

Educating for a World of Change

Introduction

Personal Introduction

As many of you know, I am a scientist by training and background...

As such, I suffer from two character flaws:

- i) First, I tend to a bit too candid in my remarks...
- ii) Second, I tend to be one of those folks who lives more in the future than in the present or the past...

My life as a scientist and engineer has been spent working on such futuristic areas as:

- i) Nuclear rocket propulsion
- ii) Laser-driven thermonuclear fusion
- iii) Supercomputers
- iv) robotics and artificial intelligence

Now, as we enter the 1990s, I find myself looking once again to the future, facing the challenge of helping to build a University capable to serve our state and our nation in the 21st Century.

My Message

My message today will be influenced by both of my character flaws as a scientist/engineer...
...it will be a vision of the future...
...and it will be candid.

In a nutshell, as I look to the future, I am sensing an ever-accelerating pace of change in our society, in our state, in our nation, in our world as we approach the 21st Century.

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 -- 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, 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 at all levels are rapidly becoming the key determinants of the strength and prosperity of our nation and the quality of life of its people.

But here there is some good news...

America is particularly well positioned, since our research universities are clearly the envy of the world, as evidenced by the extraordinary demand by graduates of every country to see advanced education and training in the United States.

Indeed, higher education is not only our nation's highest quality, but also probably also its most

competitive industry as measured by the test of the marketplace!

Further, Michigan is particularly well-positioned from this perspective, since our state has built over the years not only one of the strongest systems of public higher education in the nation, but possesses several of the world's leading research universities.

But, now for the bad news...and the candor...

A tragic combination of public misunderstanding, short-sightedness, and political opportunism, is now threatening to constrain and hamper our universities... just as we are entering an age of knowledge in which they will become our most valuable resources.

Leading to the frightening prospect that we will manage to destroy our international competitiveness of higher education just as we have many other American industries.

"Science Under Scrutiny" (NYT, 1/7/90)

In international comparisons, US high school seniors ranked 14th among 14 nations in science performance.

College science enrollments are at an all-time low.

Of those who enter college intending to major in science, 40% drop out after first course. 60% drop out by graduation

Foreign nationals now comprise 60% of engineering doctorates, 50% of physical science doctorates 40% of mathematics doctorates

In my home state Missouri we have an old saying that the best way to get a mule to move is to first hit it over the head with a 2x4 to get its attention.

Now that I have your attention,

let me explain more clearly what is at stake here...

Themes of Pluralism, Globalization, and Knowledge

Our universities today are at a particularly important moment in history, since they are being called upon to educate students who will be spending most of their lives in another century...citizens of the 21st Century, if you will.

And while it is always risky to try to speculate about the future our students will find, three themes of 21st Century America seem clear...

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...

In an age of intercontinental missiles, threats to the global environment, instantaneous worldwide communications,

a world economy, and an international marketplace of ideas and arts and political trends, it is clear that we are becoming increasingly interdependent with 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. 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.

iii) The Age of Knowledge

But there are even more profound changes underway... 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. Some examples:

1. Industrial production is steadily switching away from material and labor intensive products and processes to knowledge intensive processes:
2. Our nation's future has probably never been less constrained by the cost of natural resources.
3. Increasing manufacturing production has come to mean decreasing blue collar employment!
4. We are in the midst of an information revolution that is changing the basis of economic competitiveness and world power. (Indeed, if you want to know the real reason for the recent events in Eastern Europe, China, and the Soviet Union--the collapse of communism--it was the silicon chip which created a truly international exchange of ideas and perspectives that could not be constrained by any government!)

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.

The Challenge of Change

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 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 students 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 are really not themes of the future

...but rather themes of today...

...in a sense, I have simply been reading the handwriting on the wall...

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 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

Indeed, Michigan's per capita income has now dropped below the national average...

Our unemployment rate consistently is at the top...and, soon, if we are not careful our prison population will be as well...

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!

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 face a watershed--a fork in the road ahead.

My central point 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.

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

I believe that the coming economic transition, an equivalent infrastructure will be an educated population.

Examples:

1. We already see this in Michigan...

A recent article by the Booth Newspaper chain noted that the most prosperous cities in Michigan were characterized by a well-educated and highly skilled labor force...areas such as Grand Rapids, Oakland County, and Ann Arbor. Indeed, over 90% of the people in Ann Arbor have completed at least 12 years of school.

