

KEYNOTE ADDRESS
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In the last five or six years there has been a focus on education. Very much so, in the United States as I am sure all of you know, in about 50 separate reports, starting with "Nation of Risk" and going on after that to many reports sponsored by states, foundations, and some by outstanding educators. This phenomenon is not limited to the United States. Japan is studying its system in spite of the fact that throughout the United States there was a lot of talk about the success of the Japanese school. Apparently, they are not as satisfied with their system as many Americans think they ought to be. It was quite interesting that they felt that some of the very things that we thought were terrific about their system were not so good. That is they felt it was too rigid, it did not develop creativity, and much was based on ROTE memorization. They burned their students out so quickly in high school that the College years were wasted. The Japanese issued a report which was designed to mould their system somewhat toward ours at least in some ways.

As I travelled over the years in France and had the opportunity to speak with many of my colleagues in the French Teachers Union, people there would say "Everything here is fine. People are basically satisfied with public education." However many of you will recall that when Mitterand was elected he decided to change the formula for the funding of non-public schools. He was going to reduce the amount of money the non-public schools got in France and the result of that proposal was a rally of over one million people in Paris with large signs protesting that the public schools were producing large numbers of illiterates and that the government was about to deprive the most successful schools, namely the religious schools, of the funding that they so much needed.

For years we had been told that the British school system was one which was constantly the subject of various commissions and reports, that there was a good deal of satisfaction there. However, in the last year there has been a radical transformation in the governance and operation of schools in Great Britain. Under the Thatcher plan which was promised during the last election campaign, the schools now are under a new reform law in which, if the majority of parents in any public school so vote they may opt out of the public system and elect their own governing board and run their own schools. Simultaneously, they adopted a national curriculum which was mandatory for all schools and a national examination system so that parents will know whether they should opt out of the public school or whether they should kick out the governing boards that they have just elected to their individually-opted-out school.

Of all the countries that I have travelled, the greatest satisfaction seemed to be in Germany which has a very heavily tracked traditional school system. About a month and a half ago we had a world teacher conference in Toronto and at that meeting, the German teachers came up and said that there are the beginnings of a reform movement in Germany and the reason is that with Europe about to be united in 1992 many of the protections which different industries had will now disappear. Germany is now becoming worried that some of its industries which had been protected will now be subject to competition and therefore they need to improve and modernize their school system.

The last two weeks I was in Australia and I can tell you that each of the states in Australia has recently been subject to a major commission report and that there are some very major changes and transformations going on there.

In a number of the countries they are experiencing what you are and that is a movement to some extent from public schools to private schools. That is, a greater willingness on the part of the government to finance private schools. The movement in that direction has been proven in Australia. The opt-out provisions in Great Britain are a form of radical privatization and in the United States there are some similar moves. There are now four states that have some form of public assistance going to non-public schools and there is no doubt that the current Supreme Court if it is faced with a case of dealing with additional separation of church and state will take a very different view towards aid going to religious schools than the previous Courts have.

We have a number of radical moves in the United States; Illinois reformed the schools in Chicago last year by having each of its 420 schools have a separate board of education with the power to hire and fire the principal. (That's a way of saying we don't trust the mayor, we don't trust the union, we don't trust the board of education, let's turn the whole thing over to the parents because you can't trust anybody else.)

The entire school system in Chelsea, Massachusetts has been turned over to a private university - Boston University. Contracted out for a ten year period of time the private university does not have to hold public hearings or divulge any information. They are not subject to the usual conflict of interest laws and so forth.

Well, all this is by way of saying that because of the increasing International Competition and the Internationalization of our economy, people are questioning the adequacy of our schools of education. Part of that is due to the tremendous success of Japan. When I was a youngster

taking geography in school I learned that Japan couldn't possibly be a successful country. They didn't talk about Japan, they just said that you had to have a lot of natural resources, a lot of your own energy supplies and you had to be pretty close to all the other places that you were going to do business with. Well the Japanese managed to do it and they didn't have any of these things but they had a very highly trained and highly educated work force. So it is quite clear now that everything else could be moved and if you have got that, you have an awful lot. Therefore the tremendous focus on education.

In many of these places what we are getting are increased rules and regulations, more and more examinations, and accountability. There is a lot of talk about decentralization and giving people at the lower level initiative and at the same time a lot of standardized testing, examination, and reporting requirements. There is constant movement in opposite directions. A couple of months ago I had occasion to talk with the Vice-President of I.B.M., Mr. Jack Bowser, who is in charge of internal education. I.B.M. runs its own internal school system. They spend over one billion dollars a year exclusive of lost time retraining and re-educating their own employees. Somebody in the audience asked him "What do you think of the reforms taking place here in the United States?" He said, "If we were operating a plant building computers and if 25% or 30% of our computers dropped off the assembly line before they ever reached the end, and we didn't quite know what happened. If about 80 or 90 percent of the computers that did reach the end of the assembly line didn't work most of the time, the last thing in the world we would be doing is running the assembly line an extra month a year or an extra hour a day. We'd be asking ourselves what is wrong with the product that we are making?". This seems to be a key issue. The initial reaction of many reform movements is sort of "to do more of the same thing or to do it a little better, or to lock things in, in certain ways."

