Office of the Superintendent
Acton Public Schools
Acton-Boxborough Regional School District
http://ab.mec.edu

Isa's presentation, PD March 17, 2000

On screen, Dewey White's picture (SLIDE 1)....

Good morning. Even the picture you are looking at will be changing...

In the last seven years, I have spoken with you at the beginning of each academic year. I have taken seriously the obligation (often using parts of my vacations) to:

- reflect on our times
- consider education in our times
- look ahead into the future
- re-engage your commitment
- model for you some technology practices you can use as a teacher.

Once the Professional Development Committee asked me to be the PD day speaker on a topic they chose, Frameworks, Standards and Education Reform.

Today I asked to speak with you.

For a quarter of a century, ever since I was a high school principal, I have believed (and tried to do all that I could to implement that belief) that technology could change education:

SLIDE 2
- the form it takes
- the capacity it has
- the opportunity it provides

This is not to say that technology would ever replace teachers, a fear which predominated the early stages of this revolution; rather that teachers could enhance their ability to provide better education to their students.

SLIDE 3

In fact, in July 7, 1998 a Sunday in the Globe's Focus section, one of their columnists wrote something I believe.

"This huge technology (the Internet) is hugely important, but it doesn't change human nature. It doesn't change the fact that we live in real places and see our neighbors as we don't see the folks in chat groups....

It's hard to see the Internet replacing the kitchen table or back yard fence argument...

We will use the new technologies to our profit, personal and financial (I would add educational). But we will use them in ways that only enhance who we are."

SLIDE 4

We have called this next hour an odyssey because it has been both an adventure in previously unchartered territories and also a challenge like that presented by Circe and peril as embodied in Scilla and Charybdis.

It flashed through our minds for a minute to refer to this a space odyssey given our experiences during the last three years and the fact that technology does present a space challenge, although it also is a solution to a space problem...but this is 2000 and not yet quite 2001!

You may remember that Odysseus, a Greek chieftain in the Trojan War, set out from Ithaca after the fall of Troy, to explore the then unknown world, leaving his wife (Penelope) and son (Telemachus) at home for ten years to deal with many suitors and guests. It was just on November 18 that we presented a report to the School Committees about the state of technology in our communities. We have become

structurally dependent on technology and now questions are arising, all having to do with whether the results are worth the investment:

SLIDE 5

- If we have limited resources, should we spend them on technology?
- If students have computers at home, why do they need them in schools?
- If we cannot keep up with the advances, should we bother at all?

I won't touch upon the question of platform here. I don't want to discuss religious issues, given the separation of church and state!!!

Our philosophy is that we provide what will enable our students to achieve the objectives we have for them.

On November 18, I started with three stories which I want to repeat here to show you where we are today...

SLIDE 6 David Thornburg's picture

SLIDE 7 American Memory Project web page

SLIDE 8 George Washington's Inaugural address in his own handwriting

David Thornburg, a futurist, told us about a trip he took to the Library of Congress/American Memory Project to examine some rare historic documents a few years ago. He had to wear silk gloves and smock; the light was very dim and he could only use a pencil and someone stood over him for the entire period of time he was in the reading room. And he fortunately was more than 18 years old....

On the other hand, he and a fifteen-year old could now log on to the web site and see all of those documents at any time from any place and without supervision.

SLIDE 9 MEET web site

Under the leadership of Priscilla Kotyk, we applied for and received $40,000 from Project MEET (MA Empowering Educators Through Technology) to create a professional development model for the use of technology. We created an interdisciplinary web site which allows students to understand the issues, captured in the book and the movie...A Civil Action.

The people involved are John Nacke, Dorothy Johnson, Mark Hickey, Dennis Kavanaugh, Brian Dempsey and, of course, Priscilla.

Each teacher created a web quest around the question: What is a community?

SLIDE 10 Jamestown web site The third is an example of how two individual teachers use technology as a powerful tool: Ginny LoDuca created a Jamestown web site, which is a teacher "syllabus" and tailored "library of resources", matching information to the specific curriculum objective.

SLIDE 11 Physics web site
David McClung's physics web site is used to provide web resources, problem answers and student grade information for his classes. By the way, some of you will have a chance to look at some of these during the next portion of the program.

And I want to add another story. When we started using email, one of the most telling comments was made by Eileen Sullivan

SLIDE 12 Our only elementary curriculum specialist, Eileen has always been torn in many directions: too many people to support; too many buildings to cover; too many subjects to be in charge of. A teacher would call for help, and it might take Eileen several days to connect: telephone ping pong and conflicting schedules. Today, she can respond daily, sometimes even more often because of what we have:

SLIDE 13 This is what we had in 1985, when APS and AB received their first major infusion of instructional technology. It took the form of Apple IIGs and Image writers.