In contrast, those areas most hard-hit by the economic transition have been cities such as Saginaw, Flint, and Detroit, cities in which only 50% of the population has a high school education.

2. Indeed, when then Vice-President Bush was traveling around the country and meeting with corporate executives to prepare himself for the 1988 election, the message he heard time and time again was the the key investments the United States had to make were in:

- i) education
- ii) technology

3. This situation has not gone unnoticed by our competitors from abroad. Indeed in recent trade negotiations, Japan admonished the United States to stop worrying so much about near-term financial issues and instead focus on long-term strategies by investing in scientific research and upgrading the quality of its schools--particularly in critical areas such as mathematics, science, and foreign languages.

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 the major focus...

People -- not equipment or buildings -- are the source of creativity.

They generate the knowledge that makes the technological innovation possible. They are the workforce that produces our wealth and makes our society run.

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

But here we face very serious challenges...

The "Pipeline Problem"

Today, an unprecedented explosion of knowledge heralds the onset of a new era. Since people are the source of new knowledge, we will rely increasingly on a well-educated and trained work force to maintain our competitive position in the world and our standard of living at home -- and indeed to harness the power of this new knowledge for the good of our planet and all of mankind.

Yet here we are in real difficulty, because we are not educating enough new people to keep our economy competitive.

Further, there are serious signs that the education of the present American workforce is simply inadequate to meet the demands of the next century.

Key input to a competitive economy is quality of the workforce. Our principal competitors are simply producing workers better capable of absorbing modern production skills.

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 and science literacy among the general public.

Discuss Pipeline Graph of NSF

K-12 Education: The Scorecard

In December I attended a conference of the top scientists, government officials, and CEOs from a number of nations throughout the world. The CEO of Nissan pointed out that following an extended visit by a number of senior Japanese officials, they asked the group what they felt the greatest strength and weakness of the US were: They were unanimous in their conclusions:

America's greatest strength was our research universities.

Our greatest weakness was public education at the primary and secondary level.

Quite a paradox, isn't it?

Quite a challenge!!!

By any measure, K-12 is in serious trouble.

We are "A Nation At Risk"...

Our education system simply has not responded to the

challenges of the age of knowledge...

Today we are witnessing an unprecedented explosion of knowledge.

Technology doubles every 5 years in some fields!

Graduates are obsolete by the time they graduate!

Technological change is a permanent feature of our lives

Yet, in the face of this knowledge explosion, it is clear that both the knowledge and skills of the graduates of our primary and secondary education systems continue to deteriorate.

Graduation Rates and Literacy

Yet our adult functional illiteracy rate is 13%--our high school graduate rate is down to 72%

25% now fail to complete high school

Each year, 700,000 drop out of HS and 700,000 graduate without functional literacy;

1,000,000 immigrants must be added to this.

Hence each year we have 2.5 million persons entering our complex economy annually with limited language and work skills

Achievement Measures

Our first inclination is to think that K-12 is merely failing with minorities and at-risk kids. Not so! International comparisons demonstrate the real weakness.

Even if we don't include the dropouts, we are only educating 15% to 20% of the kids to an intellectual level capable of functioning well in the everyday world --only 20% could write an adequate letter.

Only 12% of 17 year olds could tax six fractions and put them in order of size.

The high point is represented by those who can really enter college ready to begin college-level math/science or reading of technical material. Here, only 5% of high school graduates are up to snuff.

International Comparisons

At every level of education, American children rank near the bottom in their knowledge of science and mathematics when compared to peers in other advanced nations.

Our students bring up the rear in most international comparisons

Compared to students in 15 other nations, US high school seniors scored among the bottom fourth on calculus and algebra achievement tests.

International Association for Evaluation of

Educational Achievement (IEA)

Grades 4, 8, and 12

US was 8th of 17 for 4th graders

US was 14th of 17 for 8th graders

US was 11-13 of 17 for 12th graders

Bottom 25% of US students were scoring at chance level, indicating that they were scientifically illiterate

(Top scores were Japan, Korea, Hungary

"For a technologically advanced country, it would appear that a reexamination of how science is presented and studied is required...in the United States."

