

Michigan Add-Ins

Talks

1. Economic Challenge to Michigan
Title: Michigan at the Crossroads
Themes:
 - Economic transition
 - Role of UM in enabling the future
 - Engineer, technologist theme
2. Higher Education in Michigan
Title: Runnin' on Empty
Themes:
 - Economic transition
 - Underinvestment
 - Partnership
3. Importance of UM to State
Title:
Themes:
 - How UM touches lives
 - What is UM
 - Role in future
 - Key imperatives
4. Education (General)
Title: Educating for the 21st Century:
The United States Challenge in Education
5. Michigan Alumni
Title: A Call to Arms
6. Science and Engineering Education
Themes:
 - Change Theme
 - Science liberal arts major
 - Science and engineering bootcamp
 - Engagement
7. Concepts in learning
Themes:
 - Verbal (language)
 - Visual
 - Symbolic
 - Linear vs. nonlinear
 - Top-down, bottom-up, pipeline, parallel

Titles

Educating: Inventing the American Future
The Crisis in Science Education:
Information Specialists and Citizens
The Professoriate of the Future
Robots and Computers: Magnifying Mindpower
Excellence: The Only Standard
Exploding Knowledge: The New Frontier
Forging Values for a New Century: Tradition and Renewal
Minority and Majority: Which is Which?
E Pluribus Unum: One from Many
The "Me" Generation: Individualism vs. Commitment

Themes of Change

Demographics
We are halfway down the curve in the dip of 18 year olds.
The curve will reverse in early 1990s.
What most don't realize is that the social and racial mix
of these cohorts will be enormously different from
what it was in the 1960s and 1970s.
The 21st Century will be the first post-European century
in American history.
An absolute majority of young people born in US

in the 21st Century will be born of parents
of other than European background...
Asian, African, Hispanic
And this will represent a major change in the
character of our society.

Public Skepticism

Skeptical about science and technology...
linking these with problems rather than solutions...
...waste disposal, global warming, arms race
Congressional attitudes are particularly alarming.
Congress seems unable to deal with the
proposition that investment in higher education
including research and student financial aid ought
to be regarded differently from all those other
things they are concerned about in trying to balance
the budget.

Higher Education

Traditional patterns, the ways in which universities are
comprehended and appreciated and understood,
are being challenged, and they are changing.
Education and educators are under scrutiny and are
subject to a kind of skepticism and criticism that was
not the case over most of our experience.
How do we preserve strength, vitality, excellence, and
independence in the face of this set of external forces,
and the kinds of criticisms and skepticisms that come with it.

General

Transition from linear to nonlinear world
...from a world of gradual change to
a world of revolutionary change
Deterministic to stochastic
"Ill-posed"--unstable dependence on initial
conditions or perturbations
("butterfly effect")
Unusual importance of young or newly-initiated
in triggering change.

Underinvestment Themes

Michigan Rankings:

Total state appropriation per student (CC + U): 46th
Total state appropriation per student (4 Y): 32nd
State appropriation per capita: 24th
Increase over past 10 years: 45th
Increase over past 2 years: 42nd

A Special Message to Michigan Residents

An Appeal for Help

We need your help in yet another way...
While it is clear that we are entering a very
critical period in our state's history when higher
education will increasingly be a key factor in our
prosperity and social well-being,
It is also clear that both the quality of and
access to higher education in Michigan is a
subject of great concern.
Without your direct intervention...as alumni,
a taxpayers and voters, and as citizens with a stake in
Michigan's future
Your university, the University of Michigan,
could sustain serious and permanent damage
in the years ahead.

The Need:

It is clear that Michigan is changing today at

a breathtaking pace...

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 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.

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 U of M most

specifically of all

are rapidly becoming the key determinants of the strength and prosperity of our state.

The Good news is that Michigan is well-positioned from this perspective, since over the decades we have built not only one of the finest systems of public higher education in the world, but we now possess several of the world's leading research universities.

The Bad News is that a tragic combination of public misunderstanding, short-sightedness, and political opportunism now threatens to permanently cripple Michigan's universities.