SLIDE 14 In 1987

SLIDE 15 In 1988 There was a small lab at Merriam and students were transported there by bus to use it. Training for teachers was provided there, after school. Jim Chace's comment was that "'on-line' was only a figment of our imagination". The computers were used principally for word processing and writing, and drill and practice. Everything was on the 5 and a quarter inch disc!!!

Appleworks was the program available. How ironic! The name is the same but the power of the new Appleworks is of a different universe.

SLIDE 16 This chart which I don't expect you to read but which you may have seen on the walls when you were having coffee, represents the timeline of events in our technology history.

These bullets represent some of the highlights:

SLIDE 17 • the establishment of the network and First Class

SLIDE 18 • the development and approval of our plan
the first of two NetDays
the web site established

SLIDE 19 • The Lighthouse Award

SLIDE 20 • The expansion of the TRC

SLIDE 21 • Project MEET

The vision which informed our 1996-2001 plan which was approved by the Department of Education and declared to be among the best they had received had as its vision:

By the year 2000, the public school systems in Acton and Acton-Boxborough will have established technology-infused environments for teaching and learning for all student age levels, in all subject matter, and across all disciplines. Students and staff use state of the art technology to discover, create and communicate. The schools are linked technology to each other, to our communities and to the world.

SLIDE 22 The Network
The objectives were:
1. providing equity of technology access
2. integrating the common core of learning
3. improving learning tools for students
4. providing professional development to enhance teaching and learning in support of education reform.
I think we had the right idea.

SLIDE 23 The COVER of the Plan
However, I can go back even further to 1975 when I was high school principal and "telling" my staff they had to participate in a technology professional development experience! Mostly the use at that time was in mathematics for computation.

I had a vision of an elementary school much like Gates or Conant in appearance where students sat at stations in rooms which look like the cafeteria. Each student had a computer and all the peripherals, enclosed in a gray plexi-glass dome. The teacher had a parallel station, larger of course, with two buttons.

HOLD up GUS If a student needed to be disciplined, she pressed the red button and the student fell through the floor into the jaws of a green alligator (stuffed and soft, or course, like Gus);

MAKE GUS ROAR

If the student deserved a reward, she pressed a blue button and the dome would open and chocolate kisses would rain down!!! THROW OUT SOME KISSES In 1994 many of you heard me read the semi-plausible scenario which was written by John LeBaron as part of CTAC, our Citizens Technology Advisory Committee, the first one. I remember watching the body language in the auditorium...You really did not believe it. Let me read it again in the spring of 2000...think about what is happening now...

A Quasi-plausible Scenario: Colleen's Challenges, Circa 2001 "Eleventh grader Colleen Boxton winds up an exhausting two hours of research in biotechnology using her personal digital assistant (PDA) connected to her school's information network center. She has been jointly analyzing electronic microscopic images of damaged nerve cells with her mentor lab technologist at the nearby medical center, where she also worked during last summer's four-week break. Through this hand-held PDA, connected to any one of several school access nodes, she not only communicates with her mentor, she often meets face-to-face with her teachers, her peers, and other skilled resource people related to her research project on genetically-engineered treatments for Alzheimer's disease. Several years ago, Colleen and her 11th and 12th grade peers gave up driving to school every day. It wasn't necessary, except in those instances when she needed face-to-face interaction with her teachers and student colleagues. At other times, she went to the Town's public data center (formerly called "The Library"), the medical center, or some other school-negotiated work site. While at these locations, or when using her PDA from home, she logged in to the school's main computer which was capable of identifying the location of her PDA regardless of where it was connected. (Colleen's custodial parent has a job in another town, and the school has to know where Colleen is from 7:00 AM to 6:00 PM). Colleen's PDA is brand new. It has no keyboard (a good thing, too, because Colleen couldn't type her way out of the simplest virtual environment). It also features a flat, fold-out color screen that provides a full twelve inches of viewing space. Every PDA function is launched either by mouse, by voice, by electronic penpad, by image, or by video source. Earlier in the day, working in the video studio, Colleen conducted a live "video-huddle" with Toshiro, Olga, Jean-Claude and Hans, all members of an

international work cluster on comparative government approaches to civil rights. Language was no problem. The system-wide translation protocol provided clear, gender-specific voice and text in the language of each user. Trying to achieve intellectual consensus among these folks, however, was quite another challenge! As she folded up her PDA and placed it in her coat pocket to go home for the day, Colleen's thoughts turned to the evening's activity. Using her own home entertainment device (HED -- basically a consumer-equipped version of her PDA), Colleen decides to "go" to a virtual music-video event. Sure, she knows that virtuality is no substitute for the real thing, but through a virtual experience simulator, Colleen can sample a musical repertoire that she could not afford in live concert. (Moreover, she can artificially configure her evening's virtual date with the precise personal qualities she seeks -- mostly, an abiding intellectual interest in biotechnology and civil rights).

Just as Colleen is plugging in her HED (home entertainment device) to access a commercial "virtual entertainment experience base", an incoming message alert overrides her network start-up.