Science and mathematics education

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

Knowledge is cumulative, especially in math, science, and engineering. Without basic skills, a student cannot advance his studies.

But most American high school students are not developing these skills. Only 7% of the 17 year-olds tested are prepared for college-level science courses.

Nearly 30% of nation's high schools offer no courses in physics, 17% offer none in chemistry, and 70% offer none in earth or space science.

Scientific Literacy of K-12 Teaching Force

Only 30% have had college chemistry

Only 20% have had college physics

Less than 50% have had calculus or computers

More than half of all our high school graduates have not had even one year of science.

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.

We are a sports-oriented society, and we like to frame issues in the language of the playing field like "being Number one".

But folks, this isn't a game we are talking about today, this is a deadly serious matter of raising a generation of American who will be able to hold their own in an increasingly competitive, increasingly complex, increasingly science-oriented world.

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.

We hear along about the 21st century, but this sounds remote.

These kids that test at the bottom of the heap in world terms will be the backbone of our labor force at the turn of the century...

...and will be running our country in 2025!

Face it, gang:

The tragedy is not simply our poor showing relative to other nations.

Science, mathematics, and computer literacy will increasingly become a requirement for almost all employment.

We are condemning an entire generation to a lifelong estrangement from the very technology that will inevitably govern their lives.

A particular challenge to Michigan

The education of the Michigan workforce is inadequate to the demands of the next century.

Michigan is undergoing dramatic change in industry...

Away from low-skill, blue-collar workers

The factory of the future will have NO low skill workers

Unskilled labor will lose relevance in a world dominated by microelectronics, computers, and automation.

An example: Expert systems

The "expert system" craftsman...

Serious concern:

1. The present generation of blue-collar workers does not have sufficient formal education to be retrained!!!
2. Little sign that education system is adapting to this future. High school graduates "illiterate" in science and mathematics will be condemned for the remainder of their lives to low-level service employment ... IF they

can find jobs at all!

The education of the Michigan workforce is inadequate to the demands of the next century.

The economic challenge, in simplest terms, requires upgrading the skills of 25 million American workers by 40% by the end of the century. A strong back and willing hands will no longer suffice.

It is bad enough to face the prospect of a significant fraction of our labor force becoming permanently unemployable because of an inadequate education. Do we want to condemn their children...OUR children...to a similar fate? Can we afford it?

Most folks don't understand how dire the situation is for big city schools. If they did, they would be frightened to death at the realization that if there is not significant change during the 1990s, the kind of society that we know has very little chance of continuing to exist. The democratic structure can in no way bear the weight of hundreds of thousands--indeed, millions--of young people coming into society utterly unprepared to participate in any meaningful way in our economic, political, social or cultural life.

The challenges faced by K-12 education were well-summarized in a recent editorial in a Detroit paper:

"If Michigan is to prepare tomorrow's workers for tomorrow's jobs, major structural changes are needed in public education, both in classroom quality and in the adequacy and fairness with which the system is financed."

"What is required is a strengthened commitment in Lansing to school finance reform and improving the quality of basic and higher education, and a greater political willingness to stand up to special interests who would thwart those long-term goals to pursue short-term objectives. The opportunity to eliminate chronic unemployment in Michigan may be never more within our grasp than between now and the end of the century. The alternative is a growing mismatch of job opportunities and job training that threatens not only the state's recent prosperity, but its very solvency."

(Free Press editorial, 1/5/89)

What Is Wrong In the Classroom?

The Way We Teach? (Albert Shanker)

The reform movement started 6 years ago with A Nation at Risk is still moving along... but we are beginning to recognize that we need more than gradual reform... ..we need a complete overhaul!!! need to consider a drastic overhaul.

We have essentially been taking the system we have now for granted--assuming it is a basically OK system, and all we have to do is polish it up a bit.

Instead, we need major restructuring.

One fundamental flaw in the system is our assumption that the teachers are the workers who deliver knowledge to the kids. The system is not based on the idea that the student is a worker and that nobody can educate anybody else.

The student has to listen, the student has to write, the student has to read, the student has to imagine.

If students are workers, what kind of a workplace is a classroom or school? What is it most like? Not a coal mine or a steel mill. But rather an office.

