

THE WHITE HOUSE

WASHINGTON

March 24, 1994

MEMORANDUM FOR BILL GALSTON

FROM: PAUL DIMOND
SUBJECT: LEARNING LEVERS

I met today with the folks from the NEA on Keith Geiger's plea to make sure that classrooms in America are hooked up to the NII. Of particular note, we discussed a national goal of hooking up all (or 90%) of classrooms and homes to the NII by the year 2000. This would provide a lever for increasing the productivity of learning in schools (and at home) by connecting teachers (as coaches of learning games) to families for the 90% of time that children don't spend in school from birth to age 18. This is the kind of dramatic goal that the President could announce early this fall. Such a goal could also be met if we are smart enough, and it holds real promise for revolutionizing learning productivity in short order. Such a goal could capture the imagination of the public at least as much as JFK's race to the moon, with far greater benefits to the entire economy. The initial indication is that Keith Geiger and the NEA would be major supporters of such a goal. Bill, at an appropriate time, you may want to explore this more fully. (In one of my former lives, I represented the NBPTS, of which Keith was a founding board member and major force so he has some confidence, I hope, in my judgment and credibility).

There are a number of technical, regulatory, financing (mostly off-budget), and political issues here, but I think none stand in the way of achieving the goal if we choose to make it a priority. There are a number of different players within the Administration addressing these issues, and I will get the full lay of the land over the next couple of weeks. My short-term goal is to be prepared to explore the issue fully with our ETR group within a few weeks at an extended session, with presentations from Mike Smith, John Deutsch (or his representative), Dave Barram or Ev Ehrlich from Commerce, Tom Glynn from DOL, and Henry Kelly from OSTP. As key regulatory decisions about the NII (and federal support for research on the content of learning levers) are going to be made this year, we need to close on the priority of such a national goal for the President sometime this spring if we are going to shape the federal regulatory (and research) process to support such a goal.

cc Bo Cutter
Belle Sawhill
Gene Sperling

THE WHITE HOUSE

WASHINGTON

May 15, 1994

MEMORANDUM FOR BO CUTTER, PAUL DIAMOND, HENRY KELLY, MIKE SCHMIDT

FROM: Tom Kalil TAK

SUBJECT: Enhancing the productivity of life-long learning

Information and communications technology has the potential to substantially increase the productivity of America's systems for life-long learning.

Moreover, as the Computer Systems Policy Project has noted:

"Success in the knowledge-based society of the future will require a variety of critical skills, including active, self-directed learning, the ability to access, analyze and manipulate remote data, and the ability to communicate across regional and national boundaries. In the job markets of the future, employers will demand workers who can learn new skills to adapt to changing job requirements, use knowledge and information to make decisions, and work collaboratively in groups. **Most Americans are not acquiring these types of skills as part of their education today.**"

Although technology should not be viewed as a "silver bullet" -- it can make a difference, particularly if used in the context of education reform and changes in our re-employment strategies. For example, today's Internet, a working prototype of tomorrow's information infrastructure, is being used to change the way teachers teach and students learn:

- Students are able to browse through networked, multimedia information on virtually every subject;
- Children all over the world are collaborating on projects such as global environmental monitoring;
- Communities of teachers are able to share experiences and lesson plans;
- Students use remote supercomputers and scientific instruments to conduct experiments, with on-line help from professional scientists; and
- Teachers can communicate more readily with parents.

Similarly, many companies are discovering that they **must** use information technology to help their work force keep pace with changes in their new products and services.

To take maximal advantage of these technologies, we need to make progress on a number of fronts:

1. **Professional development:**

Teachers won't use this technology as part of the curricula if they don't know how to use it. New ways of training teachers to use this technology must be developed.

Current activity: Some portion of the Education Department's \$50 million program is supposed to support professional development.

2. **Connections and equipment:**

Many schools lack the physical connectivity or the equipment to participate in the Information Revolution.

Current activity

- The President and the Vice President have set a goal of connecting all classrooms to the NII by the year 2000.
- Legislation before Congress would make this a goal, and authorize the FCC to explore preferential tariffs.
- Legislation authored by Senators Kennedy, Cochran, and Bingaman (S. 1040) would authorize \$340 million for educational technology. Appropriators, however, are unlikely to provide full funding for the Administration's request of \$50 million.
- Several telephone companies have made some pledges in this area, such as Bell Atlantic, PacBell, GTE. However, in some cases, they are just providing a wire to the school, which is inadequate.
- Many states, such as Texas, are moving aggressively to provide connectivity for schools.

Desirable outcome:

- Legislation is passed which would make connections to classrooms part of the definition of universal service.
- The Administration would determine whether legislation such as S. 1040 is necessary, and if so, work with Congress on language and funding levels.
- The federal government would work with states, educators, and the private sector to develop cost models.
- The federal government would provide challenge grants and technical assistance to states and communities.

3. Content/Applications

Current activities:

- Individual agencies are putting government information on-line that has educational applications. NASA, for example, plans to spend \$10 million to make earth and space data available to the public, with an emphasis on K-12 applications. DOE has developed an on-line "hyper-textbook" for computer science.
- The Vice President recently announced a major initiative to support global environmental education (GLOBE).

Desirable outcome:

- Concerted effort to identify government information with educational applications to organize and put on-line.
- Examine obstacles to electronic commerce in instructional material.
- The Department of Labor has a number of partnerships with industry to define the "core competencies" that workers in a given industry will require. One possible next step would be to encourage industries to develop interactive instructional material that could be delivered via a variety of platforms, including the Internet, satellite, CD-ROM, video server, etc.
- The federal government expands the number of resources such as the National Educational Supercomputer Center (NESC) that can be used nation-wide for education and training applications.

4. **Research and development:**

Current activities:

- Some of the Administration's High Performance Computing and Communications Initiative is supporting R&D that is relevant, such as digital library technology, tools for information discovery and retrieval, etc.
- TRP is funding a consortia that is developing authoring tools for multimedia educational software -- with the goal of reducing the cost and time for a non-computer expert to develop material by a factor of 10.
- The NSTC Committee on Education and Training, chaired by Governor Kunin, is responsible for proposing the FY96 R&D budget.
- The NSTC Committee on Industrial Technology has proposed a National Electronics Manufacturing Initiative, which will help industry develop the technologies for the next generation of small, mobile information appliances. Hand-held intelligent tutors may be one possible application.

Desirable outcome:

- The Administration works with industry and academia to determine what the gaps are in education and training R&D, and proposes a new "focus area" through either the Advanced Technology Program or the Technology Reinvestment Project.
- The Defense Department identifies education and training technology that could be transferred to the civilian sector.
- [Note: Many of the technology requirements for education and training -- e.g. tools for information discovery and retrieval -- are requirements for a wide range of NII applications. In these instances, the education and training community doesn't need to develop these technologies, it just needs to be able to adapt them for its own use.]

5. **Examine links between technology and Administration's education and training initiatives:**

- It is not enough to create a small technology office at the Department of Education and the Department of Labor. Technology should be an integral part of Administration initiatives in re-employment, adult literacy, worker training, and education reform.