"Probably just another telemarketing video-blitz," she fumes. Actually, it turns out to be her Mom, telling her that she'll be home late from work, and wondering if Colleen would prepare the evening meal. Colleen's hopes for the evening fade. This is the real world.

Her HED may provide full immersion in musical virtuality, but it will not dice the carrots." Well, almost!

SLIDE 24 Today we have Smart Tools/Appliances/vehicles. If we do not already own them, we can see them nightly on television advertisements.

- coffee pot turned off through web
- watching your children in class from work through the web
- refrigerator calling repairman before it needs service
- cars which automatically call for help if you need it

We have all kinds of software:

- for hiring employees (Deploy Solutions)
- for legal counsel (see below)

• for medical consultation
• for buying houses (by the way, we are increasing getting requests for information about the schools from prospective residents through email!)
• golf competence assessment

Other movements we see now:

SLIDE 25. The .coms are now everyone's natural instinct. The predictions about desocialized cottage industries now are the desired solutions. A .com co in every home; a .com solution for every (common) problem.

On Feb 28, the Globe reported that Ric Fulop, president of Into Networks, said "the just add water and mix" is the nature of Internet startups right now." You do not have to finish college to become a billionaire. In fact Harvard University just announced that it is creating a new technology center whose "primary purpose is to provide undergraduates with both technological and practical knowledge about the ways businesses are created...This comes only a few weeks after the dean of Harvard College proposed revamping university policy to allow students to run businesses from their dorms. (Globe 3/1)

We immediately think about putting all our information on the web now.

2. There has been a class system throughout time. It has taken different forms, of course. Now we call it the digital divide and it is based on whether homes have computers or not, and schools have computers or not.

3. Everyone has high expectations around schooling. The irony is that when the polls are taken people report they are happy with their child's school but think all the other schools are failing. Yet when many parents speak with us about their children they want immediate satisfaction, their way!

4.Technology has made our kids more expert than we; recently day at a School Committee meeting, a parent advised us to seek the opinion of the fifth graders before making a technology purchase!

SLIDE 26
Jeff Danziger Cartoon from March 12 Globe-- OK...let's check my father's stocks...

5. We are close to the one person, one vote. In fact, the state of Arizona just did that for the first time ever anywhere. The ability of people to influence each other, legislation, policy is almost unbelievable with the Internet. We saw evidence of that when school people, using email, convinced the MA legislature to pass the Ed Tech Bond Bill four years ago.

6. Some states are taking charge. Maine's governor announced on March 2 that he planned to give a laptop to every 7th grader (16,000) with Internet service beginning in the fall of 2001. He also proposed providing teachers with new computers (half paid by the State and half by the school district). And he understands that he needs to provide training. (Ford Motor Company announced earlier that it would give its 350,000 employees desktop computers, printers and Internet access for $5 a month.)

7. The developments are coming fast and furious...or at least inevitable...In August of 1998 in my opening day speech I spent a little time describing e ink and e-books.

SLIDE 29 Jeff Danziger Cartoon from March 12 Globe-- OK, class, now I want you to turn to www.hucklebrryfinn.book

In the last week of February, the Globe ran a huge story on that same small Cambridge firm, eInk Corp. and on Xerox of Palo Alto, the giant, both of which are working on electronic paper "that looks and feels like its paper cousin but can morph from "War and Peace" to "Anna Karenina" at the click of a button. Theoretically, an e-paper book can store an entire library on a computer installed in its spine. The market potential is more than just books, however. It's electronic magazines and newspapers that can regularly be updated,

price tags that can be instantly changed by remote control to reflect a sale, and eventually, displays that will pop up on all sorts of electronic gadgets, even smart "wallpaper" that can change patterns to match a room's decor." They are talking about a five-year window before this is marketable. The idea has stayed its course.

• What hasn't changed? SLIDE 30 Jeff Danziger Cartoon from March 12 Globe-- I couldn't do my homework because...huh...the cat ate my mouse..?

1. We still need to teach handwriting, calculation. When I was in Easton we mounted a huge Tech Expo at Stonehill College for our staff, community and schools in the region. The day dawned stormy and wet. Luckily most people had set up their technology the day before. Just as the keynote speaker, using an incredible number of computer and screening devices started, there was a thunder clap and the electricity failed. There was shocked silence in the dark. From the back of the room came a theatrical whisper. The head of the Oliver Ames mathematics department could be heard saying "That's why I always keep a piece of chalk in my pocket."

2. We still need to know how to use the library. Two Globe articles (in January 2000) on the future of libraries or libraries of the future made the following points:

•there is a connection between the quality of school library-media programs and the MCAS scores

•can become center of school change: in-depth learning, research, curricular innovation

•information technology is a key to upgrading the library; librarians these days are technologically well-informed; they contribute to the training of teachers

2. We still need to be polite, civil, respectful, thoughtful, responsible and obey the law. Perhaps even more so today when it is so easy to be impolite, uncivil, etc.