However at the same time that there is that tendency - you see it in a British definition of a national curriculum and national examinations - you certainly see it in the United States in these state by state reforms which have called for a longer day, a longer year, no automatic promotions, no automatic graduations, certain examinations for teachers and so forth - a whole bunch of rules and regulations - there is for the first time in many years a fundamental reconsideration of what it is the schools are doing and what it is the schools are about.

There have been a number of work studies over the years which have shown that schools as they are now organized owe a great deal to the success of factory systems at the turn of the century. I guess the best way to talk about this is to ask a number of these fundamental questions, about students, about

their nature of learning. We go back to Plato and Socrates. At one point, one of the sophists tells Socrates that he is a great teacher. Socrates denies this and says "No, I am not a great teacher, I am only a mid-wife". What Socrates was saying is "Look, you are the one who has got to get pregnant and you have to carry the fetus and you have to go through labour and you have to give birth. I can only be of some help. You are the one who has to do all the work."

The big message here is that no learning goes on without the work of the students. All learning is essentially self-learning. It is the result of the work of the student. Teachers can be of some help, but without students working it doesn't happen. I go all around the U.S. and around the world as well and I constantly hear teachers saying things like, "I taught that but they didn't learn it". Think about that. What does that mean? Have you ever heard a building contractor say, "I built it but it isn't there anymore, I don't see it." There is a relationship between building and something that stands after the building has been built but there doesn't seem to be a relationship between "I taught them" and something being there at the end.

Generally, we have a notion that education is something for which that teachers are responsible We teach them. We are the workers. We are the active ones. There is a British management writer, Charles Hen, who wrote a very interesting piece on this business of the student at work. He said, "No student is going to learn anything unless the student works at it. The student has to listen, read, write, think, has to imagine, has to construct".

It's what the student does that results in that student learning. If the student is a worker and the school and the classroom are work places, then what kind of a work place is a school? What is it closest to in the outside world? If you were looking for a work place that adults work in, day in and day out, what sort of work place out there is the closest point to a school? Well, it is not like an auto factory and nothing like a steel mill nor is it like a lumber mill or a canning factory. It is most like an office because in a classroom people read reports, they write reports, and listen to oral reports and give oral reports and manipulate words and numbers.

It's a lot like an office, but let me ask the question, Why is it that no office in the world is organized the way a school is organized? If you did organize an office like a school, here is what you get.

"Al, here's your desk. Look around you, there are 20 to 30 other workers sitting in desks just like yours. They are all doing exactly the same work as you are doing. Now the first

rule is that you are never to talk to them. You have to do your own work. Now she is your boss and she will tell you what to do. The next thing you need to know is that in 45 minutes a bell is going to ring and you and all the other workers are going to get up and go to different rooms. In the other room you are going to find another 25 workers. Don't talk with them either! You are going to get totally different work to do and have a completely different boss telling you what to do. All day long every 45 minutes, you're going to move to a different place, have different work to do, have a different boss and have 25 or 30 other people not to talk to."

Now why is it that no office is organized this way? Does anyone have an office like this? It is really simple, in the real world if you are doing some work, and you are not sure about it, you lean over to the person next to you and say, "Mary, did I get this right?" That's called common sense. In a school, it's called cheating. Co-operative learning is something that we value in the outside world - the big thing here in school is you have to do it on your own. Don't get any help from anybody else. The second thing that you would never do is move somebody to totally different work every 45 minutes. Why? Well some people are just getting the hang of it in 45 minutes. Some haven't even got the hang of that work after 45 minutes. It is too confusing to give people something totally different to do every 45 minutes. Also it is too confusing to give them a different manager to relate to every 45 minutes, because every manager has a different personality, different expectations. It is hard enough to get along with one manager - just look at all the problems we've got with labour relations in almost every workplace - let alone have somebody go through a different personality every 45 minutes.

How could a school as a work place - the students are workers regardless of their work - ever be organized this way? It is all very simple, if you don't think of the student as a worker. If you think of the student as raw material in a factory people being moved from one spot to another and being worked on by teachers - that school makes a lot of sense. In the first 45 minutes the students are in English. That is the first part of the assembly line where the English teacher is trying to hammer English into them. Then the students are moved along the assembly line to Mathematics where the Math teachers tries to grill mathematics into them and then they move along to the next teacher. This organization of schools really doesn't take into account the sensitivities of the students at all. The students are raw materials and are not living as far as the schools are concerned. The school is moving them from one location to another on the analogy that the teachers are workers and the students are inert, not viable, material to be worked on by the teachers.