Worse, this failure comes at just that moment in our history when we are becoming more and more dependent on these same universities to lead our state into the future.

Dark Clouds on the Horizon

Eroding state support...

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 (ranked 37th in 1989)

i) Appro per student 43rd

ii) Appro as % of tax 37th

iii) Two year % inc 42nd

iv) Ten year % inc 45th

As a highly industrialized state undergoing a dramatic change to a knowledge-intensive economy, Michigan is critically dependent upon quality higher education. Yet Michigan has now fallen into the bottom ranks of industrialized states in its support of these critical resources.

Tuition wars...

This situation has been compounded by political efforts to force tuition levels to artificially low levels, even as our universities have become ever more dependent on tuition revenues in the face of eroding state appropriations.

This latter effort is ironic, since in reality, tuition levels in Michigan's public institutions (\$2,000 to \$3,000 per year) are quite comparable to those at most other public institutions and quite low compared to private institutions (\$10,000 to \$15,000 per year). Further, these tuitions cover only a small fraction (typically 20% to 30%) of the cost of an education at a public institution.

Further, Michigan public universities have significantly increased their financial aid programs to protect access. Indeed, at the U of M, we have a policy that all Michigan resident undergraduates are provided with adequate financial aid to meet their needs until graduation.

Since federal funding for financial aid has declined 50% in recent years, tuition revenue has become a primary source of funds for financial aid programs. Hence, political efforts to drive tuitions down also drive down financial aid pools as well. The result is that those least able to afford a quality education are in danger of becoming deprived of this opportunity.

Threats to autonomy...

But political efforts to set tuition levels in Lansing rather than on our campuses raise another even more serious threat.

The traditional autonomy of governance of Michigan's public universities has been the critical factor in sustaining program quality while continuing to serve the state in spite of sharp erosion in public support.

This autonomy allowed Michigan's universities to take strong internal actions, reallocating resources, redefining priorities, and increasing tuition levels to partly compensate for reduce public support.

In recent years, however, even as state appropriations have been declining, the political pressure to restrict tuition levels to artificially low levels has increasingly threatened this autonomy.

While such political efforts have been portrayed as an effort to protect access (affordability) to public education in Michigan, they have had just the opposite effect by slashing financial aid programs.

It is clear that these forces from Lansing are being driven by not by concerns about access, but rather by fears that the Michigan Education Trust program, a prepaid college tuition program developed and financed on the assumption of low tuition levels, will become financial insolvent.

Risks to the U of M

The state's flagship institution, the University of Michigan, is at particular risk.

Despite its critical role, the U of M has been particularly disadvantaged in its efforts to achieve adequate state support in recent years.

Due in part to the intensely political dynamics of legislative process--and to the absence of any public policy in higher education --the University has consistently been given the lowest priority in state appropriations for several years.

- i) It has ranked last, 15th of 15th, in five of the last six appropriation years
- ii) The combination of low priority within the legislative appropriation process and the general erosion in state support of higher education has led to a situation in which state appropriations to the University have exceeded the inflation rate in only four of the last 10 years.
- iii) Over the past two decades, the U of M ranks last among Michigan's public universities in the growth in state appropriation.
- iv) A similar picture of eroding priorities appears in the U of M's share of state capital outlay support for academic facilities, where again it ranks last in state support over the past two decades.
- v) Indeed, during this period the State has provided funding for only two new academic facilities on the Ann Arbor campus... and then only at a 50% participation rate.
- vi) Over the past two decades, Michigan's peer public institutions have been receiving an average of \$25 - \$30 M per year for facilities. In sharp contrast, the U of M has received less than \$4 M per year!
- vii) As a result, the inventory of critical facilities needs of the University has now swelled to over \$200 million.

As with the state's other public universities, the constitutional autonomy of the U of M has been the key factor enabling it to sustain the quality of its programs and its capacity to serve the state in the face of eroding state support.

The University has been able to sustain--at least for the moment--its quality in the face of these declining appropriations only by a combination of extraordinary internal management actions.