Desired outcome:

- Administration develops linkages between technology and the core Education and Labor programs. Examples:
 - Currently, many schools use Chapter 1 funds to purchase "Integrated Learning Systems." Used differently, Chapter 1 funds could promote an evolution of the market beyond these "drill-and-practice" systems.
 - The Department of Education's Library Services and Construction Act (LSCA) could concentrate more on developing digital libraries.
 - The Department of Labor's re-employment strategy could include support the development of on-line labor market information, interactive courseware for skills development, adult literacy, and remedial skills. This could be done in partnership with firms and industries, many of which cannot find workers with necessary skills like SPC (statistical process control).

6. **Other:**

- **Budget:** We need to ensure that the FY95 request is fully funded (e.g. the \$50 million request at Department of Education, the \$100 million request for NTIA NII pilot projects, etc.) - and that these initiatives are adequately funded in FY96.
- **Evaluation:** We need hard evidence that technology, used appropriately, actually improves student performance and enhances worker skills.
- **Clearing-house:** States, school districts and schools are re-inventing the wheel because of the absence of easily accessible information on educational technology.
- **Challenge to industry:** Many people have noted that if we could combine what we know about learning and cognitive science with the entertainment skills of Nintendo and Sega -- we would have some impressive education products. The Administration should determine how to challenge the industry to invest more in this kind of product development.

THE WHITE HOUSE
WASHINGTON

September 11, 1994

MEMORANDUM FOR GENE SPERLING

FROM: PAUL DIMOND

SUBJECT: TECHNOLOGY AND LEARNING

CC: BILL GALSTON
HENRY KELLY
MIKE SCHMIDT

Please find attached my first attempt (with Henry and Mike's help) to put together the grist on technology and learning that may be useful to you, both in preparing for the meeting with Waldman and Kollenberger on message and for any larger budget and strategy questions you may wish to consider. The package includes: a brief articulation of possible themes and a list of major Administration initiatives in learning and technology (with two attachments that give different cuts at investments in R&D).

Please note that in our possible themes we have not attempted to offer a tag line or goal, like "Three Strikes and You're Out" or "All Children Prepared to Learn when They Arrive at School." We leave that to you and the brainstorming session with others.

We do know, however, that the goal of "All Americans Computer Literate by the Year 2000" is substantively wrong: by the year 2000, we may not even call the most versatile, effective, and user-friendly interactive communication devices "computers." The analogy here is to a "horseless carriage" (if not to a horse and buggy): the computer as we know it may be as obsolete by the year 2000 as the horseless carriage (or the horse and buggy) proved to be compared to the car and the airplane at an earlier time. Put another way, focussing on computer literacy now runs the risk of being well behind the technology and learning curve instead of making a call that will equip all Americans with the real skills that will help us reap new sources of prosperity well into the next century. The news media is already beginning to recognize this difficulty and is beginning to talk about the computer being merged with the telephone, the tv, cable, wireless and the NII into a "set-top box."

If you need any additional details on budget amounts, strategies, or descriptions of particular initiatives, we will be glad to get those together for you in whatever form best suits your needs. Your instincts on the BIG picture here are right on the mark -- once again!

TECHNOLOGY AND LEARNING -- Themes

1. Arm Families and Firms with the Tools they need to Thrive. The President's economic plan is designed to arm all American families and firms with the tools they need to prosper, now and in the decades to come. There are two key elements to this strategy: to invest continuously in the learning of all Americans throughout their lives so that they will have the skills they need to earn high wages and to increase the value of their work so that they and their families can live a better life; and to invest in the basic conditions essential to increasing the technological advantage of American workplaces and firms so that they become more productive at home and competitive abroad in the increasingly global marketplace. Every American family and firm will then be armed with the tools they need so that they can take responsibility for the extraordinary innovation and achievement that will enable all of us to thrive in the new global economy and to prosper into the 21st century.

2. Make Another Successful Crossing to a new Era during a time of Historic Transition. Americans have long had the courage, imagination, and will to make a successful crossing from one era to another -- whether in the crossing of our most of our forebears across the ocean to a new land or across the country to a new frontier, or in the crossing from an era of war and confrontation to an era of competition and prosperity. Perhaps, the most direct analogy is the choice that America made with such great success during the last great post-war era. During another time of anxious transition following World War II, America chose to engage a devastated Europe and Japan in building a new international system of finance, open markets, free enterprise, democracy and strategic alliances to contain the Soviet empire abroad and to invest in the GI Bill, the national defense education act, the national interstate highway system, and a broad range of research and development at home. The domestic investments armed American families and firms with the tools they needed to compete and to prosper during the first half of the Cold War era. From 1947-1972, American productivity increased at a rate of 3% per year, wages and incomes increased apace and a great, rising American middle class -- open to all who were willing to learn and to work hard -- grew and prospered.

In 1993, America faced another historic transition following the end of the Cold War and the disintegration of the Soviet Empire and state-run economics. Once again, working cooperatively with our allies and the increasing numbers of free peoples and nations seeking to reap the economic benefits of free enterprise around the world, the President has worked to create new opportunities for economic growth through expanding free trade around the world.

At the same time, President Clinton's economic plan invests at home in the learning and technology that will arm America's families and firms with the tools they need to build another generation of prosperity for a new, rising middle class -- open to all who are willing to learn and to work, harder and smarter -- into the next century.

3. America's Choice: High Skills or Low Wages. For two decades, from 1973-1992, family incomes in America stagnated, wages for the average male declined, inequality in personal income and wealth increased, job security declined, and productivity rose at only 1% per year. These trends have been experienced by all Americans for almost a generation and

contribute to the anxiety that most Americans now feel about the ability of American families and firms to prosper in the face of the new competition in the post-Cold War era -- from new free market economies in the former Soviet block in Eastern Europe, in Asia and throughout the Third World, as well as from the expanding free market enterprise in Japan and Western Europe.

Given the changing means of production and the increasing globalization of free market economies, it would be a tragic mistake for America's workers and firms to compete in the years ahead in world markets based on wages alone: in the new economy, high wages will have to be earned by high skills and adding value to goods and service; technological advance, firm innovation, and global competition all mean that lower skills will earn relatively lower wages than high skills. America's choice is, therefore, simple: (a) high skills or (b) low wages. High Skills, new technology, innovation, and high performance work where continuous learning is embedded in adding value to the production of goods, services and information provide the lever for higher productivity, wages, and living standards for all Americans. Put simply, technology and learning provide the means to arm all American families and firms with the tools they need to prosper in this new economy.

4. The New Prosperity: High Technology + Higher Average Skills = Rewarding Jobs for All. The new economy offers tremendous sources of prosperity for all American workers -- rewarding jobs, higher pay, higher involvement in workplace decisions, and constant opportunities for advancement, innovation and adding value to our work, our firms, our families and our communities. We can reap these rewards if we are willing to invest in increasing the skills of all Americans and in the basic building blocks for new technologies that can make America's workers and workplaces the highest value in the world.

President Clinton's economic plan does just that -- by investing in improving learning so that all Americans can upgrade their skills to world class standards; by investing in fundamental science and basic research that underpins all economic innovation; by establishing the conditions to enable private invention and investment to capitalize on our key advantage in national information infrastructure, telecommunications, interactive multi-media programming, medical discovery; by supporting defense and domestic R&D that encourages effective partnerships with our world-class private, university, and government laboratories, research centers, and application extension services.