Well, if that is true then we've got something here that is really fundamentally wrong. If the view of Plato and Socrates and I would think just about every educational thinker that's lived throughout history is correct that we learn through our own activities, then it is the work of the students that we must try to promote. If that is true, then we have to rethink schools because essentially the teachers are managers. Teachers have to ask questions like "How do I get the workers to want to come to work every day?" "How do I get them to do the work when I am not watching them?" That is a problem that every manager has. You can't watch everybody working for you all the time, and furthermore, "How can I get them to be interested in the quality of work so that they're not just going through the motions while I'm looking. I think they are working, but maybe they are really watching the clock." These are problems which every working modern manager talks about - simply how to engage workers in a work place, to instill a passion for excellence, how to thrive on chaos, how to improve, how to double capacity, and how to turn out fine products. All this thinking and all this work is very, very applicable to the whole question of schools.

Now, throughout the world there is, increasingly, competition at any level. The United States happens to, at this time, have a student achievement that is extremely low compared to that of other industrial countries. However, even in those industrial countries where they are doing much better as the competition heats up - increasing competition with the trade going between Canada and the United States and increasing competition as a result of the European Common Market in 1992 - the question is going to be "How do we improve our educational system?" Because the future of competitiveness for each of these countries is largely going to be viewed - is already being viewed to a large extent as a situation where you can't do very much about whether you have raw material or whether you have energy but you can do an awful lot with the quality of your work force.

The question then is: "What is it about our education system that we ought to be rethinking?"

Let's look at history for a moment. Look at American cars. The 1987, 1988, and 1989 cars are a hell of a lot better than the cars that were made in 1950, '51 and '52. Yet we are losing market share at the same time we are producing better cars. Whereas in 1950, '51 and '52 everybody wanted a Detroit car. Why? There was no competition in those days. There weren't any Japanese or other imports except for the Volkswagon and the beginnings of Mercedes. There wasn't anything else supplied because Europe had been almost destroyed in the Second World War and they were just building cars for their own use at that time.

So here we have an industry and the research says they are

doing a lot better than they did 35 years ago, but nevertheless they are now losing out in the race - not because they are worse than they were before - but because of competition.

It is not that our schools today are worse than they were 20 or 30 years ago - we are educating more kids, more difficult kids, for a longer period of time. So that isn't any longer the question. The question now that needs to be addressed is not "Are we doing better than we used to?" rather it is, "Are we doing better than our competitor is doing?"

Without exception, the schools in all our countries are from a different epoch. For the most part, schools today resemble the schools of 40, 50, 60 - 100 years ago - and even more. Not much of a change. The buildings may be a bit more colourful, with a few pieces of technology not used in a revolutionary kind of way. Teachers have had more of a formal education today than they did in those days, but essentially what goes for education is very, very similar. Namely, throughout most of education, what is going on is exactly what is going on right here in this room. There is someone standing at the front of the room and talking and there are people out there who are listening or taking notes or they are having sexual fantasies.

Now what is wrong with this? For a long time we have known what is wrong with this. Only a percentage of kids actually make it. It ranges anywhere from 5% to 30%. They are ultimately able to perform at pretty high levels. That is, they are able to solve step problems in mathematics, are able to express themselves verbally, are able to read through complex editorials or written materials, are able to write a decent essay or letter or something else that has a view. If you take a string of activities, and if you were to divide the people into four groups, at the bottom would be those who are illiterate in which ever of these things we are talking about. Next is the group that knows only the bare basics. The next group is above that but they cannot deal with things of any complexity. At the top are the people who can deal with some nuances, some complexity. The percentage of the people at the top as I indicated in our western countries ranges from about 5%, which is the United States for a low, to about 29% in Germany, with between 20% and 30% in most countries outside of the United States. Which means that huge numbers of people - the overwhelming majority - never reach this level. The question we need to ask ourselves is, "Is there something in the nature of the way we operate schools that creates this?"

I ask this question because this is exactly the question that some of our best manufacturers, whether they are in Japan, Canada, Germany, or in the United States, have asked

themselves in recent years. Once upon a time, the American system of quality control was that we design a car and start manufacturing it as fast as possible and sell it. Then you find out what is wrong with it, and then you recall 300,000 and you rebuild them. The Japanese system is a little different where you think about all these little things that might go wrong in the first place and you build that knowledge into the system. There are practically no recalls of those automobiles. Two different concepts of what is meant by quality control. One is something which is remedial, after the fact and very very expensive and the other one is essentially to design it right and build it right in the first place.

The schools that we have today came from a much earlier period as I indicated. In those days we didn't need very many people who were highly educated. We took care of that essentially by moving kids very quickly through school and by maintaining very high standards. Actually in the 30's and the 40's, we encouraged a lot of kids to leave school by providing a lot of fast and rapid exercises - sort of telling them in various ways that this wasn't the place for them. Former Secretary of Education for the United States, Bill Vann kept painting these gorgeous pictures of the past and how wonderful it was. And it was great. When I look back to my childhood in the 30's and early 40's in New York City - I had a marvelous education. Yet when I looked to see how many kids in the United States graduated, I found that twenty percent graduated from high school in 1940 and eighty percent dropped out. No Headlines. There wasn't even a word called "drop outs" in those days because 20% was probably the largest percentage that had ever graduated to that time. It was a mark of achievement - success! Besides, when people "dropped-out", they "dropped-in" to a world that needed people like that. You could go into various types of industrial service and agricultural work that required very little, or no education. Whereas today it means something very different.