3. •And what are the cautions along the way? But we need to remember that technology is no different from any other instrumentality man has created...it has the potential for good and evil and it depends on the human spirit for its ultimate achievement. It is no different than a car in every garage or an airplane one hops on to get somewhere or the television set which now resides in almost every room in a home. People are the key: their intelligence, their morality, their creativity, their responsibility. We are all wasting our breaths and time bemoaning how much more technology makes us do! Instead we should put that energy to use by finding and teaching people how to employ it to transform learning and expand capacity and opportunity.

4. Leon Botstein, president of Bard College, (NY) says: One danger of our euphoria out technology is that we are less inclined to remember anything as we can store it more easily. The Xerox machine and the Internet ought to not result in the weakening of our memories and capacity to retain, interpret and use information and ideas.

5. Don't use email to advance the cause of a political candidate (or in fact any other political purpose). The principal of the South Lawrence East School did for a then successful school committee candidate. She sent an email to her staff the day before the election. She was suspended for ten days and may be fined up to $500 if she is found to have violated state ethics law.

6. Figuring out what to believe. Even in reading books, you need to discern the bias a writer may have. With the web, it becomes even more important because there is so much information available all at once. Knowing how to evaluate a web site is one of the skills we must teach our students. Alan November warns us that students need to understand:
    - the web site's purpose
    - who the author is (what qualifies a person to be a speaker?)

• what he calls, the meta-web information--you can tell a lot from the URL...

and it is best to look beyond the web for validation. (Alan's example was of a dentist, calling himself doctor, who wrote to a user group about the "fantasy" known as the holocaust. The teacher invited in a survivor as a validator.)

4. Keeping what should be confidential private: statistics, records, histories.... Privacy is closely related to censorship... We made a decision early on to provide a level of safety to our students and community with the use of BESS. It was not a popular decision at the time.

5. What is a monopoly and what are the effects? The trial of Microsoft is reminiscent of the "muckraker" days...we seem to be back to the buy-ups and buy-outs...in the new economy, the consequences are still difficult to determine...

6. Security…the recent spate of hackings of eBay and others makes one wonder about the safety of the Internet.

7. Beyond our concerns as educators, but of concern as citizens is the question of taxation for the big business which is the Internet.
8. • Why aren't we further along?

SLIDE 31. There are people who do not agree with us: There is an alliance of educators, doctors and psychologists formed a year ago "to challenge the idea that kids benefit from early, intensive exposure to computers (we would agree intensive, we would not agree early!). From Education Week, Feb. 15 edition:

Unfortunately, according to eSchool News, Feb 2000, their strictures include elementary school. Not that we disagree with their call to "focus on developing the child's own inner powers, not exploiting machine power." We want to keep computers in

the elementary schools because the children have them at home, and it is an expected and additional tool for learning.

2. According to Larry Cuban, professor of education at Stanford University, and long an enemy of technology in schools, what employers ask of hires in entry-level positions is:
•employees who can be trusted •who care about the work they do •who finish tasks • are self-starters
•show initiative •can define problems •are able to write and think clearly •who work cooperatively in teams.

Who would argue with this list in his commentary in Education Week, February 23,00? But his conclusion that what high school seniors need is another degree at a community college or university, is self-serving! No one also argues that we should have small class sizes, well-trained teachers, preschool and adult literacy programs. Our argument is that the web is not going away and we need to help students learn to use the technology well.

3. The cost of technology is not trivial. There are several components:
•hardware, new and replacement
•network
•software
• a critical mass of technology, not just the token computer in a classroom
•support personnel
•professional development
•time to plan, to try out new approaches and ideas

But, whoever one listens to, there is a common agreement that the questions for the next decade are:

SLIDE 32
√ How to prepare students for the global economy--
√ How to prepare students for the technological economy-

√ How to prepare students for the increasing diversity

In addition, there are also issues in the next decade:

SLIDE 33 √ anytime, anywhere, anyhow learning

Anytime translates into 24 hour schools, twelve month schools, lifelong learning
Anywhere translates into learning using technology
Anyhow translates into choice:
•whether from private providers competing with public schools or,
• open enrollment, either in a district as we do, or among districts as in the State's choice option or in charter schools

According to the Department of Ed. Study of Charter Schools report recently stated:
Most (946 responded that out of an estimated 1700 charter schools in US now serving .25M students) charter school classrooms have computers for instruction, the student-to-computer ratios are low, and a majority of the computers can run advanced applications.