But imagine yourself organizing an office in the following way: "Sit down at this desk with 30 other people in the same room doing the same work. You are never to talk to them, just do your own work. And here's your manager, she'll tell you what to do. After 45 minutes a bell will ring; stop doing what you're doing and move up to room 409--where you will have 30 other workers doing a different kind of work..."

This system makes a lot of sense, if you view the kid as an passive object, passing down an assembly line, being worked on by others, teachers, the real workers. First the English teacher hammers English into him. Then 40 minutes later he goes off to the math teacher who screws mathematics into him.

Problem is that people don't learn at same rate...yet that is the only way that lecturing will allow learning to occur.

We call on kids, ask them questions, and humiliate them in front of their peers. I still remember the times I was humiliated when I was a kid. Those things, I just decided, were not my game. I wasn't going to do them. I got to dislike them intensely.

Further, we also know if we manage any sort of business that if we want our workers to produce for us and with us, we do not humiliate them. But that is exactly what we do in a classroom when we call on a kid who doesn't have the right answer.

Perhaps this lockstep approach to learning was OK for training our industrial workforce, organized hierarchically, in which only those in top management needed to analyze, think critically, and make decisions.

Today's world is a very different place and requires different skills and more initiative and creativity.

What we need to do is to stop thinking about how to fit teachers, kids, and parents into an old-fashioned factory. (Note that even modern business is abandoning the factory model.)

We need a structure in which the STUDENTS are the workers. The teacher is not the person who pours knowledge into the kids; the teacher is a manager, and has the same job that the manager of any company has.
...How do I get my workers to come here wanting to work?
...How do I get them to do the work?
...How do I get them to manage and be interested in the quality of their own work?

There are many other reasons we have to restructure the schools, not the least of which is sheer numbers.

We have 2.2 million classroom teachers now, and given the demographics of the US work force, there is no way in which we can get this many people of the caliber that we need.

We would need 23% of all the college graduates for the next decade. (We might get the bottom 23%, but this is the last thing we need!)

Some fundamental issues:

- i) We need to raise teacher's salaries
- ii) We need to reduce class size
- iii) Teachers need to learn more about the context of what they teach.
other.
- iv) We need to be more creative in using new technologies to teach basics and

relieve good teachers from unnecessary tasks.
v) We also need to use technology to pioneer
new modes of teaching.

All of this argues for the need to move away from
self-contained classrooms. We need to move to
teams of people where there are outstanding persons
on each team.

We need to build in parental involvement.

We also need real school choice. Note that under
most present schemes, there are no incentives or
disincentives. We need a real competitive
marketplace.

A major reason why we have not had
change before is the political structure of our
schools. School boards have to be responsive
to people. THE CEO of a school system meets
in a public meeting once every week; and
everything that is wrong with the schools is
brought up right there. Hence, he says to all
the principals: "Look, there aren't any rewards
for doing good things in this system, but, boy,
you've got hell to pay if you make a mistake.
No bad news!"

In this respect our public schools have been
forced far away from private schools with
their enviable independence from the vicissitudes
of the political marketplace.

What we need instead is a structure that allows
schools to be independent (although this will
require much better people).

The Teaching Profession

What do we need?

If schools are to compete, if they are going to have more
autonomy and less regulation, they will need much
better teachers and fewer but better
administrators.

Here the current situation is remarkably bleak. Most
principals are poorly trained and rather arbitrarily
selected.

Over half of all teachers in America will be replaced in next
several years, yet the least-qualified college students
now go into teaching--the best qualified of those who
have received such training don't go into the schools,
and the better-qualified of those who do go into schools
leave teaching the earliest.

As a result, our schools are eventually left with the worst of
the worst of the worst...

Universities have an important contribution to make here.

We must do a better job of preparing our graduates
to be good teachers and creative administrators.

And we have to offer them opportunities for
continuing educational renewal throughout their
careers.

Disintegration of Social Fabric

Of course, schools are not solely responsible
for these results; drugs, crime, television,
disintegrating families,...