The goal of these new investments is not to pick winners or losers -- among people or between specific technologies. Instead, we are investing in creating the favorable economic conditions (a) in which all persons and firms can continuously upgrade their skills and organization to reap the benefits of new technologies and (b) by which major advances can be made in broad categories of technology essential for America's firms and workers to lead whole markets (e.g., new generations of vehicles, electronics, and other advanced manufacturing and of medical and health products and procedures) and to build whole new industries (e.g., information and communication superhighways, interactive multimedia programs, biomass/renewable energy). Such investments will equip all American workers with the skills and the tools they need to earn high wages now and in the generations ahead.

Clinton Administration Technology and Learning Initiatives:

Lifelong Learning

Headstart/Even Start

WIC, Immunization

Goals 2000 [list major examples of goals/objectives; implementation strategy]

School-to-Work [list major objectives; implementation strategy]

Direct Student Loans [Empower individuals to invest in increasing skills at any time in life and repaying through future earnings]

National Service

[Welfare Reform]

[High Performance Workplace -- encouraging firms to embed continuous learning and innovation in the means of design, production, marketing and delivery of goods and services]

[Adult ETR/Labor Market Reform -- to enable all workers to navigate their own careers through continuous learning and finding the firms that will reward and invest in their skills and to enable all firms to find the workers with the skills they need to continuously add value]

[Replace Unemployment System with Recmployment System (REA)]

Technology/Innovation

NII

Telecommunications Bill [list key components]

Dual Use and TRP

ATP and Manufacturing/Service Extension Centers

Basic Research (Health, Science, Space Station)

Basic Technologies for 21st Century (e.g., Clean Car/New Car, High Performance Computing, Electronics Manufacturing, Building Systems, Renewable Energy/Biomass)

[See also Attachment A: Major Science and Technology Investments
Attachment B: Federal R&D]

Technology and Learning

TLC Components -- Learning Challenge, Deployment, Procurement, Programs, R&D

Integration of Manufacturing, Service, High Performance Workplace Extension Centers

Major Science and Technology Investments

The total federal R&D budget is roughly \$70 + billion. Below are some of the elements that contribute most directly to long-term economic growth and job creation.

1. Basic research, esp. NSF, NIH and DOD
2. Commerce Department technology programs
 - Advanced Technology Program
 - Manufacturing Extension Partnership
 - NIST intramural research
 - NTIA "information highway" grants
3. Focused initiatives
 - High Performance Computing and Communications
 - Advanced Manufacturing
 - Environmental technology
 - "Clean Car" (get official name)
 - National Flat Panel Display Initiative
4. Defense conversion
 - Technology Reinvestment Project
 - "Dual use" investments by ARPA
5. Technology transfer
 - Lab-industry partnerships

In addition to these investments, the Administration has pursued a number of policies designed to strengthen U.S. technological and industrial leadership, including:

1. NII initiative
 - Telecommunications policy reform
 - Allocation of spectrum for new wireless businesses
 - Promotion of applications in life-long learning, digital libraries, health care, delivery of government services, electronic commerce, etc
 - Information policy
2. Tax incentives for small businesses and for research and development
3. Export promotion through high-level advocacy, export promotion, and export control liberalization

The attached three graphs provide a rough cut at where FY95 federal spending for R&D will go. The numbers are preliminary and only designed to give a rough picture of allocations.

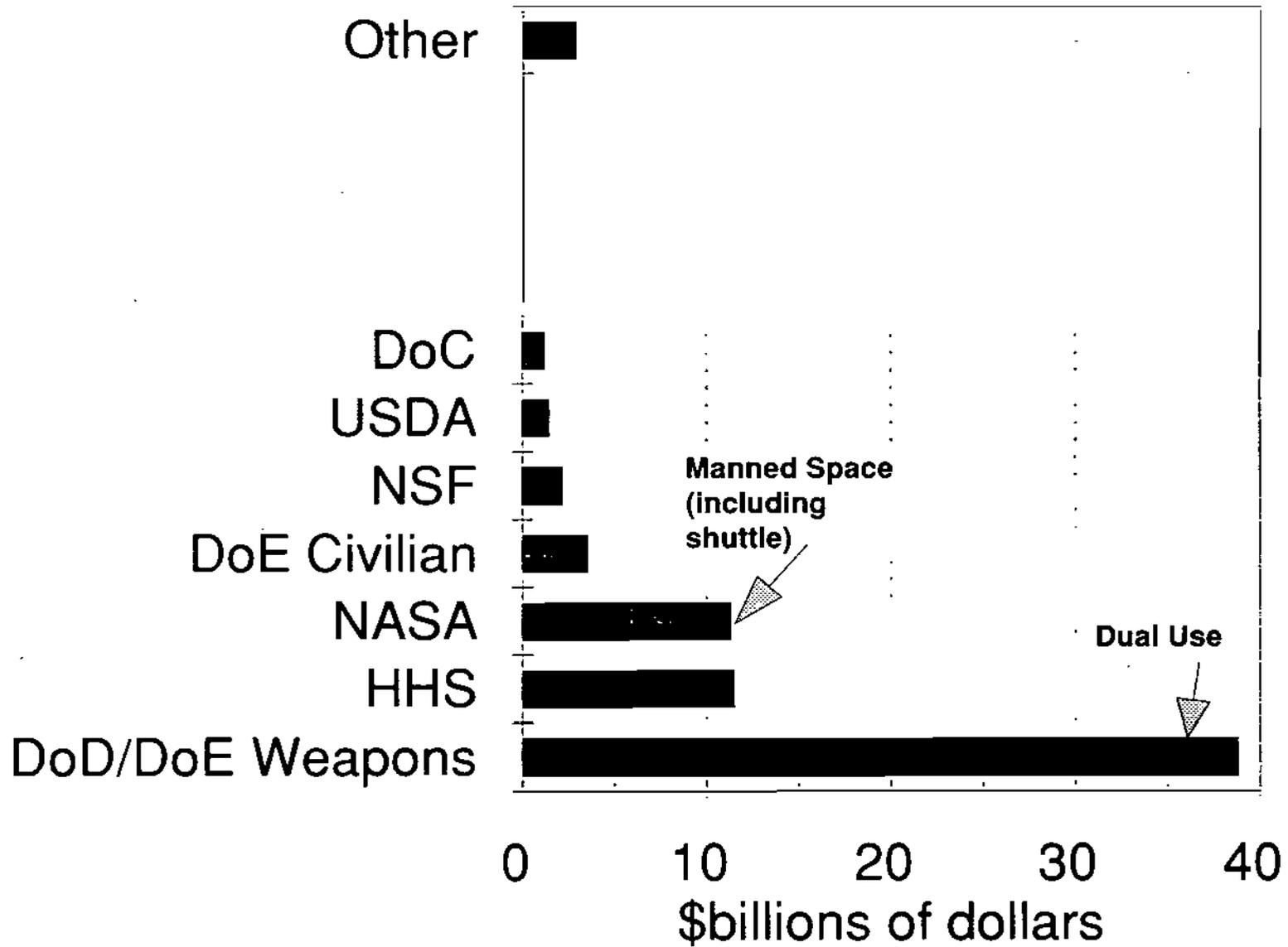
The **first chart** shows spending by agency (including funding for shuttle operations). The "dual use" item shown in the DoD/DoE weapons programs are projects that our first reviews suggest can serve both civilian and defense requirements. These dual use investments may shrink since DoD is under pressure to eliminate "dual use" projects lacking a clear and direct connection to a national security mission.