These difficult actions were necessary to focus resources on only the very highest priorities, intensified efforts to attract resources from the federal government and the private sector, and the need to increase tuition and fees.

The impact of these efforts is obvious as state appropriations became a dwindling proportion of the University's operating funds. In FY90, state appropriations will have slipped to less than 44% of its General Fund (unrestricted) revenues and less than 15% of its total revenues.

Further, even this strategy of internal prioritization and the development of alternative sources of support has been threatened by recent efforts by Lansing to interfere with the University's autonomy in the areas of tuition, nonresident enrollment, and even curriculum and faculty hiring.

It seems clear that such efforts, if successful in the face of inadequate state appropriations, will cause serious and permanent damage to the University.

What can be done?

As alumni, citizens, and voters, I urge you to insist that...

1. State government cease its efforts to interfere

with the capacity of Michigan's public universities to govern themselves--particularly during a period of serious financial stress caused by inadequate state support.

2. State government develop and implement a strategy to restore an adequate level of public support for higher education to raise Michigan from the bottom third to the top third nationally in state appropriations per student (although this is still far below our historical position).
3. State government bring to an end the present freeze on capital outlay appropriations for higher education (now entering its fourth year) and begin to deal with the seriously deteriorating facilities on our campuses.

Concluding Remarks

Higher 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 higher 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.

International Competition

Signs in Michigan

Look at the prosperous areas in Michigan

Grand Rapids
Oakland County
Grand Rapids

and contrast these with impoverished areas

Detroit
Battle Creek
Benton Harbor
Saginaw
Muskegon

Real difference stands out: education!!!

"Most economically successful areas are those with educated and highly skilled labor force.

In Ann Arbor, 90% of people 25 or older have completed at least 12 years of school:

Saginaw: 57%
Flint: 60%
Jackson: 63%

Lansing: 72%
Kalamazoo: 73%
Grand Rapids: 67%

Japanese

“American business is not serious” said a French investment banker.

“American’s look ahead 10 minutes while

Japanese look ahead 10 years...” (Morita, Sony)

“Recognition of serious American flaws (e.g., the outrageous gap between rich and poor) should come as no surprise. We’ve been talking trade and budget deficits, homelessness, crime and drugs for years.”

“But the revealing shock comes through foreign eyes which strip away the illusion. Dramatic changes in the Soviet Bloc offer unimagined opportunities for reshaping the world. There are great risks in the transition, but reason for great hopes. And there are new threats”

“The last ten years have witnessed the substantial abdication by our governments of their responsibility in critical society areas, including education”. When matched against the Japanese commentary, it is virtually cause and effect.

Without the opportunity for all Americans of limited or virtually no real income to obtain the benefits of an outstanding education, the class gap will continue to grow. And we will develop an educational elite in the 19th Century European tradition, to be sure, with all of its unfortunate results.

America’s strength has been built on the diverse backgrounds of its citizenry coupled with upward mobility based not on class but on merit.

Japanese trade negotiations:

US should upgrade schools, invest in scientific research, close the Federal deficit, and take other drastic steps to improve American industrial competitiveness.

“If the US wants Japan to change its system, the US must be more ready to correct its own shortcoming. We can’t solve our trade imbalances looking at Japan alone.”

American high schools and colleges must upgrade the teaching of mathematics, science, and foreign languages.

Age of Knowledge

Warren Brookes

Links crumbling of Iron Curtain to technology...

George Gilder in Microcosm:

“The powers of mind are everywhere ascendant over the brute force of things. This change is the great divide”. It marks the end of the Leviathan superstate by putting the information resources of the world in reach of the individual mind.

Reagan:

“Information revolution is a very different revolution that is taking place right now, quietly sweeping the globe without bloodshed or conflict.

Its effects are peaceful but they will fundamentally alter our world, shatter old assumptions, and reshape our lives...as its emblem, one might take the tiny silicon chip, no bigger than a fingerprint.