Of class of 2001, which started kindergarten
last fall,
25% are living below poverty line
15% have physical or mental handicap

14% born to teen-aged mothers
10% have illiterate parents

Family Attitudes

Interesting contrast shown in survey of mothers whose children were not performing up to expectations:

American mothers thought their child was not smart enough
Japanese mothers thought their child was not working hard enough.

Public Attitudes

In the past few decades we have neglected education's collective economic function. Whatever its individual payoff, it determines the human quality of the team on which every American plays.

If, in the final analysis progress depends on having the generations who follow us be smarter and better educated than we are, it is evident that we are sliding backwards rapidly!

Political Minefields

Ross Perot:

"The hardest thing I ever did was the year I spent trying to improve the Texas public schools. It was the hardest, meanest, bloodiest thing I ever tried to do."

We continue to be paralyzed in our efforts to come to grips with school finance reform or major structural changes necessary to achieve quality in public education.

Simple Solutions to Complex Problems

One of the curses of the American experience has been our preference for quick fixes, simple solutions to complex problems. Too often we go for the slickly marketed patent medicine that not only doesn't provide a cure, but actually aggravates the problem.

Example: The Michigan Lottery

A classic example of this tendency toward gimmickry is the State Lottery, which in effect robs from those most in need of state assistance, to subsidize those already well supported.

Furthermore, since these Lottery funds flow into the General Fund, and since state support of education has clearly not kept pace with the increase in lottery revenues, it is clear that lottery revenues are, in effect, going to build and operate more prisons (the only part of the state budget which has grown at this rate).

Some irony here, since the Lottery, in effect, is transferring funds from the deprived components of our population..

Possible Solutions:

Why isn't the reform movement having more impact?

The truth is that we already know a lot about what needs to be done.

We know our children need respect and freedom if they are to learn.

We know we need to see each child as an individual in the context of their needs in and outside the classroom.

Children can't learn if they are hungry or sick or homeless...or abused.

For too long we have compartmentalized our approach

to children and families, treating first one symptom and then another. We have to recognize the needs of the whole child.

What is missing is the vision and the will to change.

Only good thing about reform movement is that we appear to be concentrating primarily on enhancing the skills and knowledge of students-- rather than using education to unite people or assimilate immigrants or promote equality or integrate the races.

Thanks to the experience of schools like Cranbrook, we know that successful schools are marked by:

- i) freedom from external control and regulation that leaves more power in the hands of the individual school to plan its own educational program
- ii) strong leadership in trying to unite the faculty and students by articulating a clear academic mission for the institution
- iii) a lot of teacher participation in trying to decide how to teach, what materials to use, and what curriculum to follow
- iv) respect for the individuality of the student
- v) most significant was a lot of parental involvement in life and progress of the school

If you look at these findings, it is not surprising that many of the reforms are not working very well...

Instead of giving more freedom to the schools, the first wave of reform tried to impose changes from above.

Clearly we don't need any more bureaucratic constraints in education!

How We Teach...

Reshape the schools and make them more effective.

Try to bring about curriculum improvements, to raise standards, to better focus efforts.

Schools will only succeed if they replace the basic structure that was put in place 50 years ago to meet the needs of a smokestack economy with a new structure that meets the needs of an information economy. Need the creativity and openness of entirely new approaches to learning and the organization, management, and staffing of our schools.

Of course, first objective is to fill our schools with first rate teachers and administrators and then set up performance-oriented systems in which the goals for students are clearly specified, and rewards go to schools in which students make substantial progress toward those goals.

Education

K-12 Level

Better prepared teachers

Less emphasis on methods and more on content

A better reward system for teaching--salaries and other recognition

Better curriculum and delivery system

Instructional equipment and access to well-equipped laboratories

Lengthen school year from 180 days to 240 days

(note this would also achieve higher teacher salaries)

(It also eases child care needs)

All world-class industrial nations have some post-secondary skill training system for noncollege bound.

United States as nothing comparable.

Also

More demanding requirements

Higher standards and expectations

New and integrative approaches combining science and mathematics, humanities and social sciences.
Intensive teacher involvement
Parental support and commitment
The building of a national consensus that education is the key to personal success.

Needs

More programs at grade school level to excite children about science
Better programs at high school level to raise students to standards of our international competitors
Innovative programs to encourage, mentor, and support women and minority students in science
Relevant, well-equipped science programs at UG level to give graduates the skills they will need in workplace
Well-financed programs at graduate level to attract and support American students in study and research.