The **second chart** allocates R&D spending into civilian objectives -- the functions are roughly the areas covered by different committees of the National Science and Technology Council. Spending in DoD and DoE which does not appear to have a dual use application is not shown.

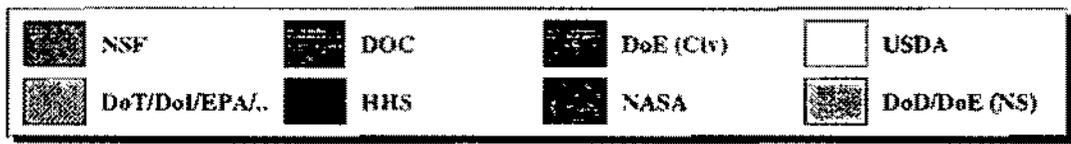
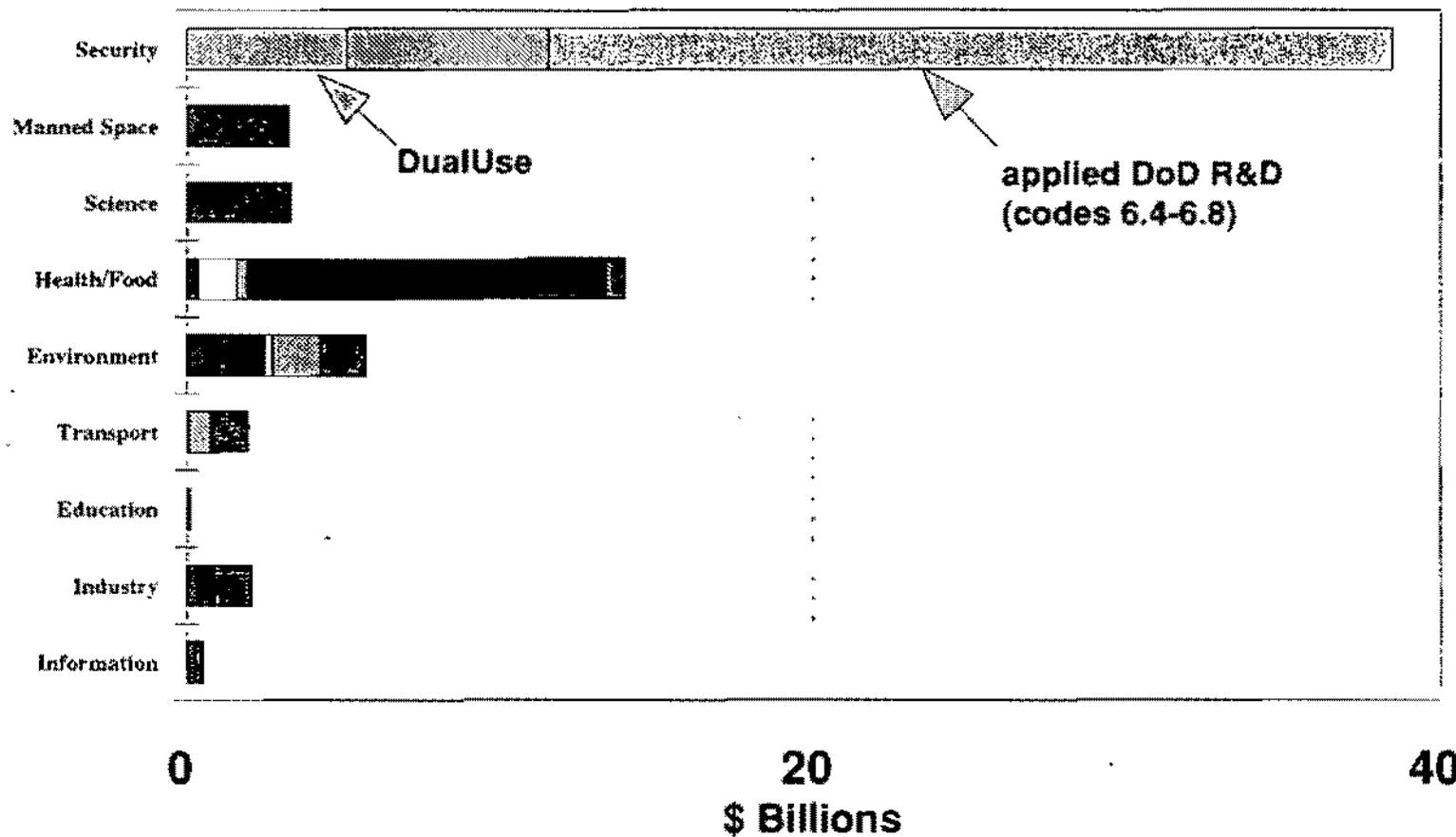
- Manned space is the space station but in this case does not cover the full cost of shuttle operations. Including all shuttle costs would increase the spending to about 5.5 billion.
- Science includes only the spending for fundamental science that is not clearly supporting a major mission in the environment, health or other area.
- Health and food are dominated by spending in NIH.
- Environmental spending includes major NASA and DoD programs in mission to planet earth as well as spending for the development of new energy systems.
- Transportation R&D spending is dominated by NASA and DoD investments aeronautic research and commercial space launch.
- Education and training R&D is small with at least half of the funding coming from DoD's development of advanced training techniques. We are working to refine these estimates because no good accounting has ever been done.
- Civilian Industrial technology includes work on our proposed focus areas (clean car, electronics, building construction) as well as large investments from the ATP program in commerce and the TRP program in DoD.
- The information category includes the Administration initiative in high performance computing and communication.

The **third chart** shows allocations if DoD dual use spending is not allocated to the civilian sectors and if research focused exclusively on DoD requirements is included. DoD research in categories 6.4-6.8 represent highly applied research -- testing operational prototypes of vehicles etc.

(FY 95 approximate)



Federal R&D for FY 95 (with all DoD \$70.4 Billion)



NEC STAFFING MEMORANDUM

Date: 1.17 Action/Concurrence/Comment Due By: _____

Subject: Kalil Memo TO U.P. ON NetDay

	ACTION	FYI		ACTION	FYI
Laura Tyson	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Mark Mazur	<input type="checkbox"/>	<input type="checkbox"/>
Bo Cutter	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Elaine Mitsler	<input type="checkbox"/>	<input type="checkbox"/>
Gene Sperling	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Aaron Rappaport	<input type="checkbox"/>	<input type="checkbox"/>
Tom O'Donnell	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Dorothy Robyn	<input type="checkbox"/>	<input type="checkbox"/>
Pauline Abernathy	<input type="checkbox"/>	<input type="checkbox"/>	Ellen Seidman	<input type="checkbox"/>	<input type="checkbox"/>
Lael Brainard	<input type="checkbox"/>	<input type="checkbox"/>	Daniel Taberski	<input type="checkbox"/>	<input type="checkbox"/>
Julia Chamovitz	<input type="checkbox"/>	<input type="checkbox"/>	Helen Walsh	<input type="checkbox"/>	<input type="checkbox"/>
Paul Deegan	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Dena Weinstein	<input type="checkbox"/>	<input type="checkbox"/>
Michael Deich	<input type="checkbox"/>	<input type="checkbox"/>			
Paul Dimond	<input type="checkbox"/>	<input type="checkbox"/>			
Chris Dorval	<input type="checkbox"/>	<input type="checkbox"/>			
Wendy Einhellig	<input type="checkbox"/>	<input type="checkbox"/>			
Jason Goldberg	<input type="checkbox"/>	<input type="checkbox"/>			
Elgie Holstein	<input type="checkbox"/>	<input type="checkbox"/>			
Gay Joshlyn	<input type="checkbox"/>	<input type="checkbox"/>			
Tom Kalil	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Bob Kyle	<input type="checkbox"/>	<input type="checkbox"/>			
David Lane	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Liz Lindemuth	<input type="checkbox"/>	<input type="checkbox"/>			
Sonya Matthews	<input type="checkbox"/>	<input type="checkbox"/>			