We’re emerging from the economy of the industrial revolution--an economy confined to and limited by the earth’s physical resources--

into an economy of the mind, an era in which there are no bounds on human imagination and the freedom to create is the most precious natural resource”

In a sense, the breaching of the Berlin Wall by the pure idea of liberty is an outward symbol of the way in which elusive and unseen electrons--acting as agents of thought--are now used by designers. In a few years, these little mind-expanding, wealth-creating chips have converted information into capital and back again to make physical and mercantile walls, rules and borders obsolete. In less than a decade, microchips have transformed the world marketplace into a perpetual referendum on government policies, the most liberating yet unifying force ever unleashed, with the capacity to overwhelm anti-market, anti-freedom systems. Totalitarian nations built on archaic structures and walls cannot survive in the new information age, an age never envisioned by Marx or Keynes. The shattering of totalitarianism in Eastern Europe portends the slower but no less certain death of central bureaucratized governments everywhere, from London to Bonn to Washington. If the technological revolution is turning the world into one common market in mind, why should we trade one central bureaucracy for another, more remote from individual control? As Reagan noted, “The fact is bureaucracies are a problem around the world”. But the whole thrust of the information revolution is to decentralize power away from both government and corporate bureaucracies back to the individual. The Judeo-Christian West has always known intuitively that the real wealth of mankind is spiritual. That intuition is now becoming a reality. We no longer live as helpless pawns in a giant macroeconomy. The microeconomy now lives within each of us. Soon, the only walls left will be those we have created for ourselves and which we alone have enough power to dismantle.

State of Michigan Funding

Governor’s Higher Ed Taskforce

The Commission clearly identified the fact that “public higher education in Michigan is at a crossroads”.

It noted that per capita support had fallen from 1979 to 1983 from 14th to 37th.

Further, it noted that Executive Order cuts had played havoc with planning, resulting in maintenance deferrals, equipment purchase cuts, and eroded support for fundamental activities--all at a time when other states were increasing support for their systems of higher education.

It also credited Michigan’s universities with launching a systematic process of improving efficiency and redirecting the system. In particular, it noted that from 1980 to 1984, over 100 programs

were eliminated, thereby indicating the creativity and adaptability of the system. It concluded that if nothing was done, higher ed in Michigan was likely to face a future in which mediocrity is coupled with inaccessibility, a totally unacceptable results for Michigan's citizens. "To provide wide access to a higher education system of mediocre quality is to perpetuate a hoax on Michigan's citizens".

UM Inputs and Outputs

Inputs:

What is level of support of UM?

UM ranks 40th in resources per student

UM ranks 30th in USN&WR ranking of resource base

UM ranks 9th in reputation

(pretty damn cost-effective...)

Minter Associates ranking as "resources per student: as:

UM: \$16,000

UCB: \$19,000

Cornell: \$30,000

Stanford: \$43,000

What would we use?

GF/FYES = \$490M/32,000 = \$15,312

GF+ER+D/FYES = \$750 M/32,000 = \$23,437

St App + Tuition/FYES = \$12,352

Output Measures:

i) Enrollments

System wide numbers

Rank within state

ii) Degree production

Rank within state

Rank nationally

(Number who stay within state)

iii) Profession production

Number of UGs who become...

Engineers

Doctors

Lawyers

MBA's...

iv) Quality measures

Ranking of Schools and Colleges

Architecture:

Art

Bus Ad: 6th (USN&WR)

Dentistry: 5th

Education: ??

Engineering: 6th (USN&WR)

Law: 3rd (USNE&WR)

Lib Sci: 1st

LS&A: 9th (USN&WR)

Med: 11th (USN&WR)

Music: 3rd

Nat Res: ???

