THE WHITE HOUSE

WASHINGTON

September 20, 1995

MEMORANDUM FOR THE PRESIDENT
THE VICE PRESIDENT

FROM GENE SPERLING
BILL CURRY
GREG SIMON
JONATHON SALLET
PAUL DIMOND
TOM KALIL
MICHAEL SCHMIDT
JIM KOHLENBERGER

SUBJECT A National Vision for Educational Technology

I. A National Vision

This memo proposes and describes a plan to establish a national vision on Education Technology that would be unveiled in October and that would be achieved through a concerted effort led by the President and Vice President and joined by parents, teachers, other educators and business leaders.

Your event in San Francisco on September 21 is a critical prelude to announcing your national vision and effort.

Such a national vision must provide our children with world-class skills through the use of educational technology. Our historic goal of universal education must meet 21st Century standards of literacy. That means we must ensure that:

1. Modern computers are part of every classroom and accessible to every K-12 student,

2. Those computers connect students to other students and to the National Information Infrastructure,

3. Educational software is as engaging as the best video game and as meaningful as an expert tutor, and

4. Teachers have the training and assistance they need to employ the new education technologies effectively.

We lead the world in designing and producing the technologies of tomorrow, yet our schools are mired in the technologies of yesterday.

Our education technology initiative depends on local action to achieve a national vision. The President and Vice President working with state/local governments, businesses, academic and non-profit institutions and, of course, with parents and teachers must provide the inspiration and leadership.

II. The San Francisco Exploratorium events of September 21st

On September 21st you will set the stage for the rollout of the national vision -- demonstrating your commitment to using education technology to enrich the education of all K-12 students by:

> (i) announcing -- and applauding -- a combination of private-sector efforts that will make Internet access available to every California K-12 school, and will extend connections to 20 percent of California classrooms by the end of this school year. This responds to your challenge in the 1994 State of the Union to connect every classroom in the country by the year 2000.
>
> (ii) set out the four goals of our national vision for enriching the education of all K-12 students through the use of educational technology, and
>
> (iii) announcing that, after consultation with business, state/local governments, parents and teachers, you will unveil a national vision whose implementation can be led by every community in America.

The private-sector commitments are the key to the events of the 21st. They demonstrate the critical role that you play in providing national leadership. By their actions, these private sector leaders will show (i) that they recognize the importance of bringing technology to K-12 students, (ii) that they will rise to the challenge laid out in your State of the Union address, (iii) that a partnership is necessary to meet that challenge, and that (iv) achieving our national goals requires your leadership and commitment.

They will also demonstrate our understanding that everyone must be involved and that government cannot provide all of the answers or all of the resources. That's why this effort must reach broadly to support local efforts.

III. Subsequent Actions

Corporate Outreach: This week we are beginning a major consultation process with 15-20 major CEOs and other leaders to obtain their input, involvement and, most of all, commitment to the national effort led by the President and Vice President. The purpose of this consultation is to secure public endorsement of your leadership of the national vision and concrete pledges by business that will make real attainment of your vision. We will also be working with your National Information Infrastructure Advisory Committee, co-chaired by Ed McCracken (Silicon Graphics) and Delano Lewis (National Public Radio), which has undertaken a comprehensive review of this issue.

Week of September 25th -- The Critical, and Threatened, Federal Role: The President and Vice President announce the Technology Learning Challenge awards and, possibly, NII grants. This event will emphasize the important role that the federal government is playing, and will continue to play under the President's balanced-budget plan, in providing local communities with resources to deploy educational technology.

October -- Launching a National Effort: At this major event, the President and Vice President unveil a national vision that sets forth:

-- a simple articulation of the goals to be achieved,

-- a time by when each step toward those goals must be accomplished,

-- a commitment of resources and assistance from the federal government, and

-- a commitment of resources and assistance from the private sector.

At this event, you would be joined by business and academic leaders, teachers (and their unions), parents and, of course, students themselves. Scheduling of this event is aimed at early October.

Follow-Up and Follow-Through: The major event would begin a process that would be re-emphasized, broadened, deepened and validated. The national vision could be re-emphasized in the State of the Union, throughout 1996, and in the second Clinton-Gore term. It could be broadened to include libraries, health-care facilities, job training efforts and governmental services. It could be deepened by the consistent accumulation of additional private-sector pledges. And, of course, it will be validated when the goals are accomplished on time -- including the goal of connecting a fifth of California classrooms by the end of this school year.

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET

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Date: 11/20/95

To: Gene Sperling

Fax Number: 62878

Number of pages (including cover sheet): 9

From: Robert E. Litan
Associate Director for General Government and Finance

Comments: Cost Comparison of Education Technology Initiative attached.

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET

Route Slip

TO: The Educational Technology Group:

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___ Take Necessary Action
___ Approval or Signature
___ Comment
___ Prepare Reply
___ Discuss with me
___ For Your Information
___ See Remarks Below

FROM: Ken Apfel and Bob Litan DATE: November 14, 1995

REMARKS:

Attached for your review is a comparison of the Department of Education's (ED) proposal for carrying out the President's Educational Technology Initiative and the McKinsey, Milken, and RAND studies of the cost of integrating technology into the schools nationwide. The analysis reveals that each of their cost estimates vary greatly because each incorporates different target dates, unit costs and assumptions regarding how the schools and the private sector will respond to various incentives. The differences between these studies make a comparison difficult, if not impossible.

Given that the ED and McKinsey estimates of the cost of achieving a similar goal are so varied, OMB recommends that each meet prior to the Commerce Department's release of the KickStart report, which includes McKinsey's estimates of the costs and benefits of connecting public K-12 schools to the NII.

We hope that these materials will help the group in defining the appropriate scope for the President's Educational Technology Initiative.

Comparison of the Educational Technology Cost Estimates

In September 1995 President Clinton announced a new initiative to integrate technology and education by the year 2000. The plan consists of four components: (1) computers in every classroom; (2) connecting these computers to the National Information Infrastructure (NII); (3) technology centered teacher training; and (4) educational software development. In developing its vision for integrating technology and education, the White House staff have examined several studies of the cost of integrating technology into the schools and the extent to which technology has already been integrated into the schools. The Education Department (ED) has also examined the cost issue. This paper compares the major cost studies and ED's proposal in an effort to identify why they differ so greatly. The answer lies in different target dates, non-comparable unit costs and different assumptions about the behavior of the schools and the private sector.

Summary

- McKinsey and Company, Inc. This report estimates that the total cost of integrating technology into the schools is $47 billion to achieve a student-to-computer ratio of 5:1 by the year 2005. This estimate is based on: (1) an estimate of the cost of integrating technology into an average school; (2) adjustments for major variations in cost around this average; (3) the existing infrastructure; and (4) multiplying the incremental costs per school by the total number of schools, accounting for population growth. McKinsey also estimates a less ambitious proposal (providing a computer lab in each school), but because this proposal is not comparable to the President's Initiative it is not included in this comparison.

- Milken Institute for Job and Capital Formation. This report estimates that the total cost of integrating technology into the schools is $31.5 billion. The report does not include information on either the student-to-computer ratio once the technology is integrated into the schools or the length of time it would take to fully integrate technology into the schools. This estimate is based on responses to a survey of the 50 State Chief School Officers who were asked how much their State has already spent on educational technology and how much more would be needed to achieve their current goals. Since the report does not include a description of what this educational technology money would buy, there is no basis for comparing the resulting technology configuration across the States to the other studies.

- RAND. This report estimates that the total cost of integrating technology into the schools "might" be $103.5 billion to achieve a student-to-computer ratio of 2:1 over three years. However, when the authors were questioned about this figure they stated that they would rather not defend this "rough" estimate of the total cost. They insisted that the primary purpose of the report is to provide an estimate of the magnitude of the cost of operating/maintaining technology in the schools by highlighting how much 8 schools that have already integrated technology into their curriculums are spending on

educational technology annually on a per student basis. The five schools with an average student-to-computer ratio of 2:1 have spent about $450 annually per student, whereas the three schools with an average student-to-computer ratio of 9:1 have recently spent about $180 on educational technology annually per student. The report estimates that within a given year, if $450 were spent on every K-12 student the total cost of operating/maintaining the technology in schools nationwide would be $20 billion, whereas if $180 were spent on every student it would cost $7.5 billion.

- Department of Education (ED). ED estimates that it will cost $10 billion to achieve a student-to-computer ratio of 4:1 by the year 2000. This estimate is based on ED's estimate of the cost of the hardware and teacher training components of the President's Eductional Technology Initiative. Since ED believes that the private sector will pick up the cost of the other two components of the President's Initiative, including connectivity and software costs, the agency does not include these costs in its estimate of the total cost of integrating technology into the schools.

MILKEN

The Milken report estimates that the total cost of integrating technology into the schools is $31.5 billion. This estimate is based on a survey of 50 State Chief School Officers who were asked how much their State has already spent on educational technology and how much more would be needed to achieve their current goals. Since only 29 States responded to the survey regarding spending to date and only 35 States responded to the survey regarding future needs, Milken estimates that the States have spent $5.4 billion to date and that $31.5 billion more is required for all the States to meet their technology goals.

Although the report provides an estimate of the total cost of integrating technology into the schools, it does not provide a break down of costs in terms of how much the States have allocated to each component (connectivity, software, hardware, and teacher training) to date or would allocate to each component if they were provided with the additional funds needed to achieve their current goals. In addition, the report does not include a description of what the outcome would be once the technology were incorporated into the schools. Also, the report does not include information on the length of time it would take to fully integrate technology into the schools.

Since the report does not include either a breakdown of the total cost or a description of what the educational technology would buy, it is impossible to compare this study's estimate of the total cost of integrating technology into the schools with the other study's estimates.

RAND

The RAND report states that the total cost of integrating technology into the schools "might" be $103.5 billion over three years based on spending about $2.3 million on every 1,000 students (there were 45 million enrolled K-12 students during the 1994-95 school year). However, when the authors were questioned about this figure they stated that they would

rather not defend this rough estimate. The primary purpose of the report, according to the authors, is to provide an estimate of the magnitude of the cost of operating/maintaining technology in the schools based on how much 8 schools that have already integrated technology into their curriculums are spending on educational technology annually on a per student basis. Notably, each of the eight schools have either a part- or full-time technology coordinator that helps with the design, layout and maintenance of the computers.

Since the primary purpose of this report is to provide an estimate of the total cost of operating/maintaining technology in the schools, rather than to provide a estimate of the total cost of integrating technology into the schools, this study's cost estimates are not comparable to the other study's cost estimates.

ED AND MCKINSEY Estimates

Since the ED proposal and McKinsey report are the only two which provide a breakdown of the total cost of achieving a student-to-computer ratio of between 4-5:1 by integrating technology into the schools within the next 4-10 years (See attached Table), their estimates are the only two that can be compared closely.

The total cost of integrating technology into the schools is $10 billion according to ED and $47 billion according to McKinsey, a $37 billion difference.

Connectivity and Software

Nearly half of the $37 billion difference between these two total cost estimates is explained by the fact that ED does not incorporate into its estimate the cost of two of the four components of the President's Initiative, connectivity and software. McKinsey, on the other hand, incorporates into its estimate $10 billion for connectivity and $6.6 billion for software.

ED assumes that the private sector will pick up these connectivity and software costs. The assumption is that if the computers are in every classroom and teachers are trained, there will be an enormous increase in the demand for connectivity and educational software. ED assumes, therefore, that it will be in the private sectors best interest to pick up the initial connectivity and educational software development costs. ED may not disagree with the costs per se, but questions whether the Federal government needs to worry about incorporating these costs into an estimate of the total cost.

Local school district and telecommunication carriers investments in connectivity will total billions of dollars over the next four years. Both the House and Senate telecommunication bills expand the Universal Service Fund, which currently assists certain residential users in obtaining telephone service, and would use these funds to reduce the monthly service rates (as well as installation rates) linked to supporting computer use within the schools. These funds (a total of $2-3 billion) would flow directly to the states and would not require a match. In addition, AT&T recently made a commitment to donate $150 million over the next five years in discounted line charges and other assistance to help schools set up and utilize various forms

of information technology. What is not clear is whether all rural and low-income school districts will be able to make or attract these connectivity investments.

Hardware and Teacher Training

The rest of the difference between these two total cost estimates is explained by a $15.5 billion difference in the amount each devotes to hardware and a $5.1 billion difference in the amount each devotes to teacher training. In each instance, the difference is largely due to (1) differences in the quality and quantity of goods and services provided and (2) other expenses that are not accounted for in the ED estimate, but that are accounted for in the McKinsey estimate.

The ED and McKinsey cost estimates are discussed more fully below.

Hardware

The total cost of the hardware is $8.5 billion according to ED and $24 billion according to McKinsey, a $15.5 billion difference. The ED and McKinsey estimates incorporate the cost of multimedia-capable computers (equipped with Internet/World Wide Web access and video-on-demand for distance learning) and printers. The McKinsey estimate also incorporates the cost of other computer peripherals (e.g., furniture, scanners and security devices) and retrofitting (expenses related to the construction and wiring that needs to be undertaken to integrate the computers/printers into the classrooms, such as, electrical, heating, ventilation, air conditioning and asbestos removal expenses), which ED's estimate does not.

- The cost of the computers is $7.5 billion according to ED and $13.6 billion according to McKinsey. The $6.1 billion difference between these two cost estimates is largely due to differences in the quality and quantity of goods provided. ED assumes a lower average cost per computer: $1,250 versus $1,700 because the agency incorporates less sophisticated multimedia-capable computers into its estimate. ED does not include any information on the differences in the quality of the multimedia-capable computers incorporated into its estimate. In addition, ED excludes purchasing new computers for students in grades K-3 because the agency assumes that less sophisticated computers already available in schools will be redirected to use in K-3 classrooms. ED believes that these less sophisticated computers will meet the needs of students in grades K-3, since it is unlikely that they will be able to take advantage of multimedia-capable computers that are connected to the NII.

- The cost of the printers and other computer peripherals (e.g., furniture, scanners and security devices) is $1 billion according to ED and $6 billion according to McKinsey. The $5 billion difference between these two cost estimates is largely due to differences in the quality and quantity of goods provided and other expenses incorporated into one estimate and not the other. ED only incorporates the cost of printers into its estimate. ED believes that furniture costs are not allowable under Title III, the provisions that support integrating technology into the schools, of the Elementary and Secondary

Education Act. McKinsey incorporates into its estimate the cost of printers that are more expensive, as well as the cost of furniture, scanners and security devices. There is not sufficient detail in either report to judge which printer and peripheral configuration may be more appropriate to incorporate into an estimate of the total cost of hardware.

- The cost of the retrofitting (expenses related to the construction and wiring that needs to be undertaken to integrate the computers/printers into the classrooms, such as, electrical, heating, ventilation, air conditioning and asbestos removal expenses) is not incorporated into the ED estimate, whereas $4.4 billion in retrofitting costs are incorporated into the McKinsey estimate. ED believes that retrofitting costs are not allowable under Title III. McKinsey estimates the average cost of retrofitting old and new schools and scales the cost up to a national level by multiplying the incremental costs per school by the total number of schools. Given that McKinsey estimates the retrofitting costs on a per school basis, these are the best estimates available but they are based on the technology that McKinsey envisions integrating into the schools which differs somewhat from the technology ED envisions integrating into the schools.

Teacher Training

The total cost of teacher training is $1.5 billion according to ED and $6.6 billion according to McKinsey, a $5.1 billion difference.

- The cost of teacher training is $1.5 billion according to ED and $3.1 billion according to McKinsey. The $1.6 billion difference between these two estimates is largely due to the number of hours of teacher training that each incorporates into its estimate. ED estimates that it will cost $1,000 to train each teacher, but assumes that as a result of the new computer and software purchases, the private sector will kick-in about $400 of the cost of training each teacher. McKinsey estimates that it will cost $1,255 to train each teacher and does not assume that the private sector will kick-in any of the cost. ED does not indicate how many hours of training each teacher would need, but McKinsey assumes that 80% of the teachers would need at least 45 hours of training and that 20% would need at least 80 hours of training. Therefore, it appears that the difference between these two estimates of the total cost of training each teacher are due to differences in the number of hours of training each incorporates into its estimate. There is not enough detail in either report to judge how many hours of training each teacher would need, though research shows that the amount that teachers learn during computer training sessions varies greatly depending on the number of hours of training.

  In addition, ED assumes that the percentage of teachers that would not need any training is 10%, whereas McKinsey assumes that it is 5%. The difference between each of these two estimates of the percentage of teachers that would not need training is because McKinsey assumes that teachers need to attain a higher level of proficiency.

- The cost of substitute teachers needed to cover during the times when teachers are out being trained is not incorporated into the ED estimate, whereas $2.5 billion for substitute teaching expenses is incorporated into the McKinsey estimate. ED does not include substitute teaching expenses in its estimate because the agency assumes that teachers could be trained on their own time, either in the summer or in the evenings. McKinsey incorporates $2.5 billion for substitute teaching expenses into its estimate because although some teachers may be enthusiastic about being trained on their own time, others may not be. Whether substitute teaching expenses need to be incorporated into the estimate is debatable given that some teachers are likely to willingly do this on their own time, whereas others may not be willing to do this.

- The cost of technology coordinators within each school district is not incorporated into the ED estimate, whereas $1 billion for 1.5 technology coordinators in each school district is incorporated into the McKinsey estimate. ED does not explain why the agency excludes technology coordinator expenses from its estimate. McKinsey incorporates $1 billion into its estimate because most schools that have integrated technology into their curriculum have either a part- or full-time technology coordinator. Given that most schools that have integrated technology into their curriculum have technology coordinators that help with the design, layout, and maintenance of the computers, it seems appropriate to incorporate the cost of technology coordinators into an estimate of the total cost of teacher training.

Comparison of Educational Technology Cost Estimates
(billions of dollars)

	Total Cost of Integrating Technology into the Schools				Annual Operation/Maintenance Costs of Technology in the Schools			
	Dept. of ED	McKinsey (High)	McKinsey (Low)	Milken	McKinsey (High)	McKinsey (Low)	RAND (High)	RAND (Low)
Proposal Highlights:								
student-to-computer ratio	4:1	4:1	lab in each school equipped with 25 computers (ratio 21:1)	–	4:1	lab in each school equipped with 25 computers (ratio 21:1)	4:1	10:1
other major proposal characteristic	–	technology coordinators per school district (1.5 FTEs)	(0.25 FTEs)	–	technology coordinators per school district (1.5 FTEs)	(0.25 FTEs)	each school equipped with technology coordinator	
Year initiated and completed:	1997-2000	1996-2005	1996-2000	–	2005	2000	1996	
Hardware	8.5	24.0	5.8	–	2.0	2.4	10.8	3.0
average cost per computer	$1,250	$1,700	$1,700		$1,700	$1,200	$1,500	$1,500
Connectivity								
connection to school	–	1.8	0.4	–	0.6	0.7	–	–
system design/layout	–	1.0	0.4	–	1.8	0.5	–	–
connection within school	–	6.1	1.4	–	1.0	2.1	1.0	0.4
subtotal	6.0	9.0	2.3	–	3.4	3.6	1.0	0.4
Teacher training	1.5	6.4	1.5	–	5.7	4.3	6.2	3.2
Software	0.0	6.0	1.5	–	2.5	3.6	2.2	0.9
Comparison of Total Cost Estimates, excluding Connectivity & Software	10.0	30.8	7.2		7.7	6.7	14.8	5.2
Total Cost:	10.0	47.0	11.0	31.5	14.0	14.0	20.0	7.5

Background Information for Cost Estimates

Dept of Education (ED):
Estimates: calculated based on the funding necessary to (1) support a student-to-computer ratio of 4:1 for grades 4-12 and (2) provide basic teacher training.

McKinsey & Company, Inc.:
(a consulting firm contracted by the KickStart Steering Committee of the presidentially-appointed National Information Infrastructure (NII) Advisory Council (Department of Commerce) to analyze the costs and benefits of connecting public K-12 schools to the NII). Authored "Connecting Schools to the NII," draft dated September 1995. Estimates: (1) calculated the cost of each of the six components (hardware, connections to schools, system design/layout, connections within schools, teacher training, and software) for an average school; (2) made adjustments for major variations in costs around the average (for example, the higher cost of installing computers and local area networks in older schools requiring retrofitting and asbestos removal); (3) mapped the existing infrastructure of each cost component for a high and low estimate; and (4) scaled the costs up to a national level by multiplying the incremental costs per school by the total number of schools, accounting for population growth.

Milken Institute for Job and Capital Formation:
(a component of the Milken Family Foundation). Authored "Expanding Classroom, Shrinking World," dated March 1995. Estimate: based on a survey of the 50 State Chief School Officers who were asked how much the States have already spent on educational technology and how much more would be needed to achieve their current goals. 29 States reported having spent $5.4 billion to date and 35 States reported that they would need $31.5 billion more to achieve their goals.

RAND:
(a nonprofit public policy and research institution). Authored "Toward a Federal Strategy to Foster the Use of Educational Technology," draft dated September 1995. Estimates: calculated based on the annual education technology expenditures of eight schools that have integrated technology into their curriculum and the percentage of their educational technology budgets spent on each component (hardware, connectivity, teacher training, and software) in recent years. The annual operation/maintenance estimates for the country were calculated by multiplying the 1994-95 Average Daily Attendance (ADA) estimate by the higher average cost per student ($450) and lower average cost per student ($180) for a high and low estimate.

DATE: November 21, 1995
TO: Gene Sperling
FROM: Paul Dimond, Mike Schmidt
RE: Educational Technology: the TLC and the FY 96 Budget Negotiations

The Department of Education has put together the following one-and-a-half pager on our desired FY96 request for the Technology Learning Challenge ($50 million) and an explanation of why this level is critical. Please take a look at this ASAP -- we wanted to make sure that this information is somehow integrated into the FY 96 budget negotiation process that is currently underway. Thanks.

Challenge Grants for Technology in Education
FY 1996

Rationale for Presidential Support

1.) Challenge Grants deliver on the President's commitment to stimulate partnerships between business and education that will bring the Information Superhighway to our schools by the year 2000. These grants have brought about new corporate partnerships that the President can stand with. Challenge Grants make the rhetoric become reality.

2.) The 1995 round of competition generated grass roots support in every community and region of the country. The 530 applicants included close to 2,700 school districts. The final 19 grant awards included 153 school districts in 23 states with 120 business partners.

3.) The 1995 Challenge grants provided the basis for a major media event on October 10, 1995, with national coverage in Washington and extensive local coverage in the 19 Challenge Grant communities across the country. A second round of the competition in 1996 could provide national press in January, when the competition is announced, and in October, 1996 when as many as 40 new grants could be announced.

Recommendation:

In final 1996 budget negotiations, the President should request $50 million for the Challenge Grants.

Time Frame and Scope of the 1996 Challenge Grant Competition

SCHEDULE: The new competition could be announced in January at or around the State of the Union address.

At least 2,000 pre-applications would be received in March 1996 (submitted by 2,000 school districts in as many communities across the country).

By the end of April, 200 of these applicants would be asked to submit full proposals by mid-June 1996. These applications would be reviewed during July and August of 1996, leading to negotiations in September 1996, and a major announcement in early October of 1996.

NUMBER OF AWARDS: Any budget scenario requires at least $15 million of 1996 money to continue the current 19 grants.

1.) If the President secures $50 million for K-12 Challenge Grants, $35 million would be available for approximately 40 new grants. This would be twice the number of 1995, and together with the 1995 awards it would establish approximately 60 communities that would be prime sites for visits and media coverage in the fall of 1996. These 60 grants would include approximately 400 school districts in almost every state, along with several hundred business firms as partners. These awards would make it clear that the President and this Administration is

very serious about brining new technologies into our schools.

FY 1995 New Awards

$9.5 million was awarded to 19 Challenge Grant winners. These funds will support the first six months of each project (Oct. 1 to March 31).

FY 1996 Continuations

A minimum of $15 million is needed to continue the FY '95 Challenge Grants for another nine months (April 1 to December 3, 1996). These projects will then move onto full 12 month funding with FY 1997 funds.

FY 1996 New Awards

An appropriation of $25 million would allow $10 million for a second round of Challenge Grants for 20 new grants to be awarded during the fall of 1996. Funds would support the first six months of these projects - as in 1995. An appropriation of $50 million would allow $35 million for approximately 40 new grants.

House Impact

The House mark of $25 million for Challenge Grants would be sufficient to support both the continuation costs of $15 million and the new award costs of $10 million.

Senate Impact

The Senate mark of $25 million sets aside $10 million for Regional Technology Consortium grants. If this happens, we would be able to meet the Challenge Grant continuation costs of $15 million, but we would be forced to terminate the second round of the Challenge Grant competition for FY 1996.

THE PRESIDENT HAS SEEN
2/14/96

THE WHITE HOUSE

WASHINGTON

96 FEB 13 P1:50

February 12, 1996

Janet — U/S — This looks pretty good. I haven't seen comments by the Commerce Department. Let's discuss this when I leave the team to you — BC

MEMORANDUM FOR THE PRESIDENT
THE VICE PRESIDENT

FROM: Laura Tyson/Gene Sperling/Paul Dimond (NEC)
Carol Rasco/Mike Schmidt (DPC)
Greg Simon (OVP)

CC: Leon Panetta, Alice Rivlin, Jack Gibbons

SUBJECT: The Educational Technology Challenge

I. ACTION-FORCING EVENT.

This Thursday, you and the Vice President will be travelling to a school in Union City, New Jersey, to announce your proposal for the "Educational Technology Challenge" to implement all four components of your vision as announced in the State of the Union, where you asked "Congress to support this education technology initiative so that we can make sure this national partnership succeeds."

We are choosing to announce the details of the initiative on Thursday because it is close enough to the State of the Union to show the tight follow-up; it is right in between the primaries so that there is less chance that political news will block out a substantive proposal, and finally, it provides us a chance to highlight the Union City story -- one the best technology success stories in the nation. Our goal with this event is to see if the actual initiative itself can breakthrough.

II. FEDERAL COMPONENT FOR YOUR NATIONAL CHALLENGE ON EDUCATION TECHNOLOGY.

You have called for a national mission to make every child technologically literate by challenging all components of the American community to help achieve four fundamental pillars of a national education technology initiative.

1. Provide access to modern computers for all teachers and students;
2. Provide every teacher the training and support they need to help students learn through computers and the information superhighway;
3. Develop effective and engaging software and on-line learning resources for the full curriculum;
4. Connect every school and classroom in America to the information superhighway

The Educational Technology Challenge would be the major federal component of your national mission. It is consistent with the themes of your State of the Union and your vision of the national role. The federal government sets a national vision --- the four pillars needed to make every young person technologically literate -- and then we challenge every state to work with communities and private sector to come through with a strategy to make this vision a reality.

III. RECOMMENDATION FOR AN EDUCATION TECHNOLOGY INITIATIVE.

Over the past few months, staff from the NEC, OMB, DPC, OSTP, OVP, and the Departments of Education and Commerce have put together a detailed proposal for your Challenge Fund. This memorandum proposes a unified recommendation from this group, but we try to highlight major policy issues that we resolved in case you or the Vice President has a different view.

A. WHY WE REJECTED AN EXPLICIT MATCHING FUND: Initially, the working group was looking at requiring each state to put forward a specific dollar match -- ranging from 1 to 1 or up to 4 to 1 -- of the federal dollars. This match could come from a combination of state, local, and private sector spending, but would have to represent new spending over and above each previous year's level to be credible. It became increasingly clear, however, to the working group that this strict matching approach would lead to a counterproductive degree of federal intrusiveness. Any plan to determine and monitor how much states were spending and how much they were matching specific federal dollars would create a need to determine maintenance of efforts levels, pricing of private sector contributions, and subjecting states to Inspector General audits and DoEd attempts book-keeping reviews that have little to do with achieving your four goals. Given these problems, the working group unanimously agreed that the best way for the nation to achieve your four goals is for the federal government to set the vision and to challenge states (with local communities and the private sector) to come up with their own strategies to accomplish this vision.

B. RECOMMENDED STRUCTURE: THE STATE CHALLENGE FOR A NATIONAL MISSION: Consistent with your stated vision of the federal and local government roles, this proposal sets a four-part national mission and then asks challenges each state to come forward with a strategy for enabling every school in the state to meet the four goals that you have outlined. Within this challenge, we can still require strategies that call for the private sector to at least match the federal contributions -- without nitpicky monitoring.

States would have maximum flexibility in meeting this four-part national mission: Each state will be eligible to receive a portion of the Fund each year based on the number of students. The only three requirements are: 1) A Statewide Strategy; 2) Strong Private Sector Participation; and 3) Public Accountability to their States.

1. Statewide Strategy: Each state will develop a strategy for enabling every school in the state to meet the four goals that you have outlined by the dawn of the next century. These State strategies will ensure that local districts and schools (like those in your Empowerment Zones) with high concentrations of students from low-income families are able to participate fully in this initiative. States will have broad flexibility in

determining how they choose to meet your goals. The strategy to achieve the fourth pillar -- to connect all schools and classrooms to the information superhighway -- should include a plan to work cooperatively with the regulators and the private sector to take full advantage of the more affordable rates and new competition flowing from the landmark Telecommunications Act. Strategies would include benchmarks and timetables for accomplishing the four goals, but these measures will be set by the State not by the federal government.

2. Private Sector Partnership: State strategies should include significant private sector participation and commitments to meet the four pillars. *Private sector commitments should at least match the amount of federal support.* The working group feels that such a match can be met by volunteer services, cost reductions and payments for connections under the expanded Universal Service Fund provisions of the Telecom Act, and a range of other commitments. The main reason for including such a private sector match is to continue your challenge to the private sector to participate as full partners in implementing your national vision within each state. This matching challenge to the private sector can be used by states and local communities to leverage private sector participation. We believe that this challenge for an "up-front" match also can be designed so that it does not carry the excess baggage (described above) of the intrusive federal administrative oversight required of an on-going match of state and local district funding.

3. Annual Progress Report to the Public: Rather than have a program that asks the state to report its progress to the federal government for review, we would only ask that each state lay out clear goals and benchmarks and then publicly release them to the citizens of their state each year. Each state would publicly report at the end of every school year to its residents the progress it has made in achieving the benchmarks it has set and how it will achieve the ultimate objectives of its strategies in the most cost-effective manner. This will assure that the states -- who will be putting up the bulk of the resources -- are fully accountable to their own voters.

C: ENSURING A TRUE NATIONAL EFFORT: We wanted to ensure that no Governor or even Mayor could stand in the way of this challenge to the nation. Therefore, we recommend that there be a "state default" option if a state does not come forward with a statewide strategy and a local innovation fund. This design ensures that at every community and every company you speak to, your challenge can apply to them. They can be part of the state challenge: if the state defaults on their option, they can come forward and apply for their portion of funds, and any company or community can apply for the local innovation fund. This way everyone is empowered to participate in this national mission.

1. State Default Option: In the event that a state is unwilling or unable to come up with a State Plan to meet your four goals and participate in this Challenge, a State Default option would be triggered. This option would make local communities in the state eligible to apply for the state share of the Challenge Fund by forming local consortia with private sector partners and putting together a plan to achieve your four goals at the local level. This will assure that all communities can participate, and no governor will have a veto over your challenge. In the current political climate, this

will put considerable local pressure on governors to join in the challenge: any governor who chooses to argue that his or her state can go it alone without your leadership and assistance will be confronted by local mayors, school boards, superintendents, teachers and parents who ill demonstrate their support for your leadership by making clear that they want to participate in the Fund Challenge.

2. Innovation Fund: An Expanded Technology Learning Challenge: As part of the national challenge fund, the proposal would set aside a portion of the fund for local innovation by expanding your successful Technology Learning Challenge Grant Competition ("TLC"). Each year a portion of the Fund will be set aside and placed into an expanded TLC. Every local community in the country will have the opportunity to apply for these competitive challenge grants by putting together a consortia of schools, businesses, telecommunication and software companies, university and other community partners that come up with truly innovative approaches to meeting all four of the pillars at the local level. As with the TLC, each consortia of schools must include some schools with high concentrations of students from low-income families.

D. FUNDING LEVELS: The Challenge Fund will provide a total of $2.5 billion over five years. The Fund will then be subject to a sunset provision to allow a reassessment in five years of whether the Fund is still needed, and if so at what level of funding.

IV: RELATION OF CHALLENGE FUND TO TELECOMMUNICATION ACT.

Implementation of the Telecommunications Act can operate to provide schools with affordable access to telecommunications connections. States, therefore, may consider giving top priority in using federal challenge dollars to help finance the Teacher Development, Computers, and Software goals. State's are not prohibited from using federal dollars for Connection; and States are encouraged to consider innovative, cost-effective financing strategies that permit bundling of one or more of the four components to permit constant renewal and up-dating over time. Your announcement of this Fund provides an opportunity for you to welcome the rapid, bi-partisan Congressional support in the Telecom Act to help implement one of the four pillars of your education technology initiative -- making connections to schools and classrooms more affordable. The Challenge Fund is designed so that Congress can now be asked to act just as swiftly on a bi-partisan basis to support implementation of all four pillars of your education technology initiative.

V: THREE OPTIONS FOR NAME OF THE FUND:

- **Education Technology Challenge:** Basic and to the point, but there is reason to believe that some feel that this implies a more advanced education and some may not seem it applies to them.

- **Technology Literacy Challenge**: This is seen as the name that most people believe will apply to them.

- **Future Tools for Schools**: Popular with people, but may seem juvenile.

AMERICA'S TECHNOLOGY LITERACY CHALLENGE

Press Materials
February 15, 1996

AMERICA'S TECHNOLOGY LITERACY CHALLENGE

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Press Materials

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2 Page Policy Announcement Overview

AMERICA'S TECHNOLOGY LITERACY CHALLENGE

February 15, 1996

> *"In our schools, every classroom in America must be connected to the information superhighway with computers and good software and well-trained teachers....I ask Congress to support this education technology initiative so that we can make sure this national partnership succeeds."*
>
> President Clinton, State of the Union, January 23, 1996

NATIONAL MISSION TO MAKE EVERY YOUNG PERSON TECHNOLOGICALLY LITERATE: The President has launched a national mission to make all children technologically literate by the dawn of the 21st century, equipped with communication, math, science, and critical thinking skills essential to prepare them for the Information Age. He challenges the private sector, schools, teachers, parents, students, community groups, state and local governments, and the federal government, to meet this goal by building four pillars that will:

1. Provide all teachers the training and support they need to help students learn through computers and the information superhighway;
2. Develop effective and engaging software and on-line learning resources as an integral part of the school curriculum;
3. Provide access to modern computers for all teachers and students;
4. Connect every school and classroom in America to the information superhighway.

A NEW TECHNOLOGY LITERACY CHALLENGE FUND: President Clinton today proposed the creation of a $2 billion, five year, Technology Literacy Challenge to catalyze and leverage state, local, and private sector efforts so that our schools provide all our children with a greater opportunity to learn the skills they need to thrive in the next century.

State Challenge with Maximum Flexibility: While states will be asked to come forward with a state-wide strategy to meet this four-part national mission, they will be given maximum flexibility to accomplish these objectives. In order to receive funds, states must only meet the following three objectives:

1. State Strategy: Each state will develop a strategy for enabling every school in the state to meet the four goals that the President has outlined by the dawn of the next century. These state strategies will ensure that local districts and schools from the suburbs to the inner cities to rural America are able to participate fully in this initiative. Strategies will include benchmarks and timetables for accomplishing the four goals, but these measures will be set by each state, not by the federal government.

2. Private Sector Partnership and Matching Requirement: State strategies should include significant private-sector participation and commitments to meet the four pillars. Private-sector commitments should at least match the amount of federal support. Such a match can be met by volunteer services, cost reductions and payments for connections under the expanded Universal Service Fund provisions of the Telecom Act, and a range of other commitments.

3. Annual Progress Report to the Public: To ensure accountability, each state must not only set benchmarks, but it must also publicly report at the end of every school year to its residents the progress made in achieving its benchmarks and how it will achieve the ultimate objectives of its strategies in the most cost-effective manner.

Local Community Challenge Option: While states are encouraged to come forward with state-wide strategies in order to receive funding, a state may also choose to have its local communities compete individually for a pro-rata portion of its funds. Or if a state is unable to come forward with a state-wide strategy application, local communities -- or consortia -- will have the option to come forward with local plans.

Local Innovation Challenge Fund: Even where a state does have a state-wide strategy, local consortia of private companies and local communities will be eligible to compete for an Innovation Challenge Fund, which will be funded at approximately $50 million a year. This will further ensure that everyone can participate in meeting this Technology Literacy Challenge.

Funding Levels: The Technology Literacy Challenge Fund will provide a total of $2 billion over five years. The President is committed to increasing education funding each year to meet the nation's education needs while dramatically cutting lower priority spending to balance the budget. To provide the $2 billion in discretionary funding over five years, other lower priority programs will have to be frozen, cut, or eliminated. Each state will receive funding based on the number of students in each state.

Reassessment and Review: The Technology Literacy Challenge Fund will provide funding for five years, then be subject to a sunset provision to allow a review of what the Fund has accomplished and a reassessment of whether the Fund is still necessary, and if so at what level of funding.

Building on Affordable Connections under the Telecommunications Act: The President signed the Telecommunications bill on February 8, 1996. This landmark Act will lower the costs of connecting schools and classrooms to the information superhighway by billions of dollars, by requiring carriers to provide telecommunications services to schools and libraries at discounted rates -- helping schools and students gain access to the Internet and advanced information services. The Technology Literacy Challenge takes the next step by building on this new platform to support the national partnership that can now accomplish the national mission of providing all students with the basic skills they need for the 21st century.

Summary Of The Christopher Columbus Junior High School Success Story, Union City, NJ

Christopher Columbus Junior High School, Union City, New Jersey

The Christopher Columbus Story

By the late 1980s, the Union City school district was on the verge of being taken over by the state. This densely populated, poor, urban school district with 60,000 residents packed within one square mile had difficulty meeting New Jersey State education goals. Student attendance and scores on standardized tests were below state averages, while dropout and transfer rates were far above the state norm.

All that began to change in the 1989-90 school year. A new district superintendent and a new executive director for academic programs were appointed, and, because of the district's poor academic track record, the state required Union City to develop a five-year restructuring plan.

At the same time district reforms were taking place, the school district extended feelers to business and industry in New Jersey, hoping to convince those communities to invest resources in the schools. Bell Atlantic -- looking to test a communications system in an inner city, minority school district with a dense population -- spotted the district's call for investment and decided that Union City was a match. The school district was renovating an old parochial school -- Christopher Columbus -- it had recently purchased to house seventh and eighth graders from two elementary schools that were overcrowded. In 1992, Bell Atlantic approached the school district and offered to implement a technology trial. It was an offer the district could not refuse.

In the summer of 1993, Bell Atlantic installed in the school and homes of all seventh grade students and their teachers 486-level computers equipped with graphics and voice capabilities. Users can communicate between school and home and have basic software tools to carry out curriculum activities. Students and teachers are encouraged to keep the computers over the summer; and the computers supplied by Bell Atlantic now supplement the ones already purchased by the school district. In addition to each classroom having several computers, there are computers in the media resource room, the science laboratory, and the computer laboratory -- all areas to which students have access -- and the teacher's room, too.

Results

The results of these reforms have been impressive. On New Jersey's Early Warning Test, test scores for Christopher Columbus students in reading, math and writing are now more than 10 points above the statewide average across the board, and the seventh grade students with the most exposure to technology had the highest overall scores for the district. Results from 1995 are equally promising: these students are continuing to outperform their peers in other district schools. Christopher Columbus also holds the district's best

attendance record for both students and faculty. The transfer rate has dropped significantly at Christopher Columbus. Parents who could not speak English just 2 years ago are now actively involved with their children's use of the computers at home and frequently send messages to teachers and the school principal. Students are using the media resource room during lunch time and after school. They're actually eager to hand in their homework, neatly typed on the computer. And they're lining up before the formal school day begins so that they can get into the building eager to continue their learning activities.

Technology and the Curriculum

Administrators and teachers now see the technology as an integral part of the curriculum, as it fits in well with their emphasis on research, critical thinking, and cooperative learning. For example, when students study the American Revolution, the teacher can divide the class into research teams. One or two teams conduct their research through traditional information, such as textbooks; another team goes to the media center and researches the topic on the multimedia encyclopedia; a third team uses the computer to research the topic through a CD ROM information disc; and a fourth group uses e-mail to access other forums or groups that may have information on the Revolution. In their communications class, students can choose a novel to read and research novels written about bravery and the Revolution. In math, they can make pie and bar graphs to compare, say, British and American resources available during the Revolution. Teams that do not complete their work during class time can continue working at home and communicate with one another through e-mail. Student teams then write group reports on the computer, which they present to the class to establish class knowledge.

Teacher Support is the Critical Factor

One sometimes hears that teachers fear technology, but not at Christopher Columbus Junior High School. Teachers at the new school had volunteered for the assignment. Their enthusiasm was supported by training they received from Bell Atlantic and from the Education Development Center's Center for Children and Technology. Before the school year began, teachers learned computer basics and how to plug in multimedia applications to the new Union City seventh and eighth grade curriculums. Training continued through the school year, so that teachers learned how to use spreadsheets and database applications, e-mail, Lotus Notes, and Internet. The Center for Children and Technology also worked with teachers interested in discussing various technical and curricular issues that arose out of their work with Project Explore. Teachers held two workshops to introduce parents to the new technology; and Bell Atlantic staff have set up parent accounts on the network. The project has the support of the principal, who provided strong leadership and gave parents, students, and teachers an active voice in the decision-making process.

KicKStart Initiative p.37

Turning an Inner-City School Around

Union City, New Jersey, is a community of ethnic and cultural diversity with a predominantly immigrant Latino population. With nearly 42,000 residents per square mile, it is the most densely populated city in the country. The Board of Education serves 8,361 students in 11 schools (8 elementary, 1 middle, and 2 high schools).

Like many urban school districts, Union City has faced many educational challenges. In 1989, it was identified as one of New Jersey's 30 special-needs districts for education. Student dropout and transfer rates were high, and standardized test scores were well below State averages. When the State investigated Union City schools, the district received failing grades in 40 out of the 52 areas studied. Union City was given 5 years to improve its schools or have them taken over by the State.

Union City responded by creating a curriculum that supports the development of thinking, reasoning, and collaboration skills. Under this plan, students learn by doing, and are expected to demonstrate proficiencies by writing research papers and completing projects. Simultaneously, the school board made significant changes in the physical environments of its schools. A bond initiative passed by Union City residents helped the district refurbish all of the schools and many individual classrooms, and funds from New Jersey's Quality Education Act provided the capital needed to install 775 computers in the district—establishing an 11-to-1 ratio of students to computers.

This program was created through a partnership of the Bell Atlantic Corporation, the Union City Board of Education, and the Education Development Center's Center for Children and Technology. The 2-year trial began in September 1993. Computers were supplied at the school and in the homes of all of Christopher Columbus' 133 seventh-grade students and their teachers. Teachers were trained on use of the computer systems and they trained the parents. The technology enabled participants to communicate between school and home, and use a set of basic software tools to carry out a wide range of curriculum activities. Later, very high-bit rate digital subscriber lines and audio/video server technology were integrated into the network. Participants gradually became accustomed to using computers by being introduced only to e-mail in the first year. During the second year, additional multimedia resources were integrated into the school and its curriculum.

Recent test scores and other data demonstrate just how successful the program has been. Student test scores for Christopher Columbus School on New Jersey's Early Warning Test in reading, math, and writing are now more than 10 points above the statewide average—across the board. Absenteeism by students and teachers is very low, and the dropout rate is now almost nonexistent (transfers into the school are high, and transfers out are very low). Parents who could not speak English just 2 years ago are now actively involved with their children's use of the computers at home and frequently send messages to teachers and the school principal.

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"I have seen the future of education and it's in Union City, NJ."—*Linda Roberts, DoEd*

"I find that my students want to write more, and they are reading more because they are using the computer and it's very patient. They are corresponding with each other, and they are corresponding with me through e-mail."—*a teacher, Christopher Columbus School, Union City, New Jersey*

"As opposed to hearing groans about assignments, they are excited about 'where are we going to find it,' and 'if it's not here let's try down at the media center.' There's a sense of anticipation about how to go about researching."—*a teacher, Christopher Columbus School, Union City, New Jersey*

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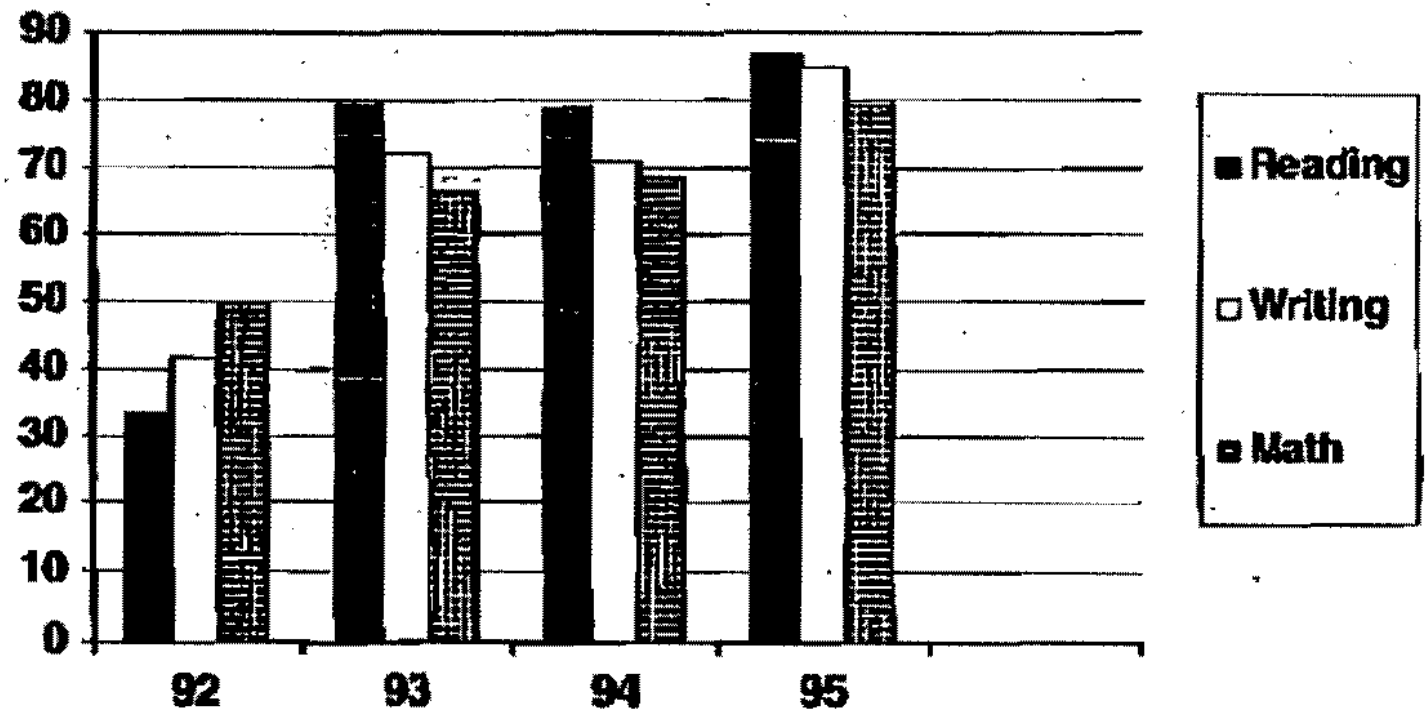
Restructuring Outcomes: 8th Grade EWT Scores



Results from Christopher Columbus Junior High School
Early Warning Tests

Center for Children and Technology of Education Development Center, Inc.

Summary Of The Bergen Academy Success Story, Hackensack, NJ

The Bergen Academy for the Advancement of Science and Technology
Hackensack, NJ

Background

The Academy for the Advancement of Science and Technology is Bergen County's magnet school, dedicated to providing students with project-based, inter-disciplinary curricula within a non-traditional atmosphere. The Academy's history starts in 1992, when the Class of 1996 became the first Academy students. Its history can best be described as one in the making because, as histories go, the Academy for the Advancement of Science and Technology (AAST) is young. However, since accepting its first class, Bergen County's magnet high school of choice has emerged as a powerful force in educational reform.

Early in 1990, secondary students from the county began utilizing the Academy's advanced computer and science labs in cooperative and exploratory programs. Soon afterwards, a morning experience in technology, Period Zero, partnered the Academy with academically rigorous area programs. In-service workshops and a professional development school, Apple Academy East, one of the most successful test sites for Apple Computer, followed. These initial innovative offerings continue in concert with the Academy's full time specialized program for talented students in mathematics, science, and technology who wish to study in an exciting, non-traditional learning environment.

The Academy Today

The Academy for the Advancement of Science and Technology, a working model of restructured education, incorporates a longer school day and school year, employs a distinguished, international faculty, and receives four times the number of applications needed to fill new classes. In its brief history, the Academy has an outstanding record of student accomplishments, remarkable because of their depth and scope. Notable school-wide achievements include admittance to the Coalition of Essential Schools, the first New Jersey school to be so honored, membership into the National Consortium for Specialized Secondary Schools of Mathematics, Science and Technology, and the identification of the Academy as a designated State Resource for the National Science Foundation's New Jersey State Systemic Initiative in Mathematics, Science and Technology Educational Reform. AAST's facility contains five Macintosh and two DOS computer suites, outfitted with cutting edge hardware and software that may accommodate the needs of over one hundred students working simultaneously. Inside a specialized television studio, Bergen ITV, a non profit consortium, links Academy programs with twenty-three secondary schools and three local colleges. The Behavioral Ichthyology and Neuro-Immunology Labs, designed and built by faculty and students, as well as an optics and advanced electronics lab, enable students to do the work of science as scientists.

Emerging Consensus On Need for Technology Literacy Challenge

EMERGING CONSENSUS ON NEED FOR TECHNOLOGY LITERACY CHALLENGE

Educators, business people, parents and students all agree that integrating technology into classrooms curricula will increase the educational achievement of the nations K-12 students. In the last several months, a number of reports have confirmed this fact:

KickStart Initiative. Recently, the President's Advisory Council on the National Information Infrastructure (NIIAC), composed of 36 distinguished Americans and co-chaired by Ed McCraken, Chairman and CEO of Silicon Graphics and Delano Lewis, President and CEO of National Public Radio, concluded in its report, *KickStart Initiative*: "that the children educated in this country can learn more and that technology can be the key to higher levels of achievement." The *KickStart Initiative* collected an impressive set of empirical data, and reported:

- **Improved Outcomes.** Technology supporting instruction improved student outcomes in language arts, math, social studies and science;

- **More Effective Teaching.** Multimedia instruction -- compared to more conventional approaches -- produced time savings of 30 percent, improved achievement and cost savings of 30 to 40 percent, and a direct positive link between the amount of interactivity provided and instructional effectiveness;

- **Higher Scores.** Gains of 80 percent for reading and 90 percent for math when computers were used to assist in the learning process for remedial and low-achieving students, and;

- **Less Expensive.** Computer-based instruction was a less expensive approach to raise math scores than peer tutoring, adult tutoring, reducing class size, and increasing the length of the school day.

McKinsey and Company. McKinsey and Company, one of the world's top management consulting firms, examined the costs and investments required to enable schools to integrate all four pillars into America's schools by the year 2000. McKinsey found that:

- **More Computers Are Needed.** There are currently, on average, only 14 multimedia-capable computers per K-12 school. This works out to one computer for every 38 kids. These averages can be misleading because computers are not distributed evenly across schools.

- **Networks Need To Be Established.** While up to 50 percent of schools have already installed local area networks, less than 10 percent of these networks connect computers in all classrooms; most just connect administrative computers or a few classrooms.

- **More Investment Is Needed.** They estimate that the share of school's budgets going to one of the four pillars must increase from its current 1.3 percent to as much as 4 percent to achieve the full potential of information technologies.

- **There Is No Formula For Using Technology In The Classroom.** There is no one fixed prescription for integrating information technologies into daily learning in classrooms. Local innovation and private sector ingenuity may continue to lead to even more powerful new applications of information technologies in the years ahead.

- **Coordination Is Necessary.** The full potential of the technological transformation in schools will be realized only if teachers, parents and administrators, and the learning resources available throughout each community and the world actually work together to make the new information technologies a real "kickstart" for improved learning by students.

Education Leaders Agree. Numerous other reports agree that we can bring the same spirit of innovation and technological advance that has already made our workplaces the most advanced in the world in the new information age to every classroom in America. These reports were published by:

- The National School Boards Association;
- The Council of Chief State School Officers;
- The National Education Association; and
- The American Federal of Teachers.

Business Leaders Agree. For the past twelve months, the President and Vice President have been meeting with business, education, parent, and student leaders to discuss how to improve teaching and learning for all students through new information technologies. The meetings have included:

- Roundtable discussions at the White House;
- Visits to schools and interactive learning centers in local communities;
- Work with NIIAC on their findings and recommendations for connecting America's communities to the information superhighway.

In meetings with the President last September and October -- along with another meeting just this week -- business leaders have applauded the Administration's Technology Literacy Challenge. They believe that nothing is more critical for the future of our country than enabling our children to learn new basic skills, and nothing has more potential for providing them with this competitive edge than applying the full potential of information technologies to improve student learning in every classroom in America. Here is some of what these leaders have said on education and technology:

Michael Eisner, CEO of Disney:
"I share with everybody here the enthusiasm for a public-private partnership to enhance education, enhance educational tools, and create an exciting new curriculum for our schools."

Jerry Levin, CEO of Time-Warner:
"For those of us who are operating in the digital domain... what this really means is a commitment on the part of the Administration, and certainly by the private sector, to bring about a real pedagogical revolution... Most of all [this is about] making the student the central architect of his or her education in a way we haven't seen before... You will find the private sector, and all of the companies here, totally committed to this effort."

Ed McCraken, Chairman and CEO of Silicon Graphics:
"Research studies and anecdotal evidence from pioneering schools show dramatic advances in learning with proper use of technology."

Louis Gerstner, Chairman of IBM:
"Technology has transformed the American workplace. It can also transform classrooms and the way schools operate."

Bill Gates, Chairman and CEO of Microsoft Corporation:
"The [information] highway will alter the focus of education from the institution to the individual."

How Education Technology Improves Student Performance

EDUCATIONAL TECHNOLOGY IMPROVES STUDENT PERFORMANCE

- **Using technology to support instruction improved student outcomes in language arts, math, social studies, and science,** according to a 1995 review of more than 130 recent academic studies.
  [Bailo, Ellen R., and Jay Sivin-Kachla. 1995. *Effectiveness of Technology in Schools. 1990-1994.* Washington, DC: Software Publishers Association]

- A review of computer-based instruction in military training found that students reached **similar levels of achievement in 30 percent less time** than needed to achieve the same level of competency using more standard approaches to training.
  [Orlansky, J., and J. String. 1979. *Cost-Effectiveness of Conmuter Based Instruction in Military Training.* Alexandria, VA: Institute for Defense Analysis.]

- A congressionally mandated review of 47 comparisons of multimedia instruction with more conventional approaches to instruction **found time savings of 30 percent, improved achievement and cost savings of 30 to 40 percent, and a direct positive link between the amount of interactivity provided and instructional effectiveness.**
  [Fletcher, J.D. 1991. "Effectiveness and Cost of Interactive Videodisc Instruction," *Machine Mediated Learning,* 3, pp. 361-385.]

- A review of New York City's Computer Pilot Program, which focused on remedial and low-achieving students, showed **gains of 80 percent for reading and 90 percent for math when computers were used to assist in the learning process.**
  [Guerrero, J.F., M. Mitrani, J. Schoener, and Swan. Summer 1990. "Honing in on the Target: Who Among the Educationally Disadvantaged Benefits Most from What CBI?" *Journal of Research on Computing in Education*, pp. 381-403.]

- A comparison of peer tutoring, adult tutoring, reducing class size, increasing the length of the school day, and computer-based instruction **found computer-based instruction to be the least expensive instructional approach for raising mathematics scores by a given amount.**
  [Fletcher, J.F., D.E. Hawley, and P.K. Piele. 1990. "Costs, Effects, and Utility of Microcomputer Assisted Instruction in the Classroom." *American Educational Research Journal,* 27, pp. 783-806.]

- A 1993 survey of studies of the effectiveness of technology found that "courses for which computer-based networks were used **increased student-student and student-teacher interaction, increased student-teacher interaction with lower-performing students,** and did not decrease the traditional forms of communications used.
  [Report on the Effectiveness of Technology in Schools 1990-1992," conducted by Interactive Systems Design and commissioned by the Software Publishers Association. 1993, p.2.]

- Research on the costs of instruction delivered via distance learning, videotape, teleconferencing, and computer software indicates that **savings are often achieved with no loss of effectiveness.** Distance learning vastly broadens the learning environment, often providing teaching resources simply not available before.

  [National Council on Disability. *Study on the Financing of Assistive Technology Devicces and Services for Individuals with Disabilities*. March 4, 1993.]

- A landmark study on the use of technology for children with disabilities showed that "**almost three-quarters of school-age children were able to remain in a classroom, and 45 percent were able to reduce school-related services**" when computer-assisted learning techniques were employed.

  [U.S. Dept. of Commerce, *National Telecommunications and Information Administration*, June 1995.]

How Education Technology Changes Teaching And Learning

EDUCATIONAL TECHNOLOGY: CHANGING TEACHING AND LEARNING

Educational technology has the following benefits:

- **Brings the world to the classroom**. No matter what their socioeconomic or ethnic background, and no matter where they live, the learning field for all students can be leveled. Students are introduced to people, places, and ideas they might otherwise not be exposed to;

- **Enables students to learn by doing**. Studies have confirmed what many instinctively knew -- that children who are actively engaged in learning, learn more. The effects are particularly noticeable among students who were not high achievers under more traditional methods. Networked projects, where students work with others and conduct their own research and analysis, can transform students into committed and exhilarated learners;

- **Encourages students and parents with limited or no English skills to learn English,** by engaging them in interactive learning;

- **Makes parents partners in their children's education** by connecting the school with homes, libraries, or other access ports;

- **Makes it possible for educators to teach at more than one location simultaneously.** Vastly expands opportunities for students in small, remote areas, linking them to students in more diversely populated, urban and suburban areas;

- **Enables educators to accommodate the varied learning styles and paces of learning within the classroom.** This makes available individualized instruction techniques that are a proven factor in student achievement;

- **Encourages students to become lifelong learners,** who can access, analyze, and synthesize information from a variety of sources;

- **Enables administrators and educators to reduce time spent on administration and recordkeeping,** increasing efficiency so they can spend more time with students;

- **Makes students proficient in the basic technological skills needed to take their place in society,** whether they enter the working world directly after high school or pursue further formal education;

[Source: KickStart Initiative, U.S. Advisory Council on the National Information Infrastructure]

Administration Progress On Education Technology

CLINTON ADMINISTRATION PROGRESS IN EDUCATIONAL TECHNOLOGY

The Clinton Administration has made an unprecedented commitment to bringing technology into the classroom. Bringing technology into the classroom is a central element of President Clinton's lifelong learning agenda. The President believes that technology can help expand opportunities for American children to improve their critical thinking, problem solving, and cooperative learning skills; maximize their potential; and prepare them for the 21st century.

Accomplishments:

Technology Learning Challenge. The Clinton Administration initiated the Technology Learning Challenge grant program to challenge communities to form partnerships of local school systems, students, colleges, universities, and private businesses to develop creative new ways to use technology for learning. Each grant focuses on integrating innovative learning technologies into the curriculum and leverages federal dollars (each federal dollar is matched by more than 3 to 1 by local and private funds) to establish local consortia of communities committed to school reform and technology integration. The Administration awarded 19 grants for fiscal year 1995. The President's Technology Literacy Challenge announced today would expand this program from less than $10 million to approximately $50 million per year.

U.S. Tech Corps. On October 10, 1995, the President announced the creation of the US Tech Corps -- a national, non-profit organization of private sector volunteers with technological expertise dedicated to helping improve K-12 education at the local level. Its mission is to recruit, place, and support volunteers from the private sector who advise and assist schools in the integration of new technologies into the classroom. Since October, leaders from industry and education have been working together to establish Tech Corps organizations in all fifty states. Official Tech Corps chapters have been formed in 21 states plus the District of Columbia, with 9 additional states expected to join by this spring. Tech Corps expects to be helping schools across the country integrate and use technology effectively in learning environments by the fall of this year.

American Technology Honor Society. On October 10, 1995, the President also announced the creation of the American Technology Honor Society (ATHS). This organization, sponsored by the National Association of Secondary School Principals and the Technology Student Association, is a school-based organization through which students with technological expertise can help expand their school's use of technology. It will recognize and reward students who use their technological expertise to serve their schools. ATHS will be piloted during the 1996-97 school year in 300 schools across all 50 states, and will be launched nationally during the 1997-98 school year.

NetDay '96. On September 21, 1995, the President and Vice President announced NetDay '96, a volunteer effort by California companies, universities, parents, teachers, and engineers to help connect California schools. On NetDay (March 9, 1996), thousands of volunteers will begin wiring thousands of California schools with the technology needed to connect classrooms, libraries, and laboratories to the information superhighway. This initiative will connect 20% of California's K-12 classrooms to the information superhighway.

Affordable Access to Advanced Telecommunications. The President and Vice President have made connecting every classroom in America to the Information Superhighway by the dawn of the next century a national goal. To deliver on that goal, the President recently signed into law the Telecommunications Act of 1996 which ensures that schools, libraries, hospitals, and clinics have access to advanced telecommunications services, and calls for them to be connected to the information superhighway by the year 2000. It will help connect every school child in every classroom in America to the information superhighway -- opening up worlds of knowledge and opportunities in rural and low-income areas.

National Information Infrastructure Advisory Council (NIIAC). President Clinton created the NIIAC by executive order on September 15, 1993. The 36-member NIIAC, co-chaired by Delano Lewis, President and CEO of National Public Radio, and Ed McCracken, CEO of Silicon Graphics, was made up of distinguished private and public sector leaders, and was created to advise the Administration on policy issues related to the "information superhighway." This distinguished group of Americans presented their conclusions to the President and Vice President on February 13, 1996. In their "Kickstart Initiative," they issued a call to action to community leaders at all levels to "connect schools, libraries, and community centers to the Superhighway" by the year 2000. Their report provides case studies of schools that are benefiting from the introduction of technology, and also provides a handbook for local community leaders. Although the work of the NIIAC is finished, its members are committed to reaching the goal of connecting all schools to the information superhighway by the year 2000, and are funding follow-on work by the non-profit Benton Foundation.

Grants to Schools Through TIIAP. In 1994, the Clinton Administration created the Department of Commerce's TIIAP (Telecommunications and Information Infrastructure Assistance Program) which makes grants to public institutions to speed the flow of information through the application of advanced communications technology. Through federal support and investment, TIIAP has accelerated the pace of connecting public institutions and has stimulated private sector investment. This program has enabled the federal government to leverage $24.4 million in federal funds to provide a total of $64.4 million in cutting-edge demonstration projects for public institutions. The program is so successful that there are 200 times more applications than there are grants.

ERIC Program. In order to reach out to the teachers across the country, the Clinton Administration funds the ERIC service, which stands for the Educational Resources Information Clearing House Service. Educators are able to send questions through e-mail to ask ERIC, and receive a response within 48 hours. Educators can ask about lesson plans, educational techniques, information on Goals 2000, and so on. Every week 200 new questions come in, and the information that ERIC has made available on-line, such as sample lesson plans and answers to frequently asked questions, is accessed more than 15,000 times a week.

Star Schools Program. The Administration has maintained strong support for the existing Star Schools distance learning projects, which have helped improve instruction in mathematics, science and foreign languages, literacy skills and vocational education. These distance learning projects serve under-served populations through partnerships that develop, construct, acquire, maintain and operate telecommunications audio and visual facilities and equipment, develop and acquire educational and instructional programming, and obtain technical assistance for the use of such facilities and instructional programming. More than one million students and their teachers in the 50 states and territories participate in this program funded by the Department of Education.

Connecting Students to the Environment. Vice President Gore initiated the Global Learning and Observations to Benefit the Environment (GLOBE) Program in 1994. GLOBE joins students, educators, and scientists in an international science and environmental education network using state-of-the-art technology. GLOBE students make environmental observations at or near their schools and share their data through the Internet. More than 2,000 schools in the U.S. participated in GLOBE in 1995.

Improving Rural Education and Health Care. The Administration supports the wide dissemination of information to improve education and health care for rural residents through the existing Rural Utilities Service Distance Learning and Medical Link (DLML) Grant Program. The program has given students attending rural schools in 28 states access to previously unavailable courses.

Regional Technology Consortia. The Clinton Administration initiated the Department of Education's Regional Technology Consortia Program to help state and local educational agencies, teachers, administrators and others to integrate advanced technologies into K-12 grade classrooms, library media centers and other educational settings (including adult literacy centers). The Consortia are establishing and conducting regional activities that address professional development, technical assistance, and information resource dissemination to promote the effective use of technology in education.

National Plan for Technology in Education. Education Secretary Riley will submit a National Plan for Technology in Education to Congress later this year. The report is the effort of hundreds of educators, citizens, and industry leaders in seven regional forums, two national conferences, and an on-line discussion over the Internet to address the important issues in educational technology.

Rural Telecommunications Infrastructure. The Rural Utilities Service (RUS) administers grant and loan programs to assist rural and remote communities with the development of their communications infrastructure, including schools. In addition, 52 K-12 school systems will be provided two-way interactive video services.

Assessing School Connectivity. The first national survey of school access to broad band telecommunications and the Internet was completed in the Fall of 1994. A second national survey was conducted in October 1995, and documents the progress being made to link schools and classrooms to each other and to the information superhighway.

Some Examples Of How Schools Can Use Funds From The President's Technology Literacy Challenge

EXAMPLES OF HOW STATES AND COMMUNITIES CAN USE FUNDS FROM THE PRESIDENT'S TECHNOLOGY LITERACY CHALLENGE

- Working with high-tech companies, universities, and others with technology expertise, schools can provide extensive technology-related training for a lead corps of teachers in the state who then serve as trainers for colleagues across the state.

- Districts and schools can provide on-the-spot technical help to technology-using teachers during the school day. For example, the Jefferson County Public Schools (Louisville, KY) has a team of technology coordinators who provide assistance by telephone and in person throughout the district.

- Communities can put sufficient numbers of multi-media computers into classrooms so that students can use databases of text, pictures, video clips, and sound in presentations and reports.

- State education leaders can enter into joint ventures with software design firms to develop products geared to state academic standards. The State of Florida, for example, worked with a software firm and a textbook publisher to develop just such software standards. The state receives a royalty for every copy sold outside the state.

- States and districts can negotiate discounts from hardware, software, and equipment providers by purchasing in bulk.

- States and districts can connect schools to high-speed networks carrying voice, video, text, and graphics. The State of Iowa recently committed $18 million to link high schools and community centers to the state's fiber optic backbone.

- States can provide funds to colleges of teacher education to develop exemplary courses and curriculum materials for preparing teachers to use technology.

- States and communities can provide incentive grants, awards, and salary increases to individual teachers who make a commitment to upgrade their level of knowledge about computers and technology.

- School leaders can work with businesses to create incentives for parents of school-age children to purchase computers for home educational use.

- States and districts can provide educators of special needs students with extra help and assistance in matching students with appropriate technology-based learning activities.

	1996	FY97
State Fed	0	250
Local Fund	10	50
		$300

$2 bill 5 yr

70 m.h W.1
130 m

1.5%

$11.5

-NDD

250 b

58

8500 mill

Lot 50 m
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255

→ High P
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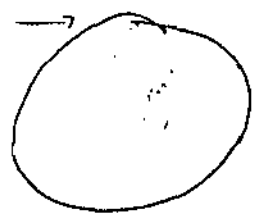


April 29, 1996

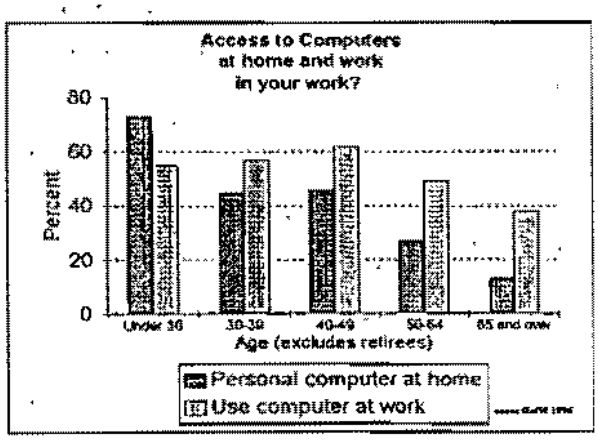
MEMORANDUM FOR LAURA TYSON, GENE SPERLING AND PAUL DIMOND

FROM HENRY KELLY

SUBJECT: Technology and Adult Education

The computer and communication technologies that are a focus of Administration efforts to improve K-12 education are perhaps even better suited to serve the diverse learning needs of employed Americans. The President's leadership in education technology, and his participation in several key events, have galvanized an extraordinary amount of attention and investment around the country. Netday96 got 20,000 volunteers helping to wire California classrooms, and Technology Learning Challenge Grants stimulated the formation of 500 consortia of schools, businesses, and universities. The President and the Vice-President succeeded in their fight for amendments to the landmark Telecommunications Act that allow schools to get more affordable access to telecommunication networks -- in addition to the benefits that will result from increased competition. In the State of the Union and subsequent addresses, the President challenged the Congress, states and localities, and the private sector to develop and implement plans that will assure that every school and classroom is connected to learning resources and the information superhighway, that classrooms are equipped with modern computers and engaging content, and that teachers are well trained to use the new technology. The President's *Technology Literacy Challenge* launched a national mission to assure that every child will be technologically literate and equipped with the basic communication, math, science, and analysis skills needed to survive in the 21st century. With a little creativity we should be able to find a way to achieve the same kind of excitement about using technology to make education, at work and at home, easier and more convenient for American workers.

Technology can change on-the-job learning more rapidly than K-12 education in part because nearly 60% of employed workers under age 50 already use a computer at work and nearly half have computers at home and usage continues to grow. A large number of office machines are already connected to the Internet. Since technology can often successfully mimic traditional apprentice-based, informal learning, it also offers a style of learning that is comfortable for people who have not enjoyed formal education or been successful there. Technology based tests can also provide a way to evaluate performance that can provide more relevant information, in much less time, for both employees and employers. For example, simulations that operate on standard computers can be used to measure success in performing practical tasks such as operating a piece of equipment or working with a team to solve a problem.



Unlike K-12 systems which require a broad basis of community consensus and public spending decisions to change approaches to

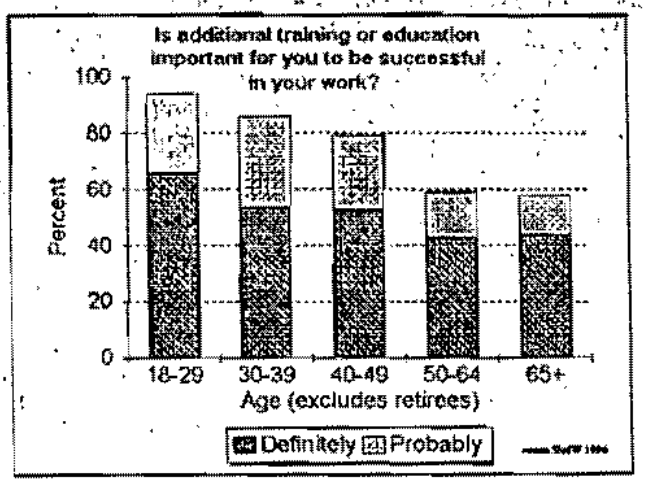
education, the institutions capable of serving the new training needs in homes and in businesses can adjust quickly. Indeed the business of providing net-based instruction to companies is already growing rapidly although use is very uneven and there is enormous confusion about quality and standards. Many large employers -- including DoD -- are convinced that technology can greatly reduce training costs and make it more accessible. The benefits should be particularly great for small businesses that can not manage traditional formal training, but few of these firms make much use of learning technology today.

Anything the Administration can do to accelerate the introduction of practical, inexpensive training methods that are easily accessible is likely to be warmly received. Indeed, this is one of the few areas in labor policy where we can expect strong endorsements from business, labor, and educators. Clearly, improved training methods won't eliminate the apprehension associated with the rapid transformation underway in the American workplace. It would, however, be recognized as a clear, practical step to enabling workers to acquire new skills rapidly and obtain more rewarding work.

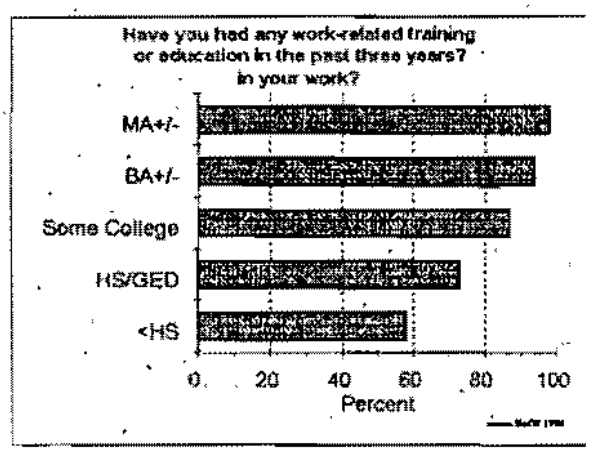
The Department of Labor has already demonstrated the level of interest that can be generated. A comparatively modest DoL investment created an on-line employment service called "America's Job Bank" which is now one of the most visited sites on the web -- winning the PC Magazine "Top 100 Web Sites" award and a listing as one of the top 5% of all web sites by the Lycos group in Carnegie Mellon.

Demand

The need for lifelong learning is widely recognized by both employers and employees. Over half of Americans between 18 and 49 think that additional education or training is "definitely important" for success in their work and an additional 25 percent think that additional training is "probably important"[1]. It is striking that more than half of the employed older workers, including those over 65, think that further education is probably important. The desire for more education is nearly independent of income or employment level.



[1] Dillman, Don A, James A. Christenson, Pricilla Salant, Paul D. Warner. *What the Public Wants from Higher Education*, Social & Economic Sciences Research Center, TR #95-52. This publication is the source of the graphs cited as: "UofW"



Worker interest is strongly supported by employers. Slightly more than a third of all Americans were asked by their employers to get more work-related training or education last year and nearly half the workers aged 40-49 were encouraged to do so.

Americans are clearly not just talking about lifelong learning, they're acting on their convictions. In 1995, over 80% indicate that they've received some kind of job-related training during the past three years. The ability of Americans to receive the education they want is, however, linked to income. The more education a person has, the more likely that he or she will receive further education. Over 90% of employees with BAs have participated in some kind of adult training in the last three years and over half participated in the previous year. Only 60% of employees lacking a high-school degree, however, participated in a training program during the past three years.

While investment in formal training is comparatively easy to document, most training has always been informal -- received from other employees, reading manuals, or observation. The need for informal "learning by doing" has probably increased as products and job descriptions change more rapidly and more work involves knowledge and mind-power rather than repetition and muscle-power.

Investment in training is probably several times higher than the approximately $50 billion invested in formal business training, but data is virtually nonexistent. Small businesses rely almost entirely on informal training.

AGT's hyperlinked just-in-time learning modules provide a meaningful learning environment and are also utilized as job-aids. Through ATG's just-in-time learning modules, companies can tool their employees with the skills they need by providing them with training where and when they need it.

AGT advertisement. The firm's clients include Dupont, Pepsi, AT& T, General Instrument, and IBM

The computers and communication systems now used throughout American businesses provide an unprecedented opportunity to expand the scope of both formal and informal education. Its potential is particularly great for informal learning methods. Technology should make it possible to marry the on-the-job learning -- with which most employers and most employees, are comfortable -- with the need to learn an unprecedented range of sophisticated new skills. Computers can simulate the operation of actual equipment or office experiences -- including simulations which require groups working together. A well designed system also offers practical problems and directs a student to specialized help or remediation when, and only when, the student clearly recognizes how it is needed and useful.

Devices ranging from Xerox machines to CAD software, to medical equipment often incorporate "embedded learning" systems. This means that the devices can teach an operator how to use them. The "just-in-time-learning" possible from these systems can be greatly expanded if other instructional material is provided through office computers and networks. In many cases an employee isn't expected to know all the sophisticated options of a new piece of

billing software or a new machine tool. But he or she is expected to be able to figure out how to use these options quickly when the need arises. DoD has made major and effective use of both embedded and "just-in-time-learning" for some time and is convinced of its effectiveness and it's enthusiasm and use of this approach has grown over the years as the cost of training technology has declined.

The extent to which informal, "just-in-time-learning" can substitute for more formal curricula is not completely understood. Whether or not the training is delivered over new technology, firms may still need to provide employees with time and resources needed to ensure that they can keep pace with major changes in their work environment. This is particularly true when the worker discovers a need to upgrade or refresh basic skills in mathematics, writing, or engineering.

Challenges:

The expense and time commitment of work-related training places great strains on many families. Less than 20% of Americans feel barred by a lack of qualifications. The barriers are cost, time, and inconvenience. Cost was the greatest barrier cited by younger Americans but a lack of time was listed by about 60% of people aged 30-50. Driving across town after work can be a major barrier to a parent, particularly a single parent.

About 75% of the firms providing support for training said that they did so because their employees needed specific skills to do their jobs. About half also cited the need to keep up "with changes in technology or production methods and to retain valuable employees". While informal training can closely track the immediate requirements of the firm, the benefits of an investment made in basic skills have benefits for the employees, and society as a whole, that may not be completely captured by the

The worldwide information technology (IT) training and education market will increase at a compound annual growth rate (CAGR) of 12.7 percent, from $14.9 billion in 1995 to $27 billion in 2000 according to a new report from International Data Corporation (IDC). This research reveals the U.S. market continues to show strong growth - nearly every training supplier surveyed reported positive growth, and some companies even reported more than 200 percent growth.

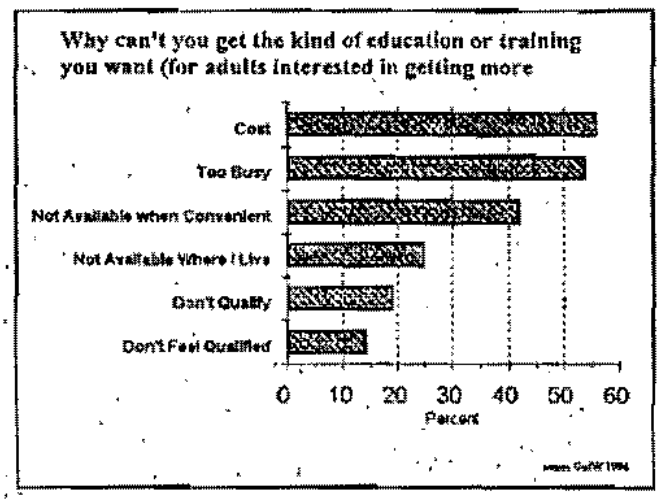
"The shift in spending on training provided by internal staff to training provided by external suppliers is one of the market drivers of growth for the U.S. IT training and education market," said Ellen Julian, IDC's senior analyst for IT Training and Education Services research. Other factors include the increasing investment in business-application training and the growing focus on continuous learning, professional development, and employee skill certification.

This research indicates that although the market is growing at a solid pace, training suppliers face a number of inhibitors to growing their businesses successfully. These inhibitors include maintaining instructor qualifications and quality, keeping equipment current, staying price competitive, and keeping ahead of technology.

"Face-to-face, instructor-led training still reigns as the most sought-after form of course delivery," said Julian. "But with the presence of distance learning programs, custom-made courseware, and multimedia tools in corporate education, the future form of learning delivery remains a big question."

International Data Corporation, Framingham, Massachusetts 1995 Survey data

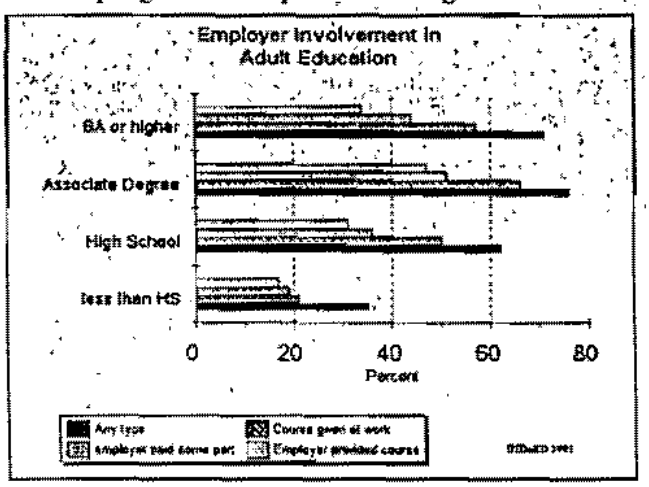
company making the investment. Only 10% of the firms interviewed admit to such concerns, however.



Larger firms are more likely than smaller ones to accept the cost of training. About 70 percent of establishments with fewer than 50 employees provided formal training in 1993, while nearly all larger firms provided training.

The vast majority of all training was focused on specific job skills. Over a quarter of the training was in sales and customer relations, management skills, and computer skills. About a third of all firms provide orientation training and training in safety and related topics. Only 3 percent of all establishments offered courses in basic reading, writing, arithmetic and English language skills. About 20% of large establishments offered such training.

Training investments are strongly correlated with other benefits such as employee assistance programs, pension plans, employee wellness programs and profit sharing. Unionized firms and firms with employing modern management practices also tend to provide more training opportunities. The Bureau of Labor Statistics finds that "Establishments that employ a number of workpractices such as just-in-time inventories, worker teams, total quality management, quality circles, peer review of employee performance, pay for knowledge, employee involvement in technology and purchase decisions, and job rotation are more likely to provide formal training than are similar establishments that do not employ as many of these practices."[2]



The Role of Technology

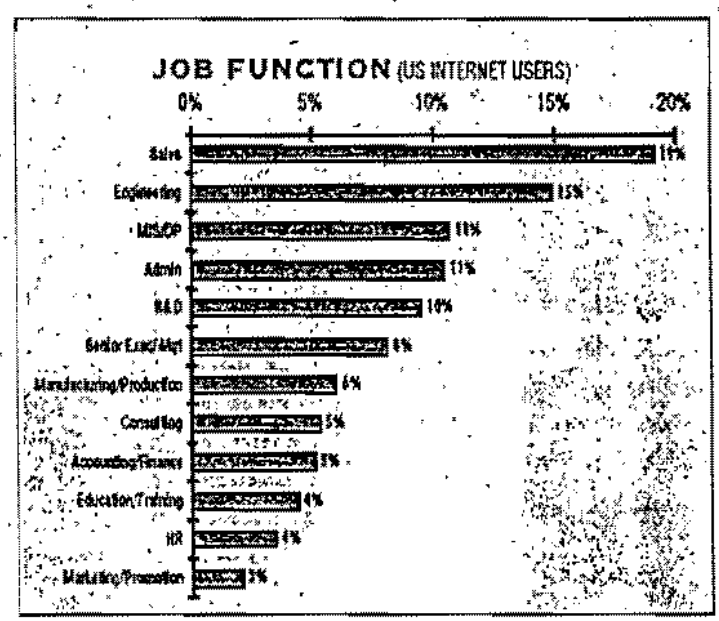
Computers and advanced communication systems provide a unique opportunity to escape some of the most fundamental limitations of the nation's adult education system.

- information technology can adapt educational services to the complex market represented by adult learners. Adults come to the education system with many

[2] Michael Horrigan, *Employer Provided Training Frequently Asked Questions*, Bureau of Labor Statistics, August 17, 1995. http://stats.bls.gov/eptfaq.htm

different kinds of formal education and job experience. A computer-based training system can tailor the learning experience to the specific needs of each individual. It can, for example, be designed to provide remedial instruction in specific areas of mathematics or other subjects.

- information technology makes it possible to offer training in a wide variety of settings. Computers and communication systems are widely in job-sites and a growing number of families have home computers. This means that learning can take place in a time or place that can be combined with the busy work and home schedules of today's employees. About 45% of all Americans below the age of 50 have a computer at home and nearly 60% use a computer at work. About 23 million adults use a home computer everyday.[3] This means that about half of the potential market for training consists of people who already have access to some form of advanced information technology and possess the basic skills needed to use it. The availability of computers at home and at work is strongly correlated to education but a third of all people with less than a high school education reported that they use a computer at work (as did 46% of people having only a high-school or GED degree).
- Coupled with local area networks operating in many businesses, the Internet makes it comparatively easy for individuals to receive a wide range of training on their office equipment and at home. A Nielson study published last October showed that 24 million people in US and Canada had used Internet during the past 3 months (11% of the adult population), 18 million had used the world Wide Web, and a majority had used the net at work. Two-thirds of the respondents reported using the net at work, 44% at home, and 8% in school. Many firms are beginning to use Internet software to provide an easy, and inexpensive, method for internal communications ("intranets") making it even easier to merge proprietary training and training that may be available over the net. About 30% of all firms now use the world wide web, and 40% report that they plan to do so in 1996. Larger firms are much more likely to have access to the web.[4] At present, Internet users are dominated by professionals, but the growth of the net in both businesses and homes



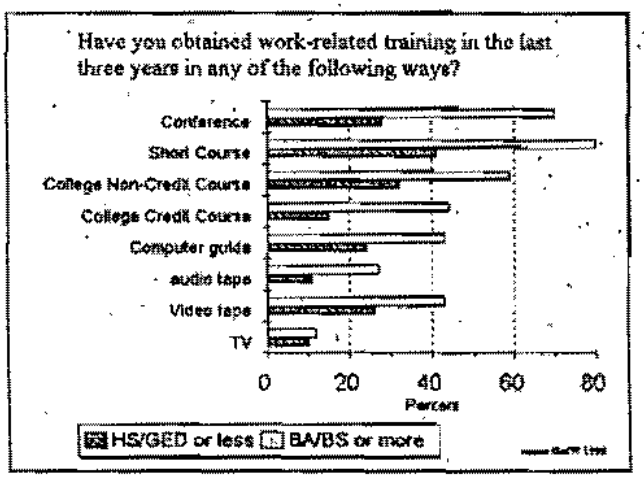
[3] CACM July 1994, vol 37, no. 7 p. 9, "newstracks" a "Times Mirror" study of 4000 US households

[4] International Data Corporation's fifth annual Global IT Survey.

has been phenomenal. Net access is likely to be as commonplace as the telephone within the decade.

- information technology provides a learning environment that many adults find more attractive than formal school settings -- settings in which many did not do well originally. Computers are infinitely patient and anonymous; the student can approach an instructor for personal at his or her option. People who failed to get a high-school degree are more than twice as likely to prefer to be taught on a videotape as people with more formal education.
- the new technology ensures that the instruction will be up-to-date and makes it possible for a firm to combine a training program aimed at a specific task with generic program for filling in background skills as needed.
- the new technology can also greatly reduce the cost of instruction. It is clearly less expensive than sending employees to off-site training.
- technology is particularly attractive for helping workers with disabilities learn to function productively in the modern workplace.

The Department of Defense provides direct evidence that these benefits are real. DoD has made effective use of technology based training over the past decade and is rapidly expanding its investment. Their studies confirm that computer-based instruction leads to better performance proven in actual combat situations like the Persian Gulf War, that the troops like it, and that it reduces the variation in outcome. Studies conducted over the past decade indicate that computer-based training is 40% more effective than standard courses and multi-media instruction 70% more effective.[5] Technology not only saved time and cost in training equipment operators and repair skills, it proved effective in teaching "soft skills" such as leadership and team performance. Much of the cost saving resulted from the fact that tasks could be learned in 30% less time. Savings were very large when simulations could substitute for operating expensive, and sometimes dangerous, equipment. Federal Express to Massachusetts Mutual Life Insurance Company, McDonnell aircraft and many large private firms are also making major investments in instructional technology.



[5] Effectiveness is measured as the difference between test scores of two groups of students divided by the standard deviation in test scores. The standard deviation of test scores of the technology-trained group is almost always smaller than the standard deviation of the control group indicating that the technology both improved average outcomes and narrowed the gap between the best and worst performers. These conclusions are based on meta-studies conducted by Dexter Fletcher and others in the Institute for Defense Analysis.

The need to reduce costs and make training more convenient are driving innovation throughout the nation's training businesses. A surprising number of people have already made use of instructional programs that do not involve conventional blackboard and text instruction methods.

The market for computer-based training is growing rapidly, but traditional education and training statistics can't follow this growth. Major gaps and problems clearly exist. Bound by tradition, many universities and colleges have not been willing to adapt to this new demand. Even colleges with an investment in "distance learning" technologies based on closed TV systems have not grasped the radically new opportunities offered by the Internet. Major new quasi-academic institutions with names like "Mind Expansion University", "Magellan University", and Galaxy University, are emerging to fill the gap. Clearly many problems remain in defining quality, standards, and accreditation. Large gaps remain in the offerings.

Where Do We Go From Here?

There is no doubt that technology-based training is expanding and will eventually play a major role in incumbent training. The administration is nowhere visible in a process which appears to be widely endorsed by labor and business groups.

> ...despite the many proven benefits to company performance, most companies are not doing a good job training their employees.
> ...Successful companies should set a goal of spending from 3-5 percent of payroll on employee training and education [up from an average of 1.4 percent].[6]
>
> Jerry J. Jasinowski, The Manufacturing Institute. April 1996.

While most of the recommendations of the White House Conference on Small Business focused on ways to remove regulations and unions, one of the 60 recommendations endorsed by the National Conference in 1995 provides a basis for establishing local partnerships with small businesses with an emphasis on on-the-job training.[7] The National Association of Manufacturing has set a voluntary goal of doubling corporate spending on training and is planning a project to link CEOs with good training programs with those who "recognize the need to do so." While both business and labor groups are calling for increased spending on training, virtually none of these groups have recognized that technology can achieve major gains in learning without increasing costs. The Council on Competitiveness has launched a study of technology in training but it is still in a very premilary stage.

The federal government has some unique options for participating in a voluntary partnership in training. Unlike K-12 education where federal investment is small, DoD and civilian agencies represents a major part of the adult training market. Federal training needs can best be served if a vigorous, competitive market is operating to provide both basic skills and specialized training. DoD recently compared business requirements for training to its own

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[6] Jerry J. Jasinowski, White Paper: ***Improving the Economic Condition of the American Worker***. The Manufacturing Institute. April 1996.

[7] ***Foundation for a New Century: Report of the White House Conference on Small Business Commission,*** September 1995.

inventory of instructional material and found that it already has 2718 software programs that appear to match both civilian and military requirements. The most important legacy of this investment may be the know-how of the firms which have developed these products under DoD contract.

A successful administration effort in education technology for American workers should focus on stimulating a large, voluntary effort which will both have a real effect on the accessibility of learning for employed Americans and have major symbolic value. And it should get significant support from unions and large businesses and enthusiastic participation by small businesses.

Several kinds of challenges could be considered:

a) finding a way to stimulate development of low-cost basic skills training in a form easily available for employees with access to computers or the net. Virtually all firms share an interest in developing a market for high-quality, low-cost products in this area.
b) finding a way for firms to offer job-specific training that can link to the basic skill packages as required.
c) finding a way for individual firms or groups of firms to establish standards for instructional materials. This might involve skills standards or standards defined by individual sectors or industries. De-facto standards could be established by industry acceptance of certification tests that could be administered through the technology.
d) finding a way to ensure that the broadest possible range of workers can benefit from the programs. Workers in small businesses may enjoy the greatest benefits, but they and their businesses must understand the opportunities.

There's clearly an opportunity here for the administration to: (i) catalyze the development of a vibrant industry in technology-based training, (ii) provide a practical, inexpensive source of training for many Americans in the very near future, and (iii) meet clear business and union objectives in increased investment in training at a lower cost. Given the potential for broad-based political support and – given the resources available to many of the private groups involved -- this should require little or no additional federal investment. What we lack, at present, is a process for bringing the groups together.

I'd suggest that the ETR be charged with holding a series of discussions with interested organizations in the near future and forge some specific options. The groups consulted would include:

- unions and professional societies
- large businesses and business organizations such as the Competitiveness Council
- small business associations
- community colleges and universities
- training firms and non-traditional training providers
- software publishers
- federal and possibly state agencies with large training requirement.

THE PRESIDENT HAS SEEN
6/24/96

CC: Gene Sperling / GS / DW

This is important — the is true (the news about this → need to get out → can we get DOJ/Secretary on Fact Validation? (Mongan '93 plan) Should do this — also need to get to interested columnists editors — Rasco/Vin

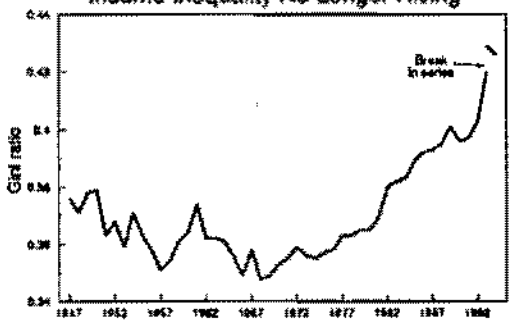
BC

CURRENT DEVELOPMENT

Income Inequality Update

Income inequality among families fell between 1993 and 1994 (see chart), though it would be hard to tell from press reports of a just-released Census Bureau study. The reports ignored important changes in survey procedures and therefore erroneously concluded that income disparities increased sharply during the first 2 years of the Clinton Administration.

After Increasing for 20 Years, Income Inequality No Longer Rising



Analysis. Beginning with the March 1994 survey, which records income data for 1993, the Census Bureau raised the upper limit at which it records high earnings from $300,000 to $1 million. That is, before 1993 a family with earnings of $1 million would be reported as receiving $300,000; beginning in 1993 that same family would be reported as receiving $1 million. Not surprisingly, this change sharply increases inequality by raising reported incomes in the top quintile.

Paying proper attention to these changes in survey procedures, Census data show for families:

- overall inequality (as measured by the Gini index of inequality) declined between 1993 and 1994;
- incomes increased across the board in 1994 for the first time since 1989, with average income growth highest in the bottom quintile;
- the share of income received by the lowest quintile increased for the first time since 1973, while the share going to the top quintile fell a little–a sharp reversal of previous trends.

One final note: Contrary to those who thought the increase in taxes on upper income individuals would adversely affect incentives, the Census report shows that income growth of the top 5 percent averaged 2.5 percent per year between 1992 and 1994, faster than in any year since the mid-1980s.