Michael Goldstein is opening one in Brighton for 160 minority HS students
or • vouchers or • home schooling

SLIDE 34 √ Children who have grown up with the technology. On February 19, the morning television show reported on the Toy Trade convention in NY. Most of the new toys are based on the technology: they either have verisimilitude or they are fantastic in the literal sense-
• Barbie has digital make over on CDRom (2/12/00 tv)
• For about $100, you can buy a real robot for a child
• There are drawing pads which make sounds--as the child draws, the pencil hits a note and a tune emerges
•There are dolls which dance in a human manner; dolls which you could mistake for a baby they are so realistic

• Animatronic toys like furbees and other animals which speak and move
•There is even an electronic fortune cookie! Just visit FAO Schwartz.
√ Since it is a new world, all of us need to learn a new language:

SLIDE 35 broadband ISDN T1
dotcom cyberscoop technofile
morphing streaming video web radio

The Kenneth Cole catalog recently graced my dining room table, although I have never bought anything from the company. There was an expensive opaque plastic insert with the following message on it:

SLIDE 36
Dear Liberated Customer, What is this world .com-ing to? The matching insert at the end said: E-nough is e-nough.
√ The commercialization of education

SLIDE 37 I was in conversation with Neil Rudenstein about how strongly he feels that Harvard professors cannot be hired by companies to teach as long as they are on the faculty. He was actually referring to a web site on which Professor Arthur Miller is giving advice and getting paid.

That web site-AmeriCounsel.com-was written up in the February 25th Globe as an example of "legal counsel just a click away...famous professionals' online ventures raise a host of ethical questions."

Peter Bull, Harvard professor of Asian Studies, when asked if he would like some support from a company to get a powerful new server, said he wasn't comfortable accepting such a gift. Yet, public schools every day accept gifts, grants, in kind contributions from businesses, otherwise we would not be able to offer some of our most modern services to students. In fact,

schoolpop.com raises money for schools from online purchases--an old idea rewritten for the Internet economy.

√ The home schoolers The internet has made their jobs infinitely easier. An example is Homeschoolers, Inc., PA which offers 12 AP courses for homeschoolers.

•Where will we go?

SLIDE 38 We have all heard many people talk about schooling in the future. You were here when Alan November spoke of the shopping mall learning center. Many of you heard Chris Dede as well. Chris' message has always been that technology is only a tool to "master sophisticated knowledge," an instrument, a part of the building architecture. He is the one who told us more than a decade ago that we would be able to carry the Library of Congress in a shoe box.

√ The vision of The School Administrator, December 1999 issue. In December of 1999, The School Administrator published by the American Association of School Administrators ran an issue called "Forecasting the Future", what's ahead for public schools, 16 experts from a variety of fields weigh in. These are people whose names I not only recognized, but now that I am older, I even knew, like Stephanie Pace Marshall, the president of the Illinois Mathematics and Science Institute, whom some of you at the High School also heard several years ago. Because I suspect no one in this room will have the chance to read this seminal periodical, let me take you on a quick tour of its messages. Let me also say that from where I have been sitting in my office in Acton, I was able to list myself most of these themes.

SLIDE 39 Of the 16, 9 commented directly on technology as part of their future vision (italics below are mine either as emphasis or commentary).

SLIDE 40 The Cetrons of Forecasting International (VA), in talking about an "educational renaissance" listed the following, among the six phenomena of the future:

•The End of the Edifice Complex...not schools as we know them but wired centers of learning with computers, closed circuit tv, the Internet that link students with information--tool they will be expected to know when they reach the workplace.

• High-Tech Voc-Ed: providing training in computer programming and repair for a host of technologically sophisticated specialties

SLIDE 41 David Pearce Snyder of the Snyder Family Enterprise (MD) talked about
•An "Info-Mated" Society That is because we at a watershed in our history, we need to reinvent the educational institution for the information age.

SLIDE 42 John M. McLaughlin, president of The Education Industry Group, (S.D.) talks about "Choice Reigns Outside the Public Sphere" and claims that "A combination of consumer needs and technological capabilities will move schools away from a mass production model toward a model of mass customization....Educating the public will no longer be synonymous with public education."

SLIDE 43 Chris Whittle, founder of the Edison Schools (NY), has a piece entitled Divorce or "Remarriage of K-12 and Silicon Valley." He talks about how "...a server stores and interprets each student's work in an individual electronic portfolio..." His aim, he says, "is not to bring more technology into schools...but rather...to make each class, every day, more effective for children and more satisfying for teachers." "National schooling companies...using their scale, capital and expertise in digital and video production, will bring together all the specialities and disciplines required." (Chris Whittle is an interesting case study. While his vision of the relationship between private enterprise and schooling has remained the same, his implementation has changed. Remember Channel One? Many of us resisted creating a captive audience for the advertisements, even though it meant we did not get free television sets for our classrooms.)

SLIDE 44 Herbert I. London, president of the Hudson Institute (IN) laments the "Incapacity of Our Talent Pool." Between 1995 and 2020, the over 65 population will increase in the US by 60%, the 45 to 64 by 34% and the 18 to 44 by 4%. If the US loses its technological edge, it will be the fault of the educational system which has been unwilling or unable to transmit the requisite skills to prospective employees in the advanced technological age we are entering.