Remarks: _____

Response: _____

David J. Lane
Executive Director
456-5352

THE WHITE HOUSE

WASHINGTON

MEMORANDUM

To: Vice President Gore
From: Tom Kalil TAK
Re: Background on NetDay
Date: January 17, 1995

What is NetDay?

As you know, NetDay was announced on September 21 by you and the President at the San Francisco Exploratorium. A number of high-tech companies agreed to organize an effort to "wire" as many of California's schools as possible. In addition, companies such as MCI, AT&T and AOL have agreed to provide free Internet access to all California schools.

Companies, engineers, parents and other volunteers can sign up on the World Wide Web to help a particular school. There are now individual home pages for each of the roughly 10,000 public and private K-12 schools in California.

On NetDay (March 9th), volunteers that have signed up for a particular school will work with school officials to install internal wiring. Those schools that are not yet organized by March 9th may do this later in the school year.

What progress has been made since the announcement?

- * A Web server has been developed that allows people to get more information on NetDay, volunteer on-line, find out who the principal of the school is, and see who else has agreed to volunteer for a particular school.
- * State Superintendent Delaine Easton has organized a series of regional briefings to involve superintendents, principals and educators at the local level. The first of these are being held on Friday (the same day you will be in San Jose) in San Diego and Shasta county.
- * The President is sending a letter to major employers and industry associations urging them to participate.

- * Thousands of volunteers have already signed up. A media blitz is in the works to recruit more.
- * Two schools in Silicon Valley have already been wired as test cases, including Arundel, the school you will be visiting.

Important points to emphasize

- * NetDay is an important first step. We also need to expand the number of computers in the classroom, train teachers to make the best use of this technology, and develop compelling educational software and applications that are integrated into the curriculum. We hope that NetDay acts a catalyst for closer relationships between the school and the community that last well beyond March 9th.
- * We need to make sure that NetDay happens across California, particularly in disadvantaged urban and rural school districts.
- * [The local media coverage must include a reference to the address for the Web site so that more people will sign up. The URL is <http://www.netday96.com>.]

NetDay as model for a new kind of politics?

If NetDay works as planned, it could serve as an interesting model for a new kind of politics. It is:

Self-organizing and "bottom-up": A community forms around each one of the 10,000 schools and its home pages, as opposed to being centrally managed.

On-line: Registration and dissemination of information is being done on-line.

Results-oriented: NetDay is based on accomplishing a clearly defined task.

Designed to foster accountability and transparency: Eventually, the WWW server will display a map of California with "dots" indicating where there is activity. This will let communities know where they stand relative to other parts of the state, and help organizers direct volunteer efforts to parts of the state that need it most.

Attached is a copy of the letter that President Clinton is sending to California CEOs and industry associations.

95Apr4Tues

Schools on the Net

NOTE: This is only a test. This is not the truth, yet.

Summary

On Net Day '95, on Saturday, August 26, one hundred thousand parents and volunteer engineers will wire ten thousand schools in California with the technology needed to place those schools on the Internet.

List of all schools in California; by city; by school district Look here or here for map for an example of what this might look like.

This project is supported by the California Department of General Services: Office of Local Assistance, administered by Oscar Wright 916.445 3377, and the California Public Utility Commission, chaired by Daniel Foss.

High-technology companies supporting this effort include

- * Sun
 - * Hewlett-Packard
 - * Silicon Graphics
 - * Xerox
 - * Cisco
 - * 3 Com
 - * IBM
 - * Apple
 - * Pacific Telesis
 - * Fluke
 - * Siemon
 - * Cabletron
 - * Sasco Data Systems, Charleston Road, Mountain View
 - * Netcom
 - * MCI
 - * Sprint
 - * Pacific Gas and Electric
 - * Southern California Edison
 - * GTE
 - * Books That Work
 - * BellCore
 - * BARRNet
 - * and hundreds of others.
-

Sponsoring organizations include

- * California Teachers Association
- * California Parent-Teachers Association
- * CAL PERS

- * IEEE
- * ACM
- * Lawrence Berkeley Laboratory
- * Oak Ridge National Laboratory
- * United States Marine Corps
- * Lawrence Livermore National Laboratory
- * NASA-Ames
- * Communication Workers of America
- * International Brotherhood of Electrical Workers
- * National Association of Broadcast Engineers and Technicians
- * Society of Motion Picture and Television Engineers
- * Far West Labs
- * Wired Magazine
- * San Francisco Foundation; Sloan Foundation;
- * KPIX-TV, KOED-TV,
- * Los Angeles Times

Educational Organizations that support NetDay '95:

- * State Superintendent of Education Delayne Eastin
- * California Department of Education
- * Computer Using Educators (CUE)
- * Teach for America
- * University of California
- * California State University
- * California Community Colleges

Funding for this project comes from the participating companies and institutions, from individual contributions from parents and communities, and from local communities and school boards.

Organizations that have developed a curriculum and course work about how this all will work include:

- * Foothill Community College
- * De Anza Community College

Table of Contents

First, are you capable of participating? Test One: do you have any people interested in this? If not, stop, and read the rest for your enjoyment. Test Two: do you have one or two hundred dollars to spend on something? If not, you can't play.

- * How to survey your school and write the plan for what is needed

Important Guide: get a copy of the California Department of Education K-12 Network Planning Guide, \$11.75 , email to cteach@goldmine.cde.ca.gov, 916. 657 5414