Up to now, if we could use the gardening analogy of developing gardens by weeding, we have been pulling out all those kids who didn't quite fit. We have been allowing those who are kind of "naturals" to go up and go ahead and enjoy. What we have not been doing in most of our systems is cultivating. We have not been taking a look at the kid who looks like a weed right now and thinking about things we can do for that kid. It is a fact that some of these kids are not learning. The fact is many of them are dropping out. The fact is that some of them are not achieving up to the established levels. Is that due to the innate ability or inability of the youngster or is that due to something that we are doing in terms of structure of schools?

Common sense and some introspection will tell us that the

latter is the answer, namely that we are wasting a tremendous amount of very valuable, very important human material because of the ways we've structured things. Let's just take a look at a few of the structural things in schools.

If we were intelligent manufacturers, let's now look at these students as people that we're working on and try to figure out how can you design a school system so you don't have all these problems with recalls, so you don't have all these defective products, all of these rejects. If we were designing a system to fit students and maximize the number who make it, then we would look very closely at this schooling process and ask ourselves, "What in it tends to make for failure?" What in it tends to create a system in which only 5, 10, 15, 20, 25% succeed and do very well and the rest not so well. Now let's take a look at a few things.

The first point has been researched many times, all the kids enter school on the same day, let's say the first grade. You ask me to put them into three different reading groups but with respect to most work in the first and second grade they do pretty much the same things. We tell them all, "You're six years old," or whatever the age is that we start them at in that country or state. But are they? How did we take them into school? In most places, there's a cut-off date based on when you're born and a whole group of kids comes in. Usually the oldest kid in the class is one year older than the youngest kid in the class. What happens? Well, the oldest kid in the class has a tremendous advantage. There are a number of researchers who have said that even if the youngest kid in the class has 35 IQ points higher than the oldest kid in the class, he will still feel dumb.

One year at the age of six is not like one year at the age of 60. The difference between 60 and 61 is very small from the point of view of human development. The difference between being five and six - that is tremendous. So what happens later on? We find that a much higher percentage of the kids who had the wrong birthday do poorly in school. A higher percentage of them drop out of schools and a higher percentage of them feel that they are stupid, that they don't know how to do things, that they are weak. All due to the accident of their birthday. Parents have got kids who are at the edge of that and they are very concerned. Should I keep my kids home so that next year he will be the oldest in the class? That's not very good. He'll waste a year. He won't be with all his friends. Well, should I send him this year? Now he's going to be too young. They know that something very important is at stake in either keeping the kid out or sending him a little earlier. They're very right.

Now why do we have to have all the kids come in on the same day? Well that's very simple, that's when the teacher starts

talking. The fact that we organize schools largely around the teachers' talking really determines that we bring them in one a year. When I was a kid, we used to come in twice a year, but in most places now it is once a year.

Now, the second thing: Peter Drucker likes to ask "What is the most important human organ that determines success in Education?" and after getting a lot of answers, most of which are wrong, he gives the answer - "The Rear End". Being able to sit still for 5 or 6 hours a day - most people are not able to do that. If I were to take my little kid at home and force him to sit there for 5 or 6 hours a day, somebody would come after me for child abuse. But in school the kid that can't sit still for 5 hours, they say that kid is "disturbed". They need "special education". Well, what about the kid who can't sit still? Does that prove that the kid can't work? There are a lot of kids who can't sit still in school (and don't do well in school) yet later on do exceptionally well in life. The majority of members of the U.S. Senate were in the bottom half of their graduating class. The majority of vice-presidents of the U.S. were at the bottom of their graduating class. The majority of the presidents were in the bottom half and the majority of the chief executive officers of Fortune 500 Companies were in the bottom half. The majority of people in America graduated in the bottom half of their class, either high school or college. Which then tells you that there are certain smarts that people have which are indeed aspects of intelligence which are not measured by schools and which are not measured in terms of sitting still.

Thirdly, we ask the kids to listen to the teacher and to learn by listening to the teacher talk. (Yes, you can read the text book afterwards). Now what happens to the kid? Does everybody learn equally well by listening to someone talk? The answer here is pretty clear. We all know people who can't listen very long but if they go home and are able to build with something or if they can look at a picture or if they can discuss it with someone - these are other ways in which people learn.

In school we don't let them learn in these ways or at least we don't make it easy for them. It would be as if you went to a doctor and you said "Doctor, look, I've got some problems." The doctor gives you some medicine, a few days later you go back to the doctor, you say, "Doctor, that medicine didn't work on me. Not only didn't it cure me, look I broke out all over from the medicine." If the Doctor were an educator he would take you and he would shake you and say, "You've got a hell of a lot of nerve not responding to my medicine, here, double the dose."