SLIDE 45 Dale Mann, professor of Education, Teachers' College, Columbia, (NY) in "The Future of Schooling: More of the Same?" asks "If email can bring commerce to customers, why can't learning bring teachers to parents"?...Whether schools help or not, telecommunications has and will move learning to the learner."

SLIDE 46 Sally Goerner, director of Triangle Center for the Study of Complex Systems, (NC), in "A Web View: Education fro an Integral Society" The changing nature of science--more interconnections--" has profound implications for pedagogy--since we now know that there are no final truths, only the pursuit of better ones, pursuit of better ones requires that we cherish differences, collaborative synthesis and critical thinking and questioning."

SLIDE 47 Freeman A. Hrabowski III, president of U of MD, in "Embracing Excellence and Diversity" The success of public education hinges largely on how we address two critical challenges: our society is becoming steadily more dependent on technology and it is becoming more diverse.

SLIDE 48 Finally, Leon Botstein, synthesizes in "What Will We Recall in Our Euphoria?" First of all, technology will permit education to take place 24 hours a day, 365 days a year…genuine individualization of learning, create a balance between individual teaching and group classroom experience. Tests will enable learner to determine immediately what and why they got something wrong…we have only just begun to see the extent of the potential that technology holds for learning .... Second, people will live longer and in a life of 100 years, people may

return to formal schooling twice or three times in their lives...actually I believe more, since that number is already characteristic of people now in their 60s. Lastly, the substance and standards of schooling will begin to transcend nations. International expectations will govern, particularly in science and mathematics. The importance of reading and writing will not diminish, but only increase. In the next century, the arts--the training of the eye, the ear and the hand--will be accepted as central components of the education of citizens. We may not need as many state and local authorities; but we must recruit our best people to the teaching profession.

SLIDE 49 There were two other prognoses which we should pay attention to, even if they are not connected with technology. Harold L. Hodgkinson, Director of the Center for Demographic Policy (DC) wrote about "The Uneven Spread and Blurring of Student Diversity" He talks about how "race is as visible as ever in our politics and economics, yet the physical traits that represent race are blurring at great speed...In hundreds of places, people of many races now live together in a community that respects them all. But I know of no place in which rich and poor live together as neighbors...American schools are the key vehicle for restoring equity (now redefined), and economic equity will become the only major target around."
My husband who teaches physics at Boston University, commented as we walked to the Boston Symphony on a recent Saturday night, that he was returning papers to his class of 90 students, and that the names he read had no relationship to the faces of the hands which came forward to collect the exams. The future is now...

Tony Wagner, consultant and teacher at HGSE, (MA) "Reasons to Learn in the New Village Schoolhouse" Smaller schools, more like the schools of the 19th century are needed...best practice schools do not try to be comprehensive. Students need to be part of a voluntary but intentional learning community." (Comment about MVPCS).

By the way, two other factors which have NOT changed: of the 16, only three were women, and only one is a practicing K-12 educator and she has just announced that she is leaving to enter the private education business. While I give much credit to these soothsayers and do believe they are on the right track, it is always important to remember that we cannot predict the future, viz.

SLIDE 50 A report from Educational Testing Service released last year quotes Thomas Edison in 1922 saying that the motion picture will revolutionize the educational system, in fact, replace textbooks;

SLIDE 51 Seymour Papert in 1984 saying that computers will "blow up" schools as we know them.

SLIDE 52 And B. F. Skinner in 1986 saying that technology will make education more efficient and therefore less expensive. So much for predicting the impact of technology!!! In fact, it behooves us to remember that what kids will be using in 5 years has not yet been invented. Now we "plug in." Later we will "walk by." •What will we need to get there? There are lots of ideas to consider. First the role of the Department of Education

SLIDE 53 The MA DoE's technology goal last year was to

- engage 25% of teachers in on-line content
- engage 85% of teachers in Professional Development
- develop guidelines for integrating technology skills into the curriculum

SLIDE 54 The Common Core of Learning includes the statement that: All students should use computers and appropriate technological methods to acquire, organize and communicate information and to solve problems. SLIDE Until just a few months ago, all the frameworks included the ISTE (International Society for Technology in Education) standards; just recently, we heard that those have been dropped, and instead a technology

frameworks is being proposed, again using the ISTE standards.

SLIDE 55 One of those problem solving skills is knowing how to find information. We are teaching that

SLIDE 56 And the 1995 Common Chapters document (in my opinion a blueprint for true learning) includes the statement "Technology Provides Important Tools For Enriching The Learning Process." This technology is characterized by:

SLIDE 57 •Providing students with opportunities to access an expanded wealth of resources and sources of information to use in inquiry-driven projects and explorations
•Offering tools for students to enhance their critical thinking skills through exploring hypotheses, solving problems and forming new ideas
• Allowing students to interact with other students, teachers, researchers, professionals through interactive video and computer networks
•Providing multiple entry points to interact with challenging subject matter

The Commissioner told me recently that the Common Chapter, called by a different name and updated, will be reissued.