Key recommendations:

Need partnerships that reach beyond the schools-- and involve the parents
Students have to gain a sense of partnering in the learning process so that they feel responsible for their education and connected to the school and regard themselves as a community of common concern.
The teaching and learning structure of the school must be more flexible
There must be a curriculum that has coherence and connections.

How We Finance Our Schools

The Need for Larger Investment

Long term trends tell us two things about our human resource base:
One is that we have not been investing in our human capital sufficiently to prepare ourselves for the future.
Knowledge, in the modern competitive world, is the new critical commodity just as natural resources and access to low skilled labor were until just a few decades ago.
The second thing that long term trends tells us is that important demographic changes are taking place in this country and that these changes sharply increase the importance of attracting women and minorities into knowledge-based careers.

We must avoid a dangerous myopia on two fronts:

We must avoid replicating the British experience where a failure by industry to support and take advantage of a first class research/education system has contributed to economic decline
We must guard against the illusion that basic research and advanced education is a luxury on which we can economize.

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 reshape state's priorities, bring a better balance to school finance by seeing education as an investment in the future that deserves a higher priority in relation to our immediate needs.

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.

We have to stop treating the symptoms and summon the will and the courage to seek a cure.

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.

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.

How We Manage Our Schools...

An Interesting Contrast

- i) in K-12, Michigan ranks near top in spending per student, but near bottom in achievement
- ii) In higher ed, Michigan ranks near bottom in spending per student, but near top in achievement

Education, like industry, can improve by restructuring operations following some very simple principles:

- i) Go for quality and build it in the first time whenever possible.
- ii) Reward success in producing quality.
- iii) When a system for rewarding quality is in place, let the people on the firing line figure out how to get the job done.
- iv) Get rid as much of the bureaucracy and as many of the intervening rules and regulations as possible.

Key is to get the incentives to make sure there are appropriate rewards for success and real consequences for failure.

If we want quality, we should reward it.

If we want student progress, we should reward it.

If we want efficiency in the use of public resources, we should reward it.

But I don't have to tell people at Cranbrook these things.

You have managed to do them.

The question is whether our public schools can learn from your example and from what we know about what works and extend true quality education to all students.

Particular Challenge of Urban Schools (Rand Study)

Basically the problems of big-city schools are much more severe than any school system can cope with alone, Only when the whole resources of the community are brought to bear--and in particular when the school problem becomes the community's primary issue--can these changes take place.

A failing urban school system can be turned around only if the entire community unites on its behalf.

Key reform strategies have two strands:

- i) an outside strand that gathers broad community support and resources
- ii) an inside strand that changes the way schools are run and instruction is delivered.

The schools that changed the most had teachers'

unions that became a major part of the coalition to create the improvement plan.

Proposal that Bush announce an education goal similar to the Mission to the Moon:

“Americans are going to be the best in the world at educating and training our people, whatever it takes!”...E.g.,

- i) overtake Singapore, now first in 12 grade biology, from our current ranking of dead last among 13 countries
- ii) overtake Canada and Norway, where 25% of 18 year olds take physics and chemistry for two years each, compare to less than 1% in US
- iii) Overtake Japan and Korea, now tied for first in general science from US at 8th
- iv) Overtake Japan in math, which will require that our high school graduates master more math than our COLLEGE graduates do now.
- v) Increase functional literacy rate from 70% to 90%, comparable to that of Europe and Asia
- vi) triple expenditures made by American firms on education and training of workers, to equal the expenditures made by their most able foreign competitors now.

Suggest four specific missions

- 1) US will do what is necessary to assure that every child starts school healthy and intellectually prepared to take full advantage of what school has to offer; no longer will millions of children enter kindergarten as damaged goods, already marked for failure.
- 2) Second, country will dedicate itself to restructuring elementary and secondary education for high performance.
- 3) US will turn its technical genius to the problem of education, to make our schools a showcase for the contributions that information technology can contribute to learning.
- 4) US will provide a second chance for every American now in the workforce to get the skills they need to contribute effectively in an information based economy.

Sure, more money will be needed. But money alone will not solve the problem. US is already a leader in spending on education. It is essential to get much higher levels of quality for every dollar spent.