- o How to count the classrooms
- o How to measure distances the wire will go

- o How to decide what goes where
- o How to understand what the buildings you have are made of
- o How to prepare a bill of materials, or list of what you need
- o How to draw plans of your school that everyone can understand
- * Who will help you survey and write the plan
- * How to write the plan for the parents, the school board, the teachers and the students
- * How to figure out how much it will cost
 - o Bill of materials
 - o Number of people needed
 - o Special labor skills
 - o Special tools
 - o Special construction problems
- * What you need to look for in your school that may require special help
 - o Special construction problems: asbestos, concrete brick, brick, stucco, widely-spaced buildings
 - o Special construction advantages: steam tunnels, air conditioning and heating ducts, undergrounded utilities
 - o Special administrative problems: who needs to be involved in design, in permissions, in maintenance of the system
 - o How to unify all sites, so that each site doesn't reinvent solutions
 - o How to help administrators understand the technology
 - o Special legal and liability problems: laws that prohibit parents from working on the physical plant, insurance restrictions that do the same
- * Who can provide special help for these problems
 - o Special communications providers: power utilities, water utilities, wireless providers, cable systems, cellular providers, telephone companies, police, fire, hospital
 - o Local experts: businesses, National Laboratories, NASA, FFRDC's, universities, community colleges
- * How to wire the school
 - o Manual for surveyers
 - o Manual for parents, teachers and students
 - o Manual for testers of network installation
 - o Manual for school board and school administration
- * How do you organize for Saturday morning?
- * How do you get a movie star, an astronaut, a scientist, a local TV station or radio station, or a politician to come to your school to help?
- * How do you test the network when it's done
 - o How to be sure it works
 - o How to get the Category Five Wiring Certificate, as well as a Fiber Wiring Certificate
 - o How to prepare for connecting computers and other equipment
- * What do you do after the wires are in the classrooms?
 - o Preparing a plan for connecting to the Internet
 - o Preparing a budget for equipment and staff time
 - o Scrounging as much as possible: how to separate the junk from the useful
 - o Putting in a modem pool for teachers and parents, perhaps with public agencies in town
 - o Establishing training certificates for teachers

-
- o Provide some alternate path to keyboards for the typing teacher
 - How do you use Internet access to make teaching and learning better?
 - o Building links to the existing curriculum
 - + Current events
 - + Writing
 - + Scientific visualization and simulation: weather, crops, satellite imagery
 - o Building new approaches to curriculum
 - + Learning to search and link
 - + Community building through MUD and MOO
 - + Making the local community visible: links to police, fire, hospital, city hall, county, legal, streets, stores

THE WHITE HOUSE

WASHINGTON

July 7, 1995

MEMORANDUM FOR DISTRIBUTION

FROM: Gene Sperling, NEC
Jack Lew, OMB
Lionel S. Johns, OSTP

SUBJECT: Technology Investments in the FY96 Budget

Investments in technology have been a central theme of this administration from the beginning. The 104th Congress is proposing massive reductions in many of these programs. The net impact of cuts is difficult to monitor both because technology investments appear in a number of agency budgets, and because they are often only a small part of the total agency budgets.

We would like you to participate in a meeting on Tuesday, July 11 at 2 PM in OEOB Room 230 to help us understand the status of technology funding in Congressional FY96 budgets and to develop a coordinated strategy for defending these programs. We also want to establish an efficient way to track technology funding throughout the government as this year's budget process unfolds.

Please come prepared to provide:

1. A summary of the status of technology budgets in your agency in the Joint Budget Resolution, and actions by House Appropriations and authorizing committees;
2. The most important programs at risk because of proposed budget reductions;
3. Concrete, easily understandable anecdotes describing what will be lost as a result of the reductions; and
4. Descriptions of actions your agency is taking to defend technology programs, including efforts to build support from the business community, and a review of which techniques appear to be most and least effective.

**CONNECTING THE CLASSROOMS:
JUST DO IT!**

Summary: A senior executive at Sun has volunteered to lead an effort to get high-tech companies to wire the California schools. Companies would direct their employees to spend a day (or more) running cable through the classroom.

Background: One of the barriers to connecting every classroom to the information highway is that schools lack "inside wiring." Once the school is connected by a Local Area Network, it is much easier to connect all of the PCs in the school to each other and to other networks such as the Internet. The cost of the physical material is low compared to the labor costs, so having companies donate skilled labor would be a big plus.

In addition to the high-tech employees, the President could announce that federal employees (military, NASA and DOE engineers, etc.) would participate in California and other places around the country where similar efforts are being organized. One additional idea that has been proposed is that Americorps volunteers would receive training to do this.

Coverage: This would cover 20 percent of the schools, and if successful, could serve as a model for similar efforts in other parts of the country.

Pros: This is a concrete step that demonstrates Presidential leadership and a willingness on the part of the private sector to meet goals that the President has articulated. Furthermore, it illustrates a very important point. Although connecting all the classrooms is a huge job -- it is not impossible if communities around the country take responsibility for getting it done. We have to be able to leverage the "small efforts of the many" -- as opposed to the "large efforts of the few."

Cons: The "inside wiring" is only one piece of the puzzle.

Next steps: It is conceivable that we could have a group of companies that were prepared to commit to this by September 21st, but only if someone were given authorization to begin organizing this immediately.

Draft 9/6/95 Tom Kalil

**CONNECTING THE CLASSROOMS:
PASSAGE OF THE SNOW-ROCKEFELLER AMENDMENT**

Summary: The President should urge Congress to include the Snowe-Rockefeller provision in the conference on the telecommunications reform legislation. This provision is in the Senate bill but not the House bill.

Background: The Snowe-Rockefeller provision states that:

1. All telecommunications carriers must provide elementary and secondary schools with "universal service" at some level of discount that the FCC and the States find to be "necessary to ensure affordable access."
2. The amount of the discount provided to schools and libraries is counted against the universal service obligations of the telecommunications carriers.
3. The FCC may develop a separate definition of "universal service" that only applies to public institutions. [For example, universal service has traditionally been defined as basic telephone service. Schools would want to have more advanced services such as ISDN or high-speed leased lines.]

In addition to the Snowe-Rockefeller provision, the Senate bill also calls for the Commission and the States to encourage the deployment of advanced telecommunications services to all Americans, but particularly to schools. States can use price cap regulation, regulatory forbearance, and other methods that remove barriers to infrastructure investment. [For example, some states have allowed RBOCs to operate under price cap regulation if they agree to connect the schools.]

Pros:

1. This is a winnable issue. It has bipartisan support on the Senate, and Bliley (chairman of the House Energy and Commerce Committee) has indicated that he is open to some version of Snowe-Rockefeller.
2. This has very strong support in the educational community.

Cons:

1. This could reduce our leverage on other issues in the telecommunications issues that we care about in the bill: The President has said that he will veto the bill unless improvements are made on provisions such as cable rates, RBOC entry into long-distance, the V-chip, etc.
2. This could be seen as a tax, since universal service is funded by telecommunications providers, and ultimately results in higher phone bills.

OPTIONS FOR FEDERAL, PRIVATE, STATE AND LOCAL ACTION TO ACHIEVE THE FOUR OBJECTIVES

The following is a list of possible action that could be taken by the Administration, the private sector, a public/private partnership and challenges that can be announced by the President. A "Y" at the end of each proposed action indicates that we have paper on this proposal. Some actions appear under more than one objective and several appeal to all objectives.

Actions to Achieving All 4 Objectives

1. A commitment of 5% of K-12 school budgets go to achieving the goal of breaking the four barriers.
2. Announcement of the National Technology Honor Society. [Y]
3. A recommitment of major companies, teachers, states, schools and parents to achieving the Goals 2000 and using the new educational technology to help all student meet or exceed world class standards
5. Announcement of the NIIAC report.