SLIDE 58 Finally, Education Reform includes the use of technology in the Teacher Performance Standards. There is a commonly held belief that if you do not evaluate it, it is not important in practice. Whether you agree with this or not, there is no question that for those who were in the more reluctant wave of technology adoption, the extra impetus of the performance standard is encouragement. We are excited about all of this because: We have always believed one of the most important aspects of technology use is to look for entry points or targets of opportunity...that is areas in the curriculum where technology can have maximum impact:

SLIDE 59 • topics which are difficult to teach and/or learn in the conventional way (there are many examples from science and mathematics)

SLIDE 60 • experiences which are unavailable in the current school setting

SLIDE 61 • lessons which are transformed with the use of technology Other initiatives from the DoE are: There are sessions later you can attend on the projects I am about to mention:

SLIDE 62 VES: Virtual Educational Space is a set of on line tools which will be available directly to and customized for each teacher and student in the Commonwealth. It will include

•curriculum management and instructional tools to implement a standards based program...a Workspace for every teacher

•set of resources, support , communications and collaboration tools

•a way for students and teachers to interact on line.. a Student Workspace
•a way for students and teachers extend the learning day, year and to open the walls of the schoolhouse to the world.
The Board of Education voted $4M to develop this vehicle, $3M to be approved by the Legislature in this budget cycle. The money is needed to custom build some of this infrastructure. MA is about a step ahead of 19 other states interested in this kind of access. VES will include another important venture:

SLIDE 63 CLASP...the Curriculum Library Alignment of Standards Project. A teacher from North Andover figured out how to align the state frameworks with local frameworks.

SLIDE 64 The IMS is the DoE's first ever technological data warehouse of all the answers to any question you might have

about the public schools of MA. We have been submitting the information requested on the web for two years now.

SLIDE 65 VHS: The Virtual High School. Started through a huge Federal grant in the Hudson Public Schools, VHS now provides an enormous number of courses on line for students. Not a new idea, but one developed to an art form by VHS. By the way, Claudia Abramson has developed a number of VHS like courses to teach art, to our students. In fact, others have a similar idea, whose time, obviously has come to the business world. One example is Apex (formed in partnership with Edison) which is delivering AP courses online in calculus, statistics, government and micro economics. Kaplan Educational Centers will market the courses! Lessons draw on sophisticated tutoring software, student research on the Internet, online discussions as well as conventional textbooks. An Apex teacher emails students daily assignments and weekly progress reports, also sent to school and students' parents. Another example is Class.com, University of Nebraska teacher offers advanced level courses. Many students lack access to such course work in their schools. (Over 40% of the nation's high schools offer NO AP courses.)

SLIDE 66 With technology, more than any other issue we currently deal with in schools today, we need community support, community defined as: families, cultural institutions, community agencies, higher education and business and industry. And we need to be able to measure the effects of the use of technology. Right now we are involved in two studies...But you can look at any number and find some results...

SLIDE 67 CEO Forum, Education Week's Technology Counts 1997,98 and 1999. EDCO/BC/FreshPond are helping us all to figure out what kind of support structures in schools lead to what kind of performance by students. CTAC2, the second such committee of our own parents and community members, we have formed, is studying us. The Vision subcommittee has already determined that while the vision we had five years ago was good for its time, we need a revised one for the next five

year plan. They also feel we do not know enough about how the technology is being used across the board and that is one aspect of data they will be collecting. There will be a survey and visits to schools to collect data. As part of the planning a few of us devised a scenario to describe what we want students to be able to do at the end of their high school careers:

SLIDE 68. The teacher offers a choice of compelling questions to answer, or problems to solve.
SLIDE 69. The student does research (including communicating with experts and others) by using the library and other sources such as the web/Internet.

SLIDE 70. The student prepares a report, including narratives, statistical analyses, links to web site and downloads from the web.

SLIDE 71. The student makes a presentation to the class or other group (using Powerpoint).

SLIDE 72. The student leads a discussion about the project.

SLIDE 73 As a result of the discussion, the student reviews and revises the report.

SLIDE 74. The student posts the final project on his/her own web page. Secondly, what is really possible? It is impossible to answer that question since every six months the technology changes. However, the fact that Harvard University is thinking about and planning for distance learning, electronic or digital learning (the vocabulary isn't settled yet) indicates that this world is very much with us. Professor Peter Bull, whom I referred to earlier, described a course he is teaching and

SLIDE 75 how he considers the web site a dynamic, layered curriculum, with an electronic reserve list...He talked about speeding up the learning curve but enabling the capacity for a student to return to any section of the course for some in depth

review and reflection. The Past is Prelude to the Future Ecclesiastes says there is nothing new under the sun. My mother said that science fiction is based on what we know, not what we don't know!