Nursing: 1st (NIH)

Pharmacy: 6th

Public Health: 1st

Social Work: 1st

Other measures

NAS/NAE/NIM numbers

Major national competitions

Hughes Research Institute

NCSM
NSFnet
URIs
NASA Center of Excellence

- v) Economic Impact
 - Dollars attracted into state
 - Spinoff companies
 - Industrial impact
 - Key to \$5 B automation industry in SE Michigan
- vi) Welfare of state
 - UM Medical Center
 - UM public service impact
 - UM cultural impact
 - UM intercollegiate athletics

Education Reform:

Joe Stroud's 4 points:

1. Need more tax support for education...
 - Education is so much the key to our future that we had better place a higher value on it.
 - Must reshaping state's priorities, gradually putting more into schools than into other state obligations.
 - Lottery experience is cause for cynism.
 - Fact that the state offset the lottery revenue by cutting back on what would have otherwise been invested from the general fund has created a deep distrust on part of voters.
 - We have to wrench the state's priorities around and make education far more the centerpiece of its efforts.
2. Reshape the schools and make them more effective.
 - Try to bring about curriculum improvements, to raise standards, to better focus efforts.
3. Devising an alternative tax method
 - Shifting from overdependence on property taxes.
 - Unless Michigan finds a way to get away from its overdependence on property taxes, we will continue to have tax revolts.
4. Equity issues: extremes between rich and poor districts
 - This inequity continues to assure that many of the state's most needy kids will get the least investment in their education.
 - Need a difference school aid formula.

Particular Michigan challenges

- Much of Michigan's economy is constructed completely upon one set of value-added activities: building parts for and assembling cars.
- Even if Big Auto can maintain market-share world-wide and chooses to preserve existing production levels in Michigan, the competitive pressures to reduce the labor content in parts production and assembly processes will significantly reduce employment levels in such plants.
- New production facilities will seek to minimize unskilled production work and will not offer replacement jobs for those unskilled jobs lost.
- Much of Big Auto activity is focused on physical production rather than the information and industrial services end of the business.
- A majority of the auto-based workforce is receiving above average wages for low-skilled work.
- Such routine production jobs are destined to disappear

over the coming decade, the victims of automation and Third World out-sourcing.

History of relatively unskilled workers receiving more than \$20/hour and the perception that labor-management relations are uncertain will continue to deter other manufacturers from locating in Michigan.

Key challenge: For Michigan to reposition itself in a world economy.

Costs of Education

While tuition is only one of a number of income sources to universities, it is the source most directly under control.

Revenue from tuition fits together with other revenues in a carefully balanced structure. When any one source of income fails to keep pace, the share that must be picked up by the other sources is increased.

Federal student-aid grant programs dropped 50% to one-half the level of their purchasing power between 1980 and 1987. Two key reasons:

- i) Pell Grant Program didn't keep pace with inflation
- ii) Elimination of Social Security scholarship program.

Colleges have coped with this steep decline in federal student aid by putting significantly more of their own money into scholarships. They have raised this extra money by cutting other costs, increasing fund-raising, and increasing tuition.

During the 1970s and 1980s, colleges coped with the inflation in expenses such as heat and health insurance, over which they had little control, by holding the increases in faculty salaries far below the increase in the cost of living. As a result, faculty lost close to 20% of their purchasing power during this period.

Why doesn't the CPI apply?

Goods and services measured by CPI are not the same as those of colleges (e.g., books)

Students have been shifting out of lower-cost fields such as education and the social sciences into higher-cost fields such as engineering and computer science.

Colleges have had to make their facilities accessible to handicapped.

What about productivity increases?

Just as one cannot speed up a symphony to make it "more efficient" to produce, so colleges have not been able to speed up the education process. Productivity increases in higher education come in the form of increased learning.

Cannot simply discontinue a program, since certain fields are essential.

Also cannot retrain staff (a French professor cannot be retrained to teach mathematics).

What is the prognosis?

Not very likely to brighten very much unless there

are different government spending priorities.

Increases in student aid, if the funds could be found, would help significantly in holding down tuitions, which are driven up, in part, to pay for institutionally funded student aid.

It is clear that tuition increases have helped to compensate for the decline in federal student aid.

Note one positive benefit:

College has become too expensive for students to be passive or indifferent about their learning or primarily focused on social life.

Students should be actively involved in their learning so as to make the most productive use of their time.