The usual panacea of education is that if something doesn't work try twice as much. Now the doctor wouldn't say that, he

would say, "I'm sorry." He wouldn't blame you for not responding to his medicine, he would say, "I'm sorry, I gave you what works for most people, but it doesn't work for everybody. Now here, try this." Where's the educational equivalent of "Now here, try this, and if that doesn't work come back, because we have something else." That is, where is the video tape, the audio tape, the computer program, the co-operative learning, the simulation game, the models to build? Where are all the other ways of getting knowledge in any particular thing aside from listening to the teacher talk?

Now having the teacher talk as the center of education also does something else - the teacher has the problem, "which group do you talk to?", because after all there is a wide range of abilities in any class. Now in the old days we used to have one room school houses. We still have some, I'm sure in this country and we have some in the United States as well - not many but we have some. In a one room school house there were a couple first graders, second graders, third graders, all the way up to the eighth or ninth graders. One thing that never happened here, this teacher didn't stand up all day long talking to all of these kids. Why not? Well, the teacher knew that there wasn't much that she could say to first graders and eighth graders that would be valuable to both of them. So what the teacher had them doing was some work on their own, had some older kids helping younger kids, or did some individual work with them. There were all sorts of things that teachers did in one room school houses. But one thing the teacher didn't do was to present all the same stuff to kids who were in first grade and the eighth grade at the same time. Yet in many of our classrooms, even though they were all, say, sixth graders, we have the same span of achievement that you might have in a one room school house. You might have someone in that same class who is at a first grade level and someone who is at the eighth or ninth grade level but because chronologically they are all the same age it's perfectly alright for the teacher to stand up and do with those students exactly what that teacher would not do in a one room school house.

Now what clearly happens in this system is that the teacher usually talks to the middle. Those who can't follow feel that they're dumb and they fall behind. Then there are a whole bunch of kids who already know it and they are bored to death. School isn't challenging them so you try to give them some special projects. This whole business of using teacher talk as the central method is very, very inefficient because essentially you're only reaching a very, very small part - you're dealing with those who are in the middle and those who happen to be able to sit still and those who are also able to listen and get something from speech over fairly long periods of time. Now what else can we do? Well, we can do things - like after I give the lesson I ask questions and I see if

you've been listening to me - I call on you. Some kids have their hands raised all the time. They love school. They know all the answers. They would come on Christmas Day. Then you get some kids who are sitting there and they never raise their hands. Now what happens when I call on Johnny this morning and ask him a question and he doesn't know the answer? This afternoon I call on him again with some other questions and he doesn't know again. Tomorrow morning I call on him again - What happens when I keep doing that with a kid, what am I really doing?

Well, I think I'm asking him questions to get pupil participation, to encourage him to learn the stuff, encourage him to do his homework, encourage him to pay attention to me, to encourage him to go home and perhaps get some special help. From that child's point of view, what I'm doing is publicly humiliating him in front of all his peers. Each and every one of us could think of how we would feel. What they feel. What does humiliation do to people? Does it act as a strong incentive to get people to learn? Well, yeah, I think if we catch it fast. It was quite powerful in the old days, we used to punish criminals that way with all those stockades and those other things that we used to see. It is extremely powerful, but if overused, one of the things that humiliation does to kids is they decide, "This is not my game, I'm no damn good at it, I'm not going to be able to do it every time. As long as I'm trying and I can't do it, I'm going to look dumb to my colleagues so I'm not in the game. I'm in some other game, I'm into hitting kids or making a noise or figuring out how to avoid going to class or doing something else." So that's another aspect.

There is another. We expect kids to know that this is the opening of school; "I'm going to give you some homework to do, you better do it tonight." The kid says, "When's the end of the school year?" "Well, next June but you better do tonight's work, tomorrow night's work and the next night's work because you have to understand that every day you don't do the work you will fall behind and eventually you're not going to be able to catch up." Well, that knowledge that what you do everyday ultimately accumulates and you have to pay a price for it is very important to have but it's knowledge most adults don't act upon. Otherwise there wouldn't be any obese people. Or there wouldn't be people who over-borrow on their credit cards. How many adults, if you gave them their year's salary in advance, would have much money to live on ten months from now? Not many. So of course if the kids have someone at home pushing them - that works. What I am saying is that no matter how well we're doing in our educational system, structurally our schools are put together in such a way that takes large numbers of youngsters who could succeed and convinces them that they're failures by the accident that they're the youngest kids in the class. They are comparing

themselves with the oldest kids and making themselves feel miserable. Why? By having teachers publicly questioning their knowledge in front of all the other kids which is humiliating them. By having essentially a single method of teaching - by requiring them to sit still for long periods at a time when they may not be able to do it. By requiring that they have are aware of consequences - either from somebody at home pounding away at them to do their work or that they have the foresight to understand the accumulative results at the end of the period of time. Any youngster who somehow doesn't put most of these things together - doesn't make it.