SLIDE 76 In the 1950's a little girl I knew and her friends played a game of travel: If you were going somewhere, what would you take with you? They cut pictures from magazines, used origamy to produce little packages with strings which they hung on their fingers.. That same person as a grown up now carries her work back and forth on a zip drive! As HS principal, my staff and I dreamed that each student would have a microfiche with examples of all the skills and products he or she developed during high school to show a prospective college or employer. Today we have electronic portfolios. The pendulum always swings. In the early 70's we were teaching BASIC and FORTRAN in schools; then we focused on using technology only as a tool. We are back in the middle position: we use it as tool, and we understand that we can teach it--for example when we teach robotics.

SLIDE 77 Dick Dow teaching robotics

SLIDE 78 What are the resources? In 1986, when I participated in writing one of the first books about technology in school administration, one was hard pressed to find resources. You simply cannot turn on the television or pick up a newspaper or magazine without seeing an article on technology. I remember going to a MassCUE meeting with my brand new Mac 126 and having people gather around me in amazement. I hardly knew what I was doing but there I was a principal with a computer. Now you cannot escape magazines, books, newspapers and web sites: Curriculum Administrator, School Planning and Management (architectural stories and pictures) all about how to use technology and about changing technology. What does this all mean to us? I always ask that question at some point in my speeches to you.

SLIDE 79 • We are not spending enough, despite the Technology plan, and we will be mandated to produce a new five year plan for the DoE shortly (future funding will depend on it), to provide the technology support needed for our students and teachers. For a while our TRC was a much admired model. Now many school districts are placing a curriculum integration specialist in each school. And what we have is getting old. The current technology turnaround production time is 18 months! The industry says the lifetime of a computer is three years.

• In both instruction and administration, we are using technology in appropriate, illuminating and capacity enhancing ways. We are in the forefront of technology intellectually in the Commonwealth; many school districts and other people ask our opinions. We are not in the forefront in our possessions and our practices because we are under endowed as I have already said.

SLIDE 80 And we are not using technology systematically across the system. We have pockets of great adventures and we have deserts of non-use. Occasionally community members complain that too many computers sit idle, and that their children are not getting enough exposure to the technology. Some of that is due to our lack of critical mass; some of it is due to lack of time for training, professional development and curriculum development and some of it is due to lack of interest. We have to deal with all three reasons! Many of you are personal users of technology but have not made the transition to using technology in the classroom for teaching and learning. We no longer hire anyone who is not interested in learning a and using the technology or isn't already doing so as part of the instruction they provide.

• Even though we do not have specific measures about APS and AB students' progress as a result of using the technology (the one exception is SuccessMaker), there are more and more findings in the research which indicate that the use of technology has a positive influence on student academic achievement. And if the EDCO study is funded, we will get measured data about us.

•Our dependence, as I said before, on technology is now the way that "educational business" is done. We cannot succeed without it any longer.

SLIDE 81 • Your job today is to observe, listen, ask, assess, adopt and develop your ideas for using technology--in ways appropriate and enhancing to your practice. Either expanding what you already do, or venturing into this new world which is very much with us, and will continue to be...

SLIDES 82 •Your job in the future is to advocate... √
in our systems your voice sometimes speaks more loudly and authentically with the decision-makers and the community.
√ in the state there is consideration now about a possible line item in the Governor's budget for technology;

SLIDE 83 There is the issue of technology as part of the new foundation formula; and there is a need to maintain technology in SBAB (that's the agency which reimburses us for building schools). The first campaign ever launched to convince the legislature using email in MA was a grassroots effort by educators and business friends and partners to get the legislature to pass the School and Technology bill four years ago, which I referred to earlier. Many of the computers and other infra-structure we have came from grants like the Ed Tech Bond Bill I just mentioned, gifts, and partnerships. We have been very entrepreneurial in our acquisition of technology. But for sustained success we need ongoing and dependable support.

When Odysseus returned to Ithaca, he found his wife and son, fending off and having fended off, unwelcome suitors. There will be people who tell us not to do what we think is right. But like Penelope and Telemachus will remain true to our mission and vision.

SLIDE 84 My final words are thanks. Thanks to the people on the slide without whom your experiences today would not have occurred. In fact this day's program is an excellent example of

what we can do because of technology. This is both a blessing and a curse: we are far more productive because everything can be speeded up, but we now expect everyone to do more than is perhaps reasonable. We are all pushing ourselves beyond anything that was ever possible before! We started planning this program late because we have had so many tasks to accomplish this year, but we managed to collapse almost a year's worth of work into about two months--because of email, fax, telephone and the web. This is the first time we have used the web for registration: the presenters sent us the information we needed to publish the brochure the booklet on the web, and you registered your choices through the web. Thanks also to the many friends of technology from outside our school districts who are sharing with us their expertise and experiences, and to our staff who are great models of how to do things right! We began with Dewey White's picture of the past and the present. Now we end with two pictures of the future from the Office of Michael Rosenfeld of our three new schools!

Isa Kaftal Zimmerman, Ed. D. PLEASE NOTE: New email address: ikz1@verizon.net Cell 617-642-4733