The Real Challenge...and the Real Solutions

The real power to influence the education at the local level

But here, we as parents and citizens have abdicated our political responsibilities.

We have not demanded that our publically elected officials respond to the seriousness of our deteriorating system of education.

While it is true that our school districts have suffered

serious damage from an erosion in public support, the responsibility for education does not rest with the schools alone.

How many parents commit themselves to working with their children?

How many support the millages necessary to build strong schools?

How many are willing to make sacrifices to pay for college?

As citizens we have to be concerned even if we do not have children in the schools.

Perhaps it is the lack of commitment of the American public, in general, and American family in particular which so contrasts us with other nations such as Japan.

Few parents take an active interest in their children's education.

Few save toward a college education...

...whether due to an unrealistic expectation of public support...
...or a preference for expensive cars, vacations, snowmobiles...

Time after time, when given a choice, we vote against good schools.

We complain about taxes necessary to support education...
Even try to roll back taxes, even as education continues to starve

Who is to blame???

Our schools and colleges???

Certainly they must take stronger actions to improve quality...and strive harder to operate in a more cost-effective manner...

But these institutions are not to blame...
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 elected public officials???

It is certainly not their fault!!
It is clear that our elected leaders, whether in Washington or Lansing or our local communities...
Would like nothing better than to make education their highest priority.

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 they are searching for creative ways to improve the quality of our schools and 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, gang...the electorate today says:

i) no more taxes...
ii) no more crime...
iii) 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 education should be pointed, as Michael Jackson would say, at "The Man in the Mirror"... ...at you and at me...

We are the ones who fail to demand the highest quality in our educational institutions in Michigan...

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 this state.

We are the ones who block any effective efforts to achieve equitable financing of education in Michigan.

We are the ones who generally are too busy to help our own children in their studies or participate in their activities.

And we are the ones who insist on building more and more prisons, even when we know that this investment comes out of the hide of education and social services-- which are, of course, the only true long term solutions to crime!

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

We seem to have stopped caring about our future.

We have chosen instead to mortgage this future to pay for mistakes
made in our past.

Six-month planning horizon...desire for immediate results...inability
to identify the investments which have to be made today to yield
the objectives for tomorrow.

Our approach to education...like to so much else in life
these days...can be summarized by that T-shirt slogan:
"Eat dessert first, life is uncertain"

Something has changed in America...

You know, I was brought up in a long tradition in
which one's first responsibility was to one's children
My parents scrimped and saved for my college education...
...and my wife and I have done the same for our
daughters.

Saving for a college education came first...

...before a house, before a fancy car, before an exotic vacation

Obviously most of you in this audience agree with me
about the importance of education and many of you
are making hard choices and sacrifices. But what
about most of our fellow citizens. What has happened
to us as a nation?

But today's generation is different...

...the "me generation" of the 1960s has grown up into
comfortable Yuppiehood...

...it is bad enough that they have not saved
for their children's college education

...and not supported adequate tax programs
to support higher education

...but they have actively encouraged government
at both the state and federal level to intervene
in an effort to hold tuition levels to unrealistic
low levels...

(either not realizing or perhaps not caring that
they were undermining the quality of the
education their children would receive at these
bargain-basement prices--and depriving many
others from less fortunate backgrounds of the
opportunity for a college education because of
the erosion of financial aid programs in the
face of inadequate tuition revenue).j

Education always falls at the bottom of the list of social
needs.

Even though surveys indicate public supports education, our
elected public officials do not seem to listen. They prefer
to fund roads or prisons or football stadiums rather than
the education of our youth!

Indeed, Michigan, a state with one of the highest per capita
incomes in the nation, continues to slip further and further
behind in its investment in education -- just as our nation
continues to fall further and further behind those very nations
now challenging our economic strength and prosperity.

The attitude we have taken toward our most precious resource,
our youth, is both callous and alarming.

I simply cannot accept the excuse that "we can no longer
afford this investment in the educational opportunities
we offer our youth.

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 build educational institutions of exceptional quality -- institutions that have provided many of us for years with unsurpassed educational opportunities.