Objective 1 -- Connecting the Classrooms

A. Administrative Action.

- 1) Direct the DoC to turn over a portion of the spectrum to help get classrooms wired. [Y]
- 2) Announce that no Telecom Bill will be signed by The President that does not include the Snowe/Rockefeller Amendment which would ensure that the federal and state regulators can work with all common carriers to ensure that schools have access to the information superhighway at affordable prices. [Y]
- 3) FCC will enter into a social contract with cable companies who violate cable laws. Rather than pay fines, the cable companies will have to connect schools. [Y]

B. Private Sector Action.

- 1) A day to wire the classrooms. On one day many engineers from major companies will spend the day wiring classrooms, literally laying cable, hooking up the computers, etc.
- 2) Announcement of the Tech Corps, a group of volunteers from the private sector who will work to connect the classrooms, assist teachers, and provide needed technical support to the schools. [Y]
- 3) Announce the commitment from major telecommunication, broadcast and cable companies to provide schools and classrooms with low-cost connectivity and inter-operable connection to the internet at affordable prices.

C. Public/Private Partnerships.

D. Challenges to the private sector, parents, teachers, students, etc.

Objective 2 -- Good Computers in Classrooms

A. Administrative Action:

- 1) Announce the establishment of a Chapter 1 purchasing consortia. [Y]
- 2) Re-announce that schools may lease computers.
- 2) Amend the Bush Executive Order to allow agencies to: donate computers to non-profits that work to refurbish and upgrade computers and give them to schools, encourage agencies to donate telecommunications equipment, and encourage federal employees with computer expertise to work with local schools. [Y]
- 3) Direct the DoD to donate computers and telecommunications equipment to schools from military bases that have closed.

B. Private Sector Action.

C. Public/Private Partnerships.

- 1) Announce Task Force of Chapter 1 schools and industry representatives.

D. Challenges to the private sector, parents, teachers, students, etc.

- 1) Challenge the computer industry to develop low cost PCs for education.

Objective 3 -- Teacher Training

A. Administrative Action.

- 1) Expanding TeacherNet so that there will be a web site for all teachers will be able to exchange information on technology curriculum. [Y]
- 2) Focus \$750 million in federal teacher development funding to help teachers use educational learning technologies to better guide all student to learn at world-class standards.
- 3) Announce funding for Regional Technology Centers. [Y]

B. Private Sector Action.

- 1) Announcement of the Tech Corps, a group of volunteers from the private sector who will work to connect the classrooms, assist teachers, and provide needed technical support to the schools. [Y]

C. Public/Private Partnerships.

D. Challenges to the private sector, parents, teachers, students, etc.

- 1) Announce the commitment of (or challenge) teachers to learn how to use the new educational technologies and integrate them into a meaningful curriculum for the students.

Objective 4 – Engaging Content

A. Administrative Action.

- 1) Announce Challenge Grant Winners. [Y]
- 2) Announce Virtual Museums Initiative to connect computers to the National Archives, the Smithsonian, NASA etc. [Y]
- 3) Direct federal agencies (particularly the DoD, NASA, DoED) to make their existing interactive education programming and other education technology tools and expertise available to schools, students and teachers.
- 4) Establish an Interagency Technology Office. [Y]
- 5) Direct DoD schools to be used as testbeds for technology learning. [Y]

B. Private Sector Action.

- 1) Announce the commitment of major entertainment, game, software and telecommunication companies to work with schools, teachers and parents to develop engaging, interactive curriculum and learning games.
- 2) KIDSNET [Y]

C. Public/Private Partnerships.

- 1) Announce that Chapter 1 schools will form a purchasing consortia to buy or lease on an on-going basis, engaging software that will serve as interactive learning tutors.
- 2) Partnership with the Annenberg Foundation.
- 3) Provide federal seed capital to develop a new generation of educational programming for pre-school children – an engaging combination of Barney II and interactive, electronic, early childhood learning games that will be affordable and made available to Head Start students.
- 4) Direct the DoD to work with the private sector to develop interactive programming for the DoD schools and then make it available to schools, students and homes.

D. Challenges to the private sector, parents, teachers, students, etc.

TECH CORPS

Vision:

A national, non-profit organization of technology volunteers dedicated to helping improve K-12 education at the grass roots.

Mission:

The mission of Tech Corps is to recruit, place, and support volunteers from the technology community who advise and assist schools in the introduction and integration of new technologies into the educational system. Volunteers provide assistance with local planning, technical support and advice, staff training, mentoring, and classroom interactions. The organization utilizes the abilities of skilled individuals and groups across the country in an effort to prepare students, teachers, and schools for the 21st century.

Mode of Operation:

Tech Corps is a volunteer organization. It is funded principally through corporate sponsorships. It has a small headquarters staff to set the Tech Corps mission and agenda, establish and maintain the culture, provide national media liaison, and ensure quality. The broader organization is based on a bottom-up philosophy and draws on the expertise and enthusiasm of technology-literate members of local communities.

Activities:

Tech Corps volunteers work with the teachers and school administrators in their local communities. They do whatever is necessary to promote the effective use of computing and communications technologies in K-12 education. Thus, their tasks may range from getting local contractors to upgrade the electrical wiring in a school, to installing a local area network, to providing assistance in obtaining computing hardware and networking services, to finding a volunteer systems administrator, to helping with the development of a school's World Wide Web home page, to providing assistance with the development of teaching materials, to mentoring students, teachers, or administrators in the uses of computing and communications technologies. Since the determining factors are local needs, a wide variety of tasks are conceivable.

Draft: 13 August 1995

Tech Corps Rollout:

- MAY 95** Begin Tech Corps incorporation and tax exemption
- JUNE 95** Tech Corps prototype in six states;
Obtain corporate and laboratory assistance in building Tech Corps
 computing and communications infrastructure
- AUGUST 95** Tech Corps home page and mirror sites on the Internet in experimental
 mode;
Refine Tech Corps definition, based on feedback from prototype
- SEPTEMBER 95** Presidential announcement of Tech Corps and call for organizers;
Initial Tech Corps media release and announcement of Charterers'
 Conference;
Public debut of Tech Corps home page;
Pointer from White House home page activated
- OCTOBER 95** Charterers' Conference held in Washington, DC
- NOVEMBER 95** Tech Corps call to businesses at Comdex (possibly by Vice
 President);
Home page focus shifts to recruiting business participants
- JANUARY 96** Tech Corps media release and call for participation by school districts;
Home page focus shifts to recruiting school districts
- APRIL 96** Tech Corps media release and call for participation by volunteers;
Home page focus shifts to recruiting individual volunteers
- SEPTEMBER 96** Tech Corps operational

WHY TECH CORPS CAN PULL ALL THE PIECES TOGETHER

What is It?

The Tech Corps will recruit, place, and support volunteers from the technology community to advise and assist schools with the introduction and integration of new technologies into the educational system. Volunteers will provide assistance with local planning, technical support and advice, staff training, mentoring, and classroom interactions. The organization will use the abilities of skilled individuals and groups across the country in an effort to prepare students, teachers, and schools for the 21st century.

What will Be the Benefit to Schools?

There is tremendous energy in our schools to move toward more effective implementation of technology. But the reality is that the available resources are slim. The Tech Corps seeks to provide the human resources that can support and enhance the school's local technology efforts.

The Tech Corps offers schools qualified, enthusiastic individuals who are willing to share their technical talents and experiences with the schools in a volunteer capacity. The "people power" being offered has the potential for offsetting significant expenses which the schools might incur if they sought outside assistance with these projects. In addition, community awareness of and interest in the schools will increase through the involvement and commitment of local citizens who might not otherwise have reason to participate in school activities.