Julie Swisshelm OSTP
6-6041

THE WHITE HOUSE

WASHINGTON

July 3, 1996

MEMORANDUM FOR PAUL G. KAMINSKI, Under Secretary for Defense for Acquisition and Technology

FROM: LAURA TYSON, Assistant to the President for Economic Policy
JOHN H. GIBBONS, Assistant to the President for Science and Technology

SUBJECT: Funding for Education Technology Research in DoD

As you know, the President and Vice President have made adoption of education technology in America's schools a major priority of this Administration. We have been gratified by the way the Department of Defense has risen to the challenge by using technology in its dependent school system. We are, however, concerned that an investment in education technology research funded through DDR&E is being terminated before planned evaluations are complete. Approximately $40 million has been obligated to-date for the Computer Aided Education and Training Initiative (CAETI) and, with strong bipartisan support, $10M was authorized and appropriated to complete the project in FY96. It is our understanding, however, that the FY96 funds have not yet been released by DoD.

Without FY96 funds, research at key universities may be terminated just before planned completion of their projects. Only a third of the planned testing and evaluation by the teachers and students in DoD classrooms in Italy and Germany would be possible.

There can be no doubt that the program contributes to U.S. security. The education of military dependents supports readiness by removing concerns the military parents have about the quality of their children's education. Moreover, many of the CAETI technologies can be used in operational training in many parts of the DoD.

The tests and evaluations that would be funded by the final year of funding for CAETI are critical for understanding whether the innovative education technology products developed by U.S. universities have real value in the classroom. We recognize the pressures on a DoD budget that is very tight and that pressure is being

applied from many special interests -- including people with a vested interest in CAETI funding. But from our perspective the final 20% of CAETI's funding appears to attack a problem critical for both Defense and civilian use of education and training technology -- a problem central to the Administration's priorities. We hope that you can find a way to release the funds required.

THE WHITE HOUSE

WASHINGTON

December 6, 1997

MEMORANDUM FOR THE PRESIDENT

CC: THE VICE PRESIDENT

FROM: GENE SPERLING
TOM KALIL

RE: LEARNING ON DEMAND

1. The vision

The skill demands in the workplace constantly change, but today they change at an even faster pace than anyone ever anticipated. Workers need to be able to keep up with the skill demands. Employers continually complain that they can't find workers with the skills they need. There are ways using today's developing technology to help address those needs for lifelong learning. In particular, technology can help those who, for a variety of sound reasons, cannot avail themselves of training through the traditional post-secondary setting. For example, it can help those who are disabled, those with family demands, those who are frequently on travel, or those in rural areas without access to post-secondary training.

We believe that our policy should have the following objectives:

- To enable adult learners to find information easily on the skills they need to advance in or change careers, and compete for higher-wage jobs.
- To expand opportunities for lifelong learning for all adults by creating pathways for them to tap into "learning on demand" delivered by a variety of institutions using new technologies such as the Internet, CD-ROM, interactive TV, and satellite.
- To advance the use of technology through the use of existing grants, loans, and tax credits in the "learning on demand" environment.
- To establish mechanisms for ensuring that the employer and the student have confidence that the degree or certificate program will provide worthwhile skills.

Although much distance learning already exists, the federal government can play a unique role in complementing current efforts by providing a catalyst to support exemplary, high-quality, disciplined and evaluated pilot projects. In addition, many of these entrepreneurial

activities, at the start-up phase, often lack the resources to achieve excellence. We propose below a $50 million pilot to start in FY 1999 to test one or more models or their variations. Below we discuss a few examples of current projects, some of the options that we have under existing laws and programs to promote learning on demand, and a few examples of the areas where we believe experimentation would be most useful.

This proposal was developed with input from OVP, DPC, OMB, and the Departments of Education and Labor.

2. Existing initiatives:

We are confident that this initiative will find willing partners in higher education, industry, and organized labor. For example:

- Since 1995, the Western Governors -- with leadership from Governor Roemer -- have been working to design a "Western Governors University." Some of the goals that they have identified include:

  -- providing a means for learners to obtain formal recognition of the skills and knowledge they acquire through advanced technology-based learning at home, on the job, or through other means outside the formal educational system; and

  -- shifting the focus of education to the actual competence of students and away from "seat time" or other measures of instructional activity.

- The State of Michigan, Michigan State University, the University of Michigan and other Michigan colleges and universities have recently formed The Michigan Virtual Automotive College. It began offering courses in the fall of 1997 that are targeted to the Big 3, automotive suppliers, UAW, and people interested in getting jobs in the automotive industry.

- The Colorado Electronic Community College was founded in 1995 to broker the courses offered by its 13 college state-wide system. Course work is delivered by a variety of technologies including print, videotape, audiotape, cable broadcast, Internet and CD-Rom. Communication such as presentations, discussions, study groups, with classmates and faculty occurs through a voice-mail system and e-mail. CECC has a multi-million dollar digital video and multimedia production and training facility located at the former Lowry Air Force Training Facility, which has been converted into a higher education center at Denver, Colorado.

3. Federal initiatives

There are a number of concrete steps that we can take to promote "learning on demand." These include:

1. **Allowing people to use financial aid and other forms of assistance for distance learning**:

- The Department of Education is seeking changes in the Higher Education Act that would eliminate the differences in the "cost of attendance" calculation that currently exist between distance learners and on-campus learners. Currently, distance learners are not allowed to include costs for computers and other equipment in the determination of student aid.

- The Department of Education is interested in establishing an experimental program with several institutions to try different models for determining student aid eligibility for distance learning, while still ensuring quality and protecting public funds.

- We also think it make sense to review other financial aid programs, training programs, and tax credits (e.g. workforce development legislation, life-long learning tax credits, Section 127) to make sure we are not inadvertently discriminating against distance learning. A Presidential Memorandum has been drafted that calls for a review of the appropriate use of technology by training and education programs.

2. **Sponsor "virtual university" pilots with a focus on high-quality adult learning**

We think that it makes sense to have a small pilot program that encourages experimentation with new partnerships for providing "learning on demand," particularly for adults. This competitive grant program, with an FY99 budget of $50 million, could have portions administered by Education and Labor, and could fund experiments in the following areas:

a. **Support services for adult learners**: Some adult learners may be totally self-sufficient, and able to search the Internet catalogs of multiple virtual education providers. Others (those making the transition from welfare to work, dislocated workers, under prepared learners, those with no prior college experience) may need a range of services -- including assessment, counseling, help in navigating through the range of options, selecting appropriate courses and programs, and rigorously monitoring their progress.

b. **A degree that's a ticket to a high-wage job**: Curriculum and software developers and the assessment industry need to know what competencies are required for specific and education and training programs. This is particularly important in a virtual environment where "seat time" is no longer relevant. This requirements could be developed by

representatives from employers, professional associations, professional licensing or credentialing organizations, and educational institutions. For example, the Western Governors University is teaming up with the electronics industry to define an associates' degree for electronics manufacturing. This could build on the work of the Skills Standards Board, which has started some work on identifying competencies needed in different industries.

c. **Jump-start the market for high-quality software and networked courses**. Currently, the lack of "economies of scale" often prevent commercial publishers and other institutions from investing the amount of money that would be required to develop high-quality educational software and other distance learning offerings. These economies of scale are incredibly important for software and other information technology products - which often have high fixed costs and low marginal costs. Critical mass might be achieved by encouraging a consortia to share courses, instructional material, or software to avoid duplication, and combining existing offerings to offer complete certificate or degree programs. Partnerships between commercial publishers and universities would also be encouraged, given that instructional software is often used only by the individual professor that developed it.

3. **Making the government a better user of technology-based training**

The government could help accelerate the development of this market by being a leading user of technology-based training. The Department of Defense is the agency most likely to be able to influence the market. Every year 1.5 million people "graduate" from 30,000 different DoD courses at a cost of $15 billion and 159,000 student-years. DoD has been a leader in the use of simulation technology for training. Currently, however, only 4 percent of courses involving specialized skill training are using new learning technologies. DOD has an initiative underway to dramatically increase the use of learning technology to reengineer a large number of courses in subject areas which are also relevant to industry (such as avionics, vehicle maintenance, information technology and electronics).

4. **Create the "Learning Exchange."**

One of the problems facing the use of technology for lifelong learning is the absence of a national market and information source for training. In a recent report on workplace change by the American Society for Training and Development, one of the primary recommendations was for the federal government to "encourage the maintenance of institutions, networks and systems that support and facilitate access to information on work-related learning." In partnership with DOD, a consortium of states, and the Council for Excellence in Government, the Department of Labor has launched a project to create a national training network that will make it easier and cheaper for individuals and businesses to locate, access, and invest in education and training. This beginning effort can be supported through existing resources. To the extent that the launch is successful, rapid expansion could be supported as part of the "learning on demand" initiative.

This will build on the highly successful "America's Job Bank" -- which has been accessed 188 million times in the last six months.

Potential risks

- Although many in higher education are excited about the possibilities to promote distance education, others are concerned that it could undermine traditional campus-based instruction. We would have to make it clear that what we are advocating is not an elimination of the campus (which is very important for socialization, face-to-face interaction, etc.)

- As we move towards an online environment, issues surrounding quality assurance and assessment become even more important. We would need to work carefully to avoid the "waste, fraud and abuse" issues that have surfaced in the use of student aid for proprietary and correspondence schools, for example.

- Focusing on remote learning could reduce attention to the fact that certain parts of the workforce need face-to-face services, such as guidance for new training and skills acquisition.

Recommendation

This proposal is supported by OVP, DPC, Education, and Labor. We have also incorporated comments from OMB.

THE WHITE HOUSE

WASHINGTON

December 6, 1997

MEMORANDUM FOR THE PRESIDENT

FROM: BRUCE REED
MIKE COHEN

SUBJECT: Education Opportunity Zones

This initiative, which you discussed in your Town Hall meeting earlier this week, would designate from 20 to 40 urban and rural school districts as Education Opportunity Zones. This initiative has a strong focus on standards, accountability, and performance. High-poverty urban and rural school districts would be eligible for federal funding under this proposal *if* (1) they adopt tough reform measures -- like those in Chicago -- that make administrators, principals, teachers, and students accountable for success or failure, and (2) show real improvements over time in student achievement. As proposed, the initiative would cost $320 million in FY 99 ($1.1 billion over five years).

Conditions and Purposes of Funding

To receive funds, local school districts would have to demonstrate that they already have begun to put in place effective reform strategies or raise student achievement, and that they will:

- provide students and parents with expanded choice within public education;
- give schools expanded flexibility while holding them accountable for results, including by rewarding schools that succeed and intervening in schools that fail to make progress;
- hold teachers and principals accountable for quality, including by rewarding outstanding teachers and removing ineffective teachers;
- require students to meet academic standards at key transition points in their academic careers -- i.e., end social promotions.

School districts could use Education Opportunity Zone funds to:

- provide extra help to students who need it to meet challenging standards, through after-school or Saturday tutoring programs and/or summer school;
- provide bonuses to schools that make significant gains in student achievement;

- close down failing schools and reopen them as charter schools, or t urn around failing schools by implementing proven reform models, providing intensive teacher training, and building stronger partnerships between schools and parents, businesses, and community-based organizations;

- provide needed training to teachers and principals; reward outstanding teachers by helping them earn certification as master teachers from the National Board for Professional Teaching standards and providing them with financial bonuses when they do so; and implement programs to identify low performing teachers and remove them if they fail to improve.

Funding Levels

As proposed, the Department of Education would award 3-year competitive grants to 10-20 urban school districts and 10-20 rural school districts or consortia (including districts serving Native American students) selected as Education Opportunity Zones. Each urban Education Opportunity Zone would receive approximately $10-25 million in its first year, and each rural zone would receive from $500,000 to $5 million (for consortia), for a total of approximately $320 million.

The stream of federal support under these grants would be structured so as to ensure that reforms can be sustained over the long term. Continued support in years 4 and 5 would be contingent upon demonstrated success in raising student achievement and willingness to work with similar districts to help them replicate successful reforms. A total of $16 million would be available each year for national activities, such as providing technical assistance, documenting successes, and disseminating lessons learned to urban and rural communities across the U.S.

Outstanding Issues

We are still working with other offices and the Department of Education on a few issues. First, we are trying to develop a component that would give Education Opportunity Zones greater flexibility in the use of <u>other</u> federal education funds as long as they continue to meet agreed-upon performance goals. In addition, we are exploring whether we could fund this initiative under existing authority, rather than seek new legislative authorization.

THE WHITE HOUSE

WASHINGTON

December 6, 1997

MEMORANDUM FOR THE PRESIDENT

CC: THE VICE PRESIDENT

FROM: GENE SPERLING
TOM KALIL

RE: TEACHER TRAINING FOR TECHNOLOGY

Summary:

Making sure that teachers have the skills they need to use technology effectively in the classroom is critical to the success of your Educational Technology Initiative. As you noted recently, "I met with a group of young people yesterday in their 20s who said .. 'What difference will it make if you connect every classroom in the country to the Information Superhighway if the teachers aren't trained to use the technology and the kids know more than they do?" Although teacher training has always been a part of your four pillars (along with connecting classrooms, computers, and educational software) -- the press has tended to focus more on the goal of wiring the schools. We believe that a new initiative is needed to shine the spotlight on teacher training - and set national goals that are both important and achievable.

At this point, we would like your approval of the proposed policy, and not a specific budgetary commitment. Although we think that this initiative will require some new investment, the decision on the exact funding level should be made in the context of the overall FY99 budget discussions.

We believe that it is particularly important to launch this initiative next year - because schools will begin to receive up to $2.25 billion in discounts to connect to the Internet in 1998. Unless we have an initiative that also addresses teacher training, we risk a "backlash" against the overall program.

We also think that there is support from the Congress for doing more on teacher training for technology. This year, Senator Bingaman added $30 million to our competitively awarded "technology innovation grants" to focus on professional development.

Why an initiative in teacher training is needed

The overwhelming conclusion of press and expert analysis of your Educational Technology Initiative is that teacher training is critical to the successful use of educational technology, and that more needs to be done in this area:

- A 1995 OTA study, *Teachers and Technology: Making the Connection* concluded that "helping teachers use technology effectively may be the most important step to assuring that current and future investments in technology are realized" and that "most new teachers graduate from teacher preparation institutions with limited knowledge of the ways technology can be used in their professional practice."

- The President's Committee of Advisors on Science and Technology (PCAST) concluded in 1997 that "the substantial investment in hardware, infrastructure, software and content that is recommended in this report will be largely wasted if K-12 teachers are not provided with the preparation and support they will need to effectively integrate information technology into their teaching."

- In 1994, the latest year for which data is available, only 15 percent of all elementary and secondary teachers had at least 9 hours of technology training.

- In 1996, according to the National Center for Education Statistics, only 15-20 percent of teachers are regularly using advanced telecommunications for curriculum development, professional development, and teaching.

National goals and initiatives to help meet those goals

We think that it makes sense to set the following national goals, and to establish initiatives that are based on meeting these goals. Below are some proposals, although obviously we will continue to work to refine them.

Goal 1: All new teachers entering the workforce should be able to teach effectively using technology

Rationale

- Over the next ten years, 2 million new teachers will need to be hired. Although there is a high attrition rate, many of these new teachers will be in the workforce for a long time. It makes sense for 21st century teachers to have 21st century skills.

- Currently, most colleges of education do not adequately prepare teachers to use technology.

Initiative

(1) Sponsor regional "summer institutes" -- at least one in each state -- that would ensure a significant number of all new teachers can teach effectively using technology. This requires both (a) an understanding of the mechanics of using computers, the Internet, and software applications; and (b) an understanding of how technology can be integrated in to the curriculum, and the new styles of teaching and learning that are enabled by technology. When combined with other efforts (new state teacher certification requirements, efforts by leading colleges of education, and private sector activities) - we think it is possible to reach the goal of training every new teacher.

Although "summer institutes" is one possible approach, it may make sense to give states the flexibility to propose other approaches, as long as they make significant, measurable progress towards the goal of training all new teachers.