We simply must re-establish the importance of both our personal and public investments in education, in the future of our children, in our own future, at the local level if Michigan -- indeed, if our nation -- is to face the challenge of the age of knowledge.

Yet the writing on the wall could not be clearer:

As we prepare to enter the Age of Knowledge, our ability to sustain the strength of our state and our nation...to achieve the quality of life for our citizens...will be determined, more than any other factor, by how we develop, nurture, and educate that most precious of resources, our people.

The University of Michigan Response

What can an institution such as my University do?

A Narrow Mission

Do we confine our attention to simply educating the scientists and engineers, the doctors and lawyers, the leaders of our increasingly technological society?
the leaders

Is this enough?...Of course not.

I believe our responsibility must go far beyond this... indeed, I believe that as the flagship of higher education in this state, the University of Michigan has a particular responsibility to provide leadership in education at all levels...from cradle to grave, if you will....

To work with you -- to strengthen your capacity to provide your students with opportunity to develop their abilities to the fullest to work with our public schools.

Recommendations for universities:

- i) We need to spread out more to school districts by reporting on new methods of instruction and new ideas for reorganizing and improving schools.
- ii) Need to mount much more effective programs than those we have had to train teachers, principals, superintendents
- iii) Need to work with schools to experiment with new techniques, new texts, new methods of instruction, new ways of organizing knowledge, to engage students in the excitement of experimentation and problem solving.
- iv) We must look at our schools of education--these have had low status on our campuses--being known as a haven for mediocre students and mediocre faculty (In fact, if you look at reforms of past 5 years, it is depressing to see how little mention is made of schools of education.)

We must reexamine our priorities and ask ourselves whether we are not partly to blame and whether each one of us should not put a much higher priority on doing what we can to help improve the quality of public education.

Coalition for a New American Education

The Challenge to Michigan

Challenge

Our education system is complex and decentralized and the primary responsibility is located at the state and local level.

There is no simple solution...we must push on all fronts.

We must weave a strategy of many strands--a strategy that places existing programs in a larger context that established a clear sense of direction, develops the leadership for the task, and insures continuity of effort.

Above all, we must be consistent and persevere.

Today the State of Michigan faces serious challenges that will clearly determine its future prosperity and well being...

the challenge of pluralism...

the challenge of participation in a global community...

the challenge of the Age of Knowledge

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... an economy that allowed us to build some of the world's great institutions---including some of its finest universities--

But that economy is rapidly disappearing...

...and our challenge for the next decade 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 it...this will not be an easy transition...and the outcome is still very much in doubt.

In my frequent interactions with the leaders of the public and private sectors throughout this nation I detect an increasing sense of fatalism about Michigan's--indeed, America's--will and capacity to take the actions necessary for our future.

Indeed, many now believe that that our nation is well down the road toward "outsourcing" its knowledge resources--just as we have been our labor, our manufacturing, our products--since American industry can not only depend on domestic knowledge resources--that is, a well-educated labor force or an adequate supply of scientists, engineers, and other professionals.

i) There is increasing pessimism that the staggering problems facing K-12 education can be overcome on the time necessary to preserve our economic strength.

ii) Further, despite the fact that most other nations regard higher education as our greatest strength, there is little sign that this view is shared either by our elected political leaders or the public at large. Indeed, it has become fashionable to attract our universities, even as we continue to seriously underfund them.

iii) The rapid growth of "transnational" companies

which seek resources, whether they be labor, processes, or knowledge--wherever they can get them at highest quality and lowest price--suggests that outsourcing of knowledge from other parts of the world will become increasingly common as the quality of American education deteriorates.

This is truly a frightening prospect. Industry has already outsourced labor and manufacturing. Can Michigan afford to lose its competitive capacity to produce knowledge as well?

Let's face the facts, people...

We're not going to be rich and prosperous if all we do is mow one another's lawns.

We have to bring something to the table of the international marketplace.

We have to generate our wealth...through our people...their knowledge and their skills.

I, for one, do not share the pessimism of many of my colleagues.

I believe that we can meet the challenge of the knowledge-based, global society that is our future.

But it is also clear that to do so will require sacrifices on all of our parts...

It will take renewed commitment to that most fundamental of all characteristics in the new economic order: quality

And it will take renewed investment in that most critical resource for our future--our system of public education.