The question is: Could we have a system where more than 15 or 20 or 25 or 30% of the youngsters are really able to read, write, understand science, and do problems in mathematics? Could we double the number of kids who are really college and university caliber if we did create artificial ways of catching people who fall off along the way? Now it isn't so far-fetched to think that schools could be so designed. Some time ago it was far-fetched to think that you could design and mass produce products that would have a very, very high quality with very few recalls. It was inconceivable if you went to mass manufacturers of the United States, Canada, Great Britain, and France and say, "look, we are mass producing things - to a certain number of them - this is going to happen, that's going to happen." The whole notion that you could fine-tune a mass production system, is something that the Japanese have taught the world. The rest of the world is now trying to catch up with the idea that we don't have to accept the massive amounts of rejects, mistakes, faults, etc. within the system. It seems that that is something we have to do in the schools as well.

Now, I would like to deal with several other things that we need to think of in terms of future restructuring. I touched on one just a few minutes ago when I talked about the large percentage of people at the bottom of their graduating class. One of the problems in school is that our conception of intelligence is too narrow. Intelligence or what we think of as worthwhile study in school has to do with manipulation of words and numbers. I think that one of the most important things that we need to look at is the broader notions of intelligence that these two writers Gardener at Harvard and Sternberg at Yale talked about. Why are all these people at the bottom half of their graduating class doing so well? They're doing so well because they have other aspects of intelligence. Aspects which they had as kids, aspects which could be developed in school, aspects which could be recognized in school. We can take these kids who are not that great at manipulating symbols but are very good at these other things and make them feel that they are somebody. Somebody who is the equal to those kids who are good at these other skills and indeed they are, because they go on later on in

life and prove it. What are these other aspects?

Well, one of them has to do with creativity, coming up with crazy, new ideas. You don't really get much in this world for remembering what somebody did 50 or 100 years ago. I think it's important and it's very nice and certainly important in discussing social and historical problems. However, there are equal or perhaps greater inputs when people come up with brand new ideas, things that nobody has thought of before. Now what do we do with that in school? Well, we tend to discourage it. It is not an accident that the Einsteins and the Churchills and the Edisons and other people who later went on to invent and to create everything else had terrible trouble in school. If you read their autobiographies or biographies you'll find that a lot of trouble was that they kept coming up with ideas that the teachers told them were crazy because they weren't going to be on the final examinations. They happen to be very good ideas. The kid who comes up with bright hypotheses is creative and smart. He has questions, questions for which perhaps there aren't any answers yet. Now, what is the reward he gets? Can creativity be taught in school? It can be recognized, it can be recorded, it can be evaluated. The third aspect has to do with practical intelligence - street smarts. The kid who knows how to play hookey, there's a smart kid. Just think out there in the world of how people today make a living by takeovers, by figuring out how to get tax dodges, tax deductions. The person who gets the Ph. D is not necessarily the person who is the smartest person intellectually. That person figured out the right university to go to, the right person to pick as the advisor, the right subject to pick as the thesis. A whole bunch of street smarts are practical things that you have to do so that very often you have this very brilliant person who has done all these things wrong who never gets it where someone else has it all because he knew how to put it all together.

Well, is it possible to teach these things? It is. There are three aspects of intelligence, the school deals with only one. If it dealt with all three there would be many more kids in school who would look smart because they are. These are the kids who don't do well and later on go out and do very, very well in the world. What we're saying to them is, "If you can't manipulate words with numbers, abstract words and numbers well, you're done." When actually there are these other ways that they could be using their smarts. Now, if we took into account some of the things that I've talked about, what might these schools look like? From your point of view, what kind of facility would one need to design for the school to be able to experiment with and try some of these other approaches to intelligence? Well, before I go on to an actual school model, you might think of what would happen if school much more resembled something like Boy Scouts or Girl Scouts. Boy Scouts and Girl Scouts have a curriculum. When you join

there are a whole bunch of tests you have to take to become Tenderfoot all the way up to the top. In a Boy Scout troop, people come in at different times, they don't all come in on the same day. They're all doing different things so their scoutmaster might have 40 or 50 kids and two of them are doing knots, one is doing clay, another one is doing cooking, and another one is doing first aid and somebody else is doing something else. Therefore the scoutmaster cannot lecture to the youngsters, he cannot do what the teacher does in class.

How does learning take place in an environment like that? Well, in some cases there are models. "Johnny, here's a board that's got all the knots on it. See if you can copy them." In some cases it's an older kid helping a younger kid. In some cases it's a parent volunteer working in the troop. One of the ways of rethinking the school is to take other institutions that educate youngsters and try to generalize the school and ask what would the school look like if it were structured on the basis of the other institution. Let me talk about an actual school that I saw which is structured quite differently. Now I don't believe that this is the way every school must be organized although this school has its concept based on a report dealing with middle schools which was published about 3 to 4 weeks ago. I give this example because most of us went to the same kind of high school where we sat and didn't do anything while the teacher talked. Therefore this notion of school is a very pervasive one in our own heads. It's not like some other institution which we all go into when we're 17 or 18 or 19. We don't start learning about schools when we become school board members or teachers, we start learning about schools when we enter kindergarten, or the first grade. Later on when we try to think of how else might this be organized, this idea is so much a part of our blood and bones that it's very hard to think of some other way.