What Will Be the Benefit to the Volunteers?

All too often, individuals wish to volunteer but do not know where or how. The Tech Corps offers a vehicle for volunteering for those individuals who would like to share their time and talents with their local schools. Through the Tech Corps, individuals have the opportunity to give something back to their community and to have a positive impact on kids, schools, and education in their state.

While working with a specific school district, Tech Corps Volunteers will also be part of a larger organization that is having impact on education state- and nation-wide. Volunteers will meet with others throughout the state at state-wide Tech Corps events, learn about projects in other school districts across the nation through the Tech Corps web site, and feel part of an organization that is making a difference.

Training Teachers

Draft: 9/8/95

Private Sector Action
(next page)

Goal

By the year 2000, the nation's 2.9 million teachers will have the skills to use technology for effective teaching and learning. Today, approximately ten percent of teachers are proficient users of instructional technology. 500,000 additional teachers must receive training each year from now to the year 2000.

Executive Actions

- *Teacher Training Summit.* The Secretary of Education has committed to providing leadership and visibility to a national effort to train every teacher in the use of technology by the year 2000. In partnership with national organizations and the private sector, the Secretary will convene a summit in December to examine how to improve teacher preparation and scale up current efforts in order to reach more teachers. The use of technology to provide professional development; changing state certification requirements for teachers; individual teacher grants; and the Tech Corps, a voluntary organization of technology professionals who provide training and advice to schools are all strategies that will be discussed.
- *Tech Corps and National Technology Honor Society.* Both of these organizations will encourage badly-needed support for school staff who are beginning to use technology.
- *Regional Technology Consortia.* Six Regional Technology Consortia (RTC's), recently funded by the Department of Education, will push for new ways to reach more teachers. One priority for the RTC's is to help teachers and administrators integrate technology into classrooms through professional development and information and resource dissemination. Teacher training efforts in technology are also supported by the Department of Energy, NASA, the National Science Foundation, and dozens of federal research and development centers across the country -- reaching tens of thousands of teachers every year.
- *Funding.* The Eisenhower Professional Development Program and Title I provide teacher training funds by formula to states and school districts, mostly in mathematics and science. As there is no limit to how much of these funds can be used for professional development on the use of technology, this program can become an important means of supporting technology professional development.
- *Teacher networks.* Teachers report that they find great value in electronic networks that encourage teachers to share resources, information, techniques, and professional know-how. The Department of Education and other agencies will expand electronic teacher networks through federal programs such as Star Schools, the Challenge Grants, NSF's Applications of Advanced Technologies, Networking Infrastructure for Education, and

Teacher Enhancement programs, and the Department of Commerce's Telecommunications and Information Infrastructure Applications Program (TIIAP).

Private Sector and State and Local Actions

States

States are a crucial partner. Today, states contribute to teacher training for technology by providing funds for training to districts, by providing training through statewide training centers, by supporting statewide networks of teachers, and by setting new teacher certification standards. Many more states will need to adopt these strategies to meet the goal.

- *Funds for training.* The Florida legislature allocated \$55 million for educational technology for the 1993-94 school year. Districts applying for these funds were required to set aside 30%, or over \$16 million, for training.
- *Statewide electronic networks.* As of early 1995, 37 states had statewide telecommunications networks of some kind. Funding for these networks has grown eleven-fold in the last two years, from \$18 million in 1993 to \$207 million in 1995. These networks provide free or inexpensive access for teachers to the Internet and have a strong focus on teacher professional development. Many provide on-line courses for teachers and resources such as lesson plans.
- *New teacher certification or in service requirements.* State certification requirements for teachers are set by state legislatures. In 1994, at least 18 states required training in computers or technology for all teachers seeking certification. This represents a 50% increase from 1987, when only 12 states had such requirements. Alabama requires that teachers receive at least some training each year on the use of computers. Vermont strongly recommends that districts do so.

Private Industry

Summer courses for teachers and encouraging employees to volunteer their technical know-how to schools are just a few ways businesses can support teacher training. If a business commits to training one percent of the teachers in a state or community in which it does business, each of those teachers can be asked to train ten of their colleagues, greatly expanding the impact of the initial investment.

High-tech companies can work with universities and school systems to develop the next generation of teacher training strategies. They can also offer equipment or software discounts for teachers.

Private Sector Involvement in Teacher Training

The US West Foundation, working with the National Education Association, awarded a three-year, \$1.6 million grant to the University of Northern Colorado to establish a corps of teachers and administrators who are skilled in the use of telecommunications networks. About one percent of the state's teaching force has received training and free equipment, and each participant is expected to train ten additional teachers and administrators. So far, teachers have been enthusiastic about training their colleagues. Teachers in 13 other states are slated to receive training in the future. (Source: Benton report; Gwen Solomon)

TCI, the nation's largest cable TV provider, operates the J.C. Sparkman Center, a teacher training facility in suburban Denver that provides training every year for over 400 teachers a year who live in communities served by TCI. The training covers a full range of technology topics.

School Districts, School Administrators, and Teachers

District and school building leaders and teachers themselves are in the best position to ensure that purchases of hardware and software are accompanied by investments in teacher professional development and support. Currently, only about 15 percent of K-12 technology investments are for teacher training (OTA, p. 136). The experience of leading edge schools -- and the private sector -- with technology suggest that expenditures on technology should be re-allocated in favor of training, so that it comprises 30 to 50 percent of the total. Actions:

- *Launch a teacher training initiative* that includes providing on-going technical support for teachers and school staff through district or school building technology coordinators, and technology courses for teachers, possibly linked to incentives such as increases in salary. "Train the trainer"-type efforts have been successful in many schools and districts. Schools can also call upon parents and employees of local businesses to help teachers learn new skills.

School and District Approaches to Teacher Professional Development

The **Blackstock Middle School** in Port Hueneme, California, has taken a radical and innovative approach to professional development. Eight years ago, a history teacher was given a year off from teaching and told to develop a year-long history program which made significant use of technology. He was given considerable freedom and resources to redesign his classroom into a "smart classroom." Later, several other teachers were given the same opportunity. Today, the school has eight "smart classrooms" and teachers can learn how to use them in three weeks of training.

The **Jefferson County Public Schools** (Louisville, Kentucky) have twelve computer in service teachers, called "CITs," who work directly with teachers in the district's 153 schools. The CITs in turn support school building-level technology coordinators. The CITs perform services such as providing workshops, trouble-shooting software and hardware problems, ordering equipment through the district's procurement service, and working with individual teachers to integrate technology into their instruction.

Colorado's **Boulder Valley School District** has joined forces with the University of Colorado at Boulder, regional and state networking agencies, the local business community, the Boulder Area Chamber of Commerce, and the National Science Foundation to teach teachers and students how to use the Internet and build a community-wide network. Part of the district's initiative is to train a core group of 25 lead teachers from all grade levels and disciplines, who will evolve into a team of peer trainers.

- *Encourage students to contribute.* Many schools have found that -- properly supervised -- students can make valuable contributions to maintaining technology in schools. In fact, many educators find they learn computer systems faster than adults. Kyle Sheumaker is one example. A senior at Central High School in Kansas City, Missouri, Kyle is an essