or more...
- ii) For example, the UM's engineering programs-- supported in part by the Research Excellence Fund, are credited as a key to the recent growth of a \$5 billion industry in industrial automation in the southeastern Michigan area.
- iii) Each year the University spins off dozens of new companies, creating new jobs and attracting new dollars to our state
- vi) Each year the UM produces thousands of engineers, scientists, business executives, lawyers, teachers,...and all of the other professionals so necessary to compete in the knowledge-based economy which characterizes our world.

Health Care

Last year, over 750,000 patients were treated in the UM Medical Center...regarded as one of the world's great centers of quality health care.

Indeed, our recent market surveys have indicated that essentially every family in this state at one time or another has had one of their members referred to and treated by our doctors.

I would suggest there is not a person in this room whose life has not been...or will not be touched at one time by our doctors and medical scientists!

It is clear that the public research university...

...an institution for which the University of Michigan

is not only the prototype, but perhaps also the flagship...
...touches the lives of a great many people in a
great many different ways...

Through education, research, and service...
through health care, economic development, and
...yes...even through a sense of pride in their
athletic accomplishments.

Yet as important as these institutions are today in
our everyday lives, it is my belief that
in the future they will play an even more critical role
as they become the key player in providing the
knowledge resources...knowledge itself, and the
educated citizens capable of applying it wisely...
necessary for our prosperity, security, and
social well-being.

"The solution of virtually all the problems with
which government is concerned: health,
education, environment, energy, urban development,
international relationships, space, economic
competitiveness, and defense and national security,
all depend on creating new knowledge---and hence
upon the health of America's research universities" (Bloch)

The Particular Challenge Faced by Higher Education in Michigan

1. Numerous studies over the past several years have
suggested that Michigan is seriously underinvesting
in its "knowledge infrastructure"...by as much as
30% to 40% relative to other states.

2. The challenges faced by K-12 education are apparent.
By any measure, K-12 is in serious trouble.
We are "A Nation At Risk"...

Note: it is bad enough that...

10% of Americans are illiterate

25% now fail to complete high school

But in recent years we have learned that in international
comparisons of achievement in science and mathematics,
our grade school and high school students score at
the very bottom of industrialized nations.

But most American students are simply not developing
these skills.

They aren't even learning the basics...

reading, writing, critical thinking, languages
geography, history, literature, the arts

3. The situation is somewhat different yet no less acute for
higher education in our state.

While the quality of Michigan higher education today is
still high, the long term prognosis is poor
if we continue as we have been in recent years.

Over the past two decades, the State of Michigan
has dropped from the position of a national
leader (ranked 6th in 1965) in its public support
of higher education to among the lowest in the
nation.

Let's look at the comparisons for a moment:

Among the states, Michigan currently ranks

i) 33rd in appropriations per student

ii) 37th in appropriations as a percent of personal income

iii) 35th in appropriations as a percent of tax revenue

Further, we not only fall significantly below the national
average in our support, but it is clear that we are
slipping even farther behind with each passing year:

In fact, the increases we have provided in our support to higher education now rank
iv) 42nd over the past two years
v) 45th over the past ten years
nearly dead-last among the states.

Hence, no matter how you slice it, our state now ranks among the lowest in the nation in its support of higher education.

Yet Michigan has now fallen to the bottom of the ranks of industrialized states in its support of these critical resources.

Whether measured in terms of state appropriation per student or fraction of our tax dollars directed toward higher ed, it is clear that in comparison with other states, our present level of public support is simply inadequate to maintain over the long run a system of higher education that is competitive on a national basis.

We have become consumers of education, not investors in the future.

As a nation we have been spending our children's future to pay for greedy consumption and quick fixes.

Instead of investing in our schools

We have squandered money on junk bonds and leveraged buyouts, on payouts and write-offs to people who already have enough.....or more than enough.

Conclusions

It is clear that our state is in the midst of a profound transition...
...from an industrial economy based upon the abundance of natural resources, unskilled labor, and, to some degree, constrained, slowly moving domestic markets...

To a knowledge-based economy, characterized by intensely competitive world markets, rapid change, and--most important of all--educated people and their ideas.

This has not been...and will not be...an easy transition to make.

The impact of these changes are already painfully apparent to Michigan's workers and industries.

The truth is that the outcome is still very much in doubt!

Whether we will emerge from this transition as a world economic leader once again...with a strong, prosperous--albeit new--economy producing jobs and improving our quality of life.

Or whether we will fail to heed the warnings...

...to make the necessary investments and sacrifices today necessary for strength and prosperity tomorrow...

And become an economic backwater in the century ahead.

It is clear that we have arrived at a fork in the road ahead.

My central theme is that education, broadly defined, will be the pivotal issue in determining which of these two alternative futures will be Michigan's...and America's.

Indeed, I am absolutely convinced that the dominant issue of the 1990s will be the development of our human resources.

Previous economic transformations were closely associated with major public investment in infrastructure such as railroads, canals, electric networks, and highways.

In the coming economic transition, an equivalent infrastructure will be an educated population.

The actions we must take today...

...and the investments we must make...

...will clearly determine our capacity to

respond to this future...

Wrapup

We recognize that the choices before Michigan are not easy.

We must address pressing social issues of employment, health, social welfare, we must meet the important needs of our citizens today.

But also we must balance these immediate needs with investment in our future.

If we don't invest in cures, our symptoms will, in time, become fatal...

The Challenge of Investment

Years ago our parents stepped up to their responsibilities by sacrificing to give us an opportunity for a better life through education.

They had faith in education.

Now it is our generation's turn.

We must rekindle that faith and that commitment to the future today.

We must care for our children's future as much as we attempt to our present needs and desires.

Today we are called upon to demonstrate a similar commitment to our children...to the next generation...to the future.

Education represents one of the most important investments a society can make in its future...since it is an investment in its people...

It is indeed the case that our state and our nation have developed the finest systems of public education in the world...

But we must also remember this resulted from the willingness of past generations to look beyond the needs and desires of the present and to invest in the future by building and sustaining educational institutions of exceptional quality--

Institutions that have provided those of us in this gathering today with unsurpassed educational opportunities.

We have inherited these marvelous institutions because of the commitments and the sacrifices of previous generations...and it is our obligation as responsible stewards--not to mention as responsible parents--to sustain them to serve our own children and grandchildren.

It seems clear that if we are to honor this responsibility to future generations, we must re-establish the priority of both our **personal** and our **public** investments in education, in the future of our children ...and hence in the future of our state and our nation.