The school I saw was in Cologne, Germany, a secondary urban school with over 2200 - 2300 youngsters. Now in Germany all kids are given an examination in the fourth grade and then they're tracked after that. The kids who do very well are sent to "Gymnasiah", (Phonetic Spelling) that's the academic track of colleges and universities. The kids who do just O.K. are sent to something called "Real Schula" (Phonetic Spelling). And the kids at the bottom are sent to "Kauschula" (Phonetic Spelling) which ultimately has a work-study relationship where you have part-time work and part-time study. My example is a comprehensive school which means that no matter what mark you get you can go to this school. However there's not many kids who can go to university here, so this is mostly a school made up of the final two tracks of kids, kids who have been given a test and in the judgement of their teachers and principals have been told, "you're not smart enough to go to college, so you're going to go to one of the bottom two tracks." This school runs from the fifth grade

until kids graduate at age 19. Here's how the school is organized. If I were a teacher in school I would be told, "Al, go down to that room, you'll meet the six other teachers in your team. The kids will be here in a couple of days. First of all we've given you seven teachers per team even though you should only have six. We never hire substitutes when a teacher is absent because the substitutes don't know the kids, the kids run rings around them, and the kids disrespect them. We've given you an extra teacher so that you have to organize yourselves in such a way than when one or more teachers are absent you're going to cover, you're going to handle it."

"Secondly, here are your kids, a list of them that is, a 100 - 110 kids. The seven of you decide how they're organized within classes. You can reorganize them whenever you want. So if you find that Johnny isn't doing well, he seems to be on the bottom and despite everything you do - nothing seems to work, well you can move him. You don't have to ask the principal, you don't have to ask the assistant principal, you don't have to go to your computer, you don't have to go to a superintendent. The seven of you, if you meet and you have a majority vote you can move youngsters from one group to another or one class to another. Remember, everytime you do that you're going to confuse the kid, you're going to create new relationships. Don't do it lightly, don't do it everyday but that is your right."

"The next thing is we have no bells during the day. It's your job collectively, if you want to spend the whole morning on German, if you want to spend the whole day on mathematics, go ahead. If you find that a whole day is too much, the kids can't take that much of it, they get bored, their attention span is too small, the seven of you can meet and rearrange things. If you find the kids need more time for social studies and less time for something else, go ahead. It's your judgement, the seven of you decide how to use the time. It's also your judgement about who teaches what subjects. You can take somebody who's an expert in math, in German, in English, in History, in Science and work in your chosen fields. Also, the science teacher may love Shakespeare and you can decide among yourselves how to use your talents, where they would best be contributing." Now notice in a typical school that the decisions are made for you in advance, somebody else has given you your class. They've decided that. It's very difficult to move a kid from one class to another. At this school, the bells are programmed so that the kids are going to move every 40 or 45 or 50 minutes. What it is that you teach and what it is that you contribute, that's predetermined. Whereas, in this Cologne School all these things are matters of judgement of the team.

Now the next thing that this team is told: "The seven of you are going to meet with these kids from the fifth grade until they graduate at age 19. You're going to get to know them, their mothers, their fathers, their sisters, their brothers. You're not going to be able to say - 'I inherited those kids from a tough teacher who ruined them last year, I can't wait to get rid of them next June! They are not just passing through the assembly line, you are going to look in the mirror a couple years from now and you're going to say I am morally responsible for providing an alternative to a system which by and large is bureaucratic, which moves kids on from one teacher to the next every period, every semester, every year. We are creating the kind of stability here where your team of teachers cannot escape responsibility. By the way, guess who is going to get after a teacher who is not a good teacher? It's going to be the other six members of the team because you're going to be working with that same group for all those years. You don't have to wait for somebody to come in from the outside - an inspector or a principal or an external accountability system. If you've got somebody on your team who is not working out, you can do something constructive. There is an internal mechanism that's going to work there because you're not going to be able to tolerate working, looking, and thinking about working all those years with somebody who is making life more difficult for you and the kids.

The next thing is that inside the classroom there is no lecturing. The kids are all at tables for five and they are given problems and questions to do together, what we call cooperative learning but the entire curriculum is not true cooperative learning. Kids are thrown a question like "Don't look this up in a book, we don't want the real answer, we want a good hypothesis. Here's a map, see if you can find the time zones, right! When it's 9:00 in Cologne what time is it in London? What time is it in New York? What time is it in Victoria? You see that on the map, now what we want is - spend one half hour - we want you to come up with a theory. When did the time zones first start and why? Were they around the time of Jesus? What effect would it have on the world if time zones were abolished tomorrow? Who would be for it and who would be against it? You've got one hour to come up with a good hypothesis, not the right or wrong answer from the book."

Now one other effect of our system is that we lose an awful lot of time each year when you've got five or six classes with 20 or 30 kids in a class. Sometimes it takes you six weeks before you learn the names of all the kids. At the end of the year you start packing up a couple weeks early because after all, you're not going to be their teacher next year. In this German school you don't spend all that time at the beginning of the year to learn their names because they're the same kids you had the year before and you never pack up because these

are the same kids you're going to have next year so whenever you finish with something you go on. If you've got kids who are working faster great, you start next year's work because they're the ones you're going to have next year. A huge proportion of these kids who are told that they are too dumb to go on to college do end up going on to college. That is a very successful school. There are about 60 of these in Germany. Is this the model, the perfect model, the successful model? No.

The purpose of this model is to say we're only succeeding with 5 to 30% of our kids. Great for that 5 to 30%. Are there probably large numbers of others who could meet the same achievement? The answer, I think, is yes. Well how do we decide? By asking whether there are certain obstacles that we place in our current structure that make life in school painful for kids and make them less likely to learn.

From that, it seems to me that we have to develop some alternative models where we can move in the same way that we have in industrial situations where things are automatically responsible to finely tuned quality control. What we need to do is to move away from a school system which is viewed as a mass production of youngsters. Where one teacher is doing the same thing with all the kids, with the same textbook, and at pretty much the same speed. In this German school there is a lot of attention given to moving, to variation of time, and the judgement of the teachers who are with those kids most of their formal education. This is a much more customized approach to education.

I'd like to conclude with two recent experiences. One of the main things that we see in our current school system is that while it fits the old factory system quite well, there is a mismatch between our current schools and our current workplaces. I was at another IBM meeting, and one of the men who was working there told a story about his wife and daughter and himself. He said "Look, I've been working here at the Atlanta branch of IBM and I work very hard. I have a 13 year old daughter, who has dinner with my wife every night because I don't get home until about 8 or 9:00 p.m. When I get home I have some papers that I have to go through so once I say hello to my wife and daughter and chat with them for a few minutes I get back to my work. After I did that for a week or two my daughter asked my wife, "Mommy, why doesn't Daddy ever come to dinner with us and why is it that when we welcome him home he just spends a minute or two with us and then he ignores us?" His wife says, "Well he doesn't finish his work by 5:00 or 6:00 o'clock so he stays later. When he gets home he still has some work he hasn't done so he says 'hello' to us and he goes on with his work." And the daughter asks her mother, "Well then why don't they put him in the slow group?"

The fact that we laugh at that really shows the kinds of wrong lessons that we're teaching our kids. Are we teaching them about the world? We are teaching them to manipulate abstract symbols free of any context, we're telling them that they've got to do it alone without the association of any other human beings and we're telling them that they've got to do it without the use of any technology. The world is exactly the opposite. A lot of people are able to deal with symbols if they're dealing with a concrete problem but they're not able to deal with an abstract one. A lot of people can make a contribution on solving problems if they're doing it with a team of other people but they can't do it if they're told to do it alone. A lot of people can do these things if they've got some type of technology, and I'm not just talking about computers. In almost every job there's some sort of rule of thumb that a person who's been doing it knows how to do it. He may say "I don't have to go through all that abstract stuff - here's how you do it." We tend not to do that in schools.

Well we have quite a job to do and there's mounting dissatisfaction in most western industrial countries. (By the way, the dissatisfaction is also true in the iron curtain countries. They have had waves of recent reports on what it is that their schools produce and don't produce and they're not doing very well.) We're likely to get increased pressure from privatization in most of our systems unless we show leadership, unless we can turn to the business people and the public within our communities and say "Look, you don't have to do it to us, you don't have to pressure us, you don't have to send our kids to private schools, we are aware of our shortcomings. We're doing a good job now, we're doing a better job than we've ever done before. However, we're not going to rest with that. We are taking the leadership just as many of you are in your own industries. You're not satisfied with the factories of yesterday, you're using newer technology, you're thinking about new ways to use your employees. You are doing all sorts of things. You're not abandoning all of them. You say you've found new ways of doing it, you take time to do that. We're not going to throw over everything we have right now for a system that doesn't exist yet but we're going to keep trying to make substantial improvement in our system by doing some very non-traditional things.

In the last year, I had the opportunity to twice visit Poland to try to help Solidarity before they were legalized. After the first trip, a year ago April, when I came back to the U.S., I read an article in the Wall Street Journal which at first seemed like a pile of junk to me. But after I read it I realized that while it might be a pile of junk it's also an Educator's joke and it applies just as much to us as to the Poles. Here's the story. It was about a year and a half ago and the Polish economy of course then (and now) was in a

terrible state of poverty. A Polish economist was asked a question, "Is it really possible to lift Poland from this terrible state of poverty into a state of prosperity?" The Polish economist said, "Yes, it is but there are basically two ways to do it. One way is the national way and the other way is the miraculous way." "Well, what's the national way?" "The national way would be for a host of angels to be sent to Poland and to lift it into prosperity." "Well then, what's the miraculous way?" "Well the miraculous way would be if the Poles did it themselves."

Now, I suggest to you that would it indeed be miraculous that if those of us in education were to change the ways in which we have operated for 50 or 100 years. But there is no host of angels that will do it for us. Just as the economic consequences that the economists and business people fear are terrible indeed, if you don't keep up with what competitors are doing, so too the consequences for us in public education will be terrible unless we do the miraculous and do it ourselves. Thank-you.