Some of the requirements of the program might include:

- A focus on people who will soon be entering the workforce as new teachers (e.g. juniors and seniors in colleges of education) -- and faculty at colleges of education, which would strengthen the capacity of colleges of education;

- Matching funds from the private sector and non-federal sources (we think that private sector companies may be willing to donate equipment and software);

- A competitive selection process that selects at least one grant per state, and possibly more for large states; and

- Support for ongoing computer networks that allow new teachers and experienced teachers to continue to communicate with each other, ask questions, and share best practices. [Studies show that this is critical to maintaining momentum and excitement generated by an intensive summer workshop.]

(2) Support for consortia that make it easier for teachers to use technology in subjects that the Administration has made a priority (e.g. math, science, and reading). These consortia might include colleges of education, the private sector, professional societies, and subject matter experts, and could pursue projects such as:

- Make it easier for teachers and students to find high-quality resources on the Internet [Today, a new teacher doing a search on "Newton's Laws" on the Internet would get over 10,000 responses!];

- Coordinate the efforts of thousands of teachers and subject matter experts to contribute quality, Internet-based educational resources;

- Develop high-quality training materials in specific subjects that could be used at the summer institutes, or during the course of the school year; and

- Evaluate commercial software.

Goal 2: **Every elementary and secondary school should have at least one teacher that has significant training in the use of technology that can in turn train other teachers**

Rationale

- Ensuring that every school has one teacher that is adept in the use of technology could serve as a catalyst - especially if the initiative helps "train the trainers." (This is similar to our strategy for having at least one Board-certified teacher in every school).

- Currently, the Technology Literacy Challenge Fund allows but does not require states to invest in teacher training. Experts believe that educational technology efforts should spend at least 30 percent on professional development. Few states and local school districts do this -- because teacher training is not as "tangible" as purchasing hardware, software, and Internet connectivity.

Initiative

- Direct states to use 30 percent of the Technology Literacy Challenge Fund to provide intensive training to at least one teacher per school, and require that teacher to train his or her colleagues.

- States would have flexibility as to how to achieve this goal. It would tie in nicely with the "summer institute" program, since this could provide a mechanism to train existing teachers as well as new teachers.

Funding

We believe that the initiative to train all new teachers will cost $100 million in new money. The cost of training one teacher per school is roughly $100 - $125 million. This could be financed through a combination of increasing the Technology Literacy Challenge Fund from $425 million to $475 (as proposed in the current OMB passback) and using some of the base funds. This would attach some more strings to a program that has been a formula program, but we think that this is reasonable, given the importance of teacher training. We are not seeking a decision on the funding in this memorandum - this proposal needs to be weighed against competing priorities.

Bully pulpit

We also believe that the Administration can make progress on these goals through use of the bully pulpit. For example:

- During your speech to the National Board for Professional Teaching Standards, you urged the board to make the use of technology a part of their standards.

- Equally important, every state sets their own requirements for certification and recertification of teachers. You can challenge the Governors and the Chief State School Officers to work with their State Boards of Education to set the standards for teachers technological literacy. [One good example is the State of North Carolina that now has performance standards in use and integration of technology for both new teachers and for every teacher as their recertification period comes up.]

- Obviously, educators also need to be integrally involved in this initiative. After a slow start, the 21st Century Teachers initiative that you announced is beginning to gather momentum.

- You could also challenge the private sector to "adopt" colleges of education (those that lack technology resources and infrastructure) and schools, and to work with them to create teacher preparation programs for the 21st century.

Finally, this initiative links to our proposals for Title V of HEA, which are designed to strengthen teacher preparation programs.

Recommendations

This initiative is supported by Education and OVP. DPC and OMB have provided comments.

THE PRESIDENT HAS SEEN
6-8-98 | Copied
Sperling
Reed
Kahl /
COS

THE WHITE HOUSE
WASHINGTON

June 4, 1998

MR. PRESIDENT:

This Sperling/Reed memo seeks your approval of severa policy announcements already included in the new draft of Friday's MIT speech, which you will receive separately today.

Technology Literacy. Gene and Bruce ask you to announce a national goal of universal information technology literacy by the time students complete middle school. Literacy means having the ability to: use technology as a learning tool in core subjects; locate and synthesize information from multiple sources; communicate and present information using electronic media; and collaborate in teams using technology. They also propose challenging the states to make technology literacy a middle school graduation requirement.

Building on your previously announced FY99 Educational Technology Initiative, Sperling/Reed propose to: (a) target $180M over 3 years from the $2B Technology Literacy Challenge Fund to provide technology training to teams of teachers, who can train other teachers, in all middle schools with technology literacy requirements; and (b) support competitions to develop high-quality educational software and web sites ($5M/year for 3 years).

Approve ✓ Disapprove ___ Discuss ___

None of your advisors objects to these proposals.

Phil Caplan Phil
Sean Maloney

THE WHITE HOUSE

WASHINGTON

June 3, 1998

THE PRESIDENT HAS SEEN
6-8-98

MEMORANDUM FOR THE PRESIDENT

CC: THE VICE PRESIDENT

FROM: GENE SPERLING, BRUCE REED, TOM KALIL

RE: MIT COMMENCEMENT ADDRESS -- UNIVERSAL INFORMATION TECHNOLOGY LITERACY

Summary: We believe that you should use the MIT commencement address to set a national goal of universal information technology literacy by the time students leave middle school. We think there is a strong case to be made that this is a "new basic." To be full participants in the information economy and information society - our children need to be able to use information technology to acquire and synthesize information, prepare for a life-time of learning, and collaborate in the technology-intensive workplace of the 21st century. Information technology can also be a powerful tool for teaching and learning in all academic subjects. As of 1996, 10 states have already established some sort of requirement in this area - although most require a course or demonstration of competency for high school graduation.

This initiative builds on your Educational Technology Initiative -- the centerpiece of which is the $2 billion Technology Literacy Challenge Fund. You have set four goals: connecting all classrooms to the Internet, training teachers, increasing the number of computers in the classroom, and promoting the development of high-quality educational software. Since the press has tended to focus on the "wiring" goal -- the MIT announcement focuses on the ability of students to use the technology and teacher training.

To strengthen this initiative -- we believe that you should:

- Provide states that join with you to meet this goal with the resources to train a team of technology expert teachers in each middle school - who could in turn help train the other teachers. The cost of this ($180 million over three years) would be paid for by targeting a portion of the Technology Literacy Challenge Fund -- which is already slated to increase in the FY2000 budget.

- Support competitions to encourage the development of high-quality educational software and educational Web sites by students, university faculty, and commercial software companies -- and make it easier for teachers and parents to find high-quality resources. This would cost $5 million per year for three years.

Your vision of universal information technology (IT) literacy needs to be broader than the traditional definition of "computer literacy" - which has tended to focus on the basic skills required to use a computer and a few computer programs, such as a word processor or a spreadsheet. This is necessary but not sufficient. For example, students need to able to effectively use information technology to locate, extract, and synthesize information from multiple sources. They need to be able to use information technology to learn and express key concepts in all academic subjects - such as math and science.

Why should you call for universal IT literacy?

1. **Information technology can be a powerful tool for teaching and learning in all academic subjects**

IT literacy is not just an end in itself. The rationale for your Educational Technology Initiative is that information technology can be a powerful tool for teaching and learning across the curriculum. Students who are IT literate and who have access to technology are able to:

- Engage in project-based learning - such as collecting and sharing environmental information with students and scientists all over the world;
- Conduct research using primary material - such as the Library of Congress;
- Learn at their own pace, and get immediate feedback on whether they understand a new concept by using interactive courseware.

2. **Many high-wage jobs now require IT skills:**

- There is already a 10-15 percent wage premium for people who know how to use computers as compared to those who don't.
- Jobs in the information technology sector pay $48,000 per year, as compared to a private sector average of $28,000.
- Information technology is increasingly pervasive in all industries. Many firms are using information technology to customize products and services, forge closer relationships with customers and suppliers, and slash the time required to develop new products. A machinist, for example, may need to know how to operate a programmable machine tool.
- Although there is some debate about the exact numbers, many high-tech companies report that they cannot hire enough workers with IT skills, and that this is their number one constraint on growth.

3. **Being IT-literate will allow people to be full participants in the emerging Information Society:**

Information technologies are becoming so pervasive that people who are IT-literate will have more opportunities and will be able to make better choices -- as workers, parents, voters, consumers, owners of small business, and members of local communities. People who are IT-literate are able to:

- Be better consumers of health care by finding out what others are saying about the quality of care they are receiving from HMOs or individual physicians;
- Track the voting record of their member of Congress on issues they care about -- or get more information on a policy issue than the 30 second soundbite on the evening news;
- Tap in to an EPA database to find out what corporations are dumping toxic substances into the local environment;
- Work from home - or use the Internet to sell the products and services of their own small business;
- Log on to the web site of their local school to find out what homework their children are supposed to be doing, communicate more frequently with their children's teachers, and compare how their school is doing relative to other schools;
- Use "intelligent agents" to get the best price on a new car or a family vacation;
- Acquire a new skill to compete for a higher-wage job by participating in a "virtual university"; and
- Learn and adapt to future waves of technological innovation.

Proposed Administration "vision" for universal IT literacy

- Just as schools would not allow students to graduate from middle school without being able to read and write -- all students should be "IT literate" before they graduate from middle school.
- This is a "new basic" - but it clearly rests on a foundation of the fundamentals -- the first basic skills. Obviously, knowing to send e-mail or browse the Web is worthless without knowing how to read and write effectively.
- Being IT literate is about more than knowing how to turn on a computer and use a few computer programs. It requires demonstrating the ability to:

- Use technology effectively as a tool for learning in core academic subjects;
- Locate and synthesize information from multiple sources;
- Communicate and present information effectively using electronic media; and
- Collaborate in teams using information technology.

■ The Administration will call on educators and high-tech employers to develop a consensus on the important elements of IT literacy -- building on the experiences of states and local school districts that have been leaders in this area.

Technology training for teachers

Students will have a difficult time becoming technologically literate unless their teachers are as comfortable with a computer as they are with the chalkboard. As you noted in a speech you gave last year, "I met with a group of young people yesterday in their 20s who said .. 'What difference will it make if you connect every classroom in the country to the Information Superhighway if the teachers aren't trained to use the technology and the kids know more than they do?"

We think that it would make sense to provide states that set a goal of universal IT literacy with the funding to train a team of technology experts in each middle school - who could in turn help train the other teachers.

We estimate that the cost of this would be $180 million over three years - $30 million in the first year, and ramping up to $90 million in year 3 as all states establish universal IT literacy as a goal. It would be paid for by targeting a portion of the Technology Literacy Challenge Fund over the next three years -- which is already slated to increase in the FY2000 budget.

Schools would use the money ($20,000 over three years) to:

■ Provide intensive training during the summer to a team of teachers in each school; and

■ Provide follow-up training and release time so that these teachers can help train other teachers.

Competition for high-quality educational software

You could also use the speech to announce that the Administration will sponsor competitions for educational software and educational Web sites -- working with industry, educators, and other experts. These competitions would award prizes in different categories,

including students, university faculty, and commercial software developers.

These competitions would:

- Highlight the incredible ways in which students are using technology in the classroom. One recent contest encouraged students to develop interactive Web sites on Black History Month, tracking a stock market portfolio using real-time data, and modeling the tradeoffs between tourism and the environment in Hawaii.

- Help students, parents and teachers find higher-quality software by providing prizes to software and Web sites that are truly excellent.

- Provide grants to universities that developed the best ideas for developing educational software.

The cost of this proposal would be $5 million per year for three years.

Discussion

Pros

- Universal IT literacy is clearly an important national goal. Achieving this goal will help students improve their academic performance, prepare them for the workplace of the 21st century, and enable them to be full participants in the emerging Information Society.

- Even those parents who have a sense that technology has passed them by definitely want their children to participate in the Information Revolution.

- This initiative would also make progress on teacher training and educational software.

Cons

- It may be difficult to communicate that the Administration is promoting something that goes beyond the traditional, narrow definition of "computer literacy."

- The proposal could get caught up in the politics of the national standards debate.

Views of your advisors

This proposal is supported by the Department of Education, NEC, DPC, and OMB. Secretary Riley wants to make sure that you use the speech to defend the e-rate -- since it is under attack and is the biggest source of revenue we have to help reduce the gap between rich and poor schools. There is a section on the e-rate in the current draft of your speech.

January 29, 1999

A Digital Library for Education

"It is a time to build, to build the America within reach ... an America where every child can stretch a hand across a keyboard and reach every book ever written, every painting ever painted, every symphony ever composed."

- President Bill Clinton

Summary: This $35 million initiative will begin the development of a national library of text, images, sound recordings, and other materials available to every school-child and every American with access to the Internet. It will include: hundreds of thousands of America's historical and cultural artifacts that are now only accessible to scholars visiting archives; hundreds of thousands of books and images of paintings; and leading-edge material to help America's children meet high academic standards in math and science. Modern information technology gives us powerful new tools for making America's rich and diverse cultural legacy and educational content available to Americans of all ages.

This initiative supports the President's Educational Technology Initiative by making unique historic, cultural, and scientific materials available to teachers, children, and parents. It also supports the goals of the White House Millennium Project by "honoring the past and imagining the future." The Smithsonian Institution, the National Park Service, and other Federal agencies are the custodians of priceless records and objects of American achievements in the arts and sciences as well as the raw material of American history. Currently, only about one to two percent of these collections are on display at any given time. Fortunately, new digital technology and the Internet can make these materials easily available to homes and schools throughout America. The Administration will seek to leverage these funds by partnering with corporations, libraries, museums, archives, foundations, and other organizations.

Elements of the Initiative:

1. America's Treasures Online ($5 million, Smithsonian and $5 million, National Park Service)

The Federal government is the custodian of such things as the Apollo 11 command module, Rose Kennedy's personal tour of the John F. Kennedy birthplace, the Gettysburg battlefield, Ansel Adams photographs of Yosemite, the compass Lewis and Clark used to explore the American West, immigration records of Ellis Island, and Thomas Edison's laboratory notes. These funds will allow the Smithsonian and the National Park Service to digitize, index, and make available on the Internet not only pictures and documents, but music, oral history, 3-dimensional objects, and virtual tours of cultural sites like historic buildings or battlefields.

2. **Digitizing the classics and putting museums online** ($10 million, Institute for Museum and Library Science)

This initiative will digitize hundreds of thousands of books that are in the "public domain," such as the complete works of Mark Twain, the Federalist Papers, Shakespeare, the Odyssey and the Illiad, Nathaniel Hawthorne, Ralph Waldo Emerson, the great Greek philosophers, Dante's Inferno, Charles Darwin's diary, Henry David Thoreau, John Locke, Jane Austin, etc. Uses will expand rapidly as better screen resolution, longer battery life, and lower costs make it as easy for students to read electronic books as their electronic equivalents. Students will be able to download entire books from the Internet, carry many books in one lightweight device, and search large archives for material. The Administration intends to work closely with the publishing industry to ensure full compliance with U.S. copyright laws.

This initiative will also support the digitization of hundreds of thousands of images, paintings, sculptures and other works of art from museums around the country.

3. **Digital Library for Math and Science Education** ($15 million, National Science Foundation)

The Third International Mathematics and Science Study (TIMSS) found that the performance of U.S. secondary school students in science and mathematics is well below the international average. As the National Science Board concluded, "No nation can afford to tolerate what prevails in American schooling: generally low expectations and low performance in mathematics and science, with only pockets of excellence at a world-class level of achievement ... In the new global context, a scientifically literate population is vital to the democratic process, a healthy economy, and our quality of life." This initiative will help address this problem by supporting a digital library for math and science education, which might include:

- Tools to make it much easier for students and teachers to find high-quality resources, using specialized search engines and "peer review" mechanisms.

- Hands-on, interactive content that makes math and science come alive and enables students to "learn by doing." Students could track the progress of a real scientific experiment, or understand a concept using simulation and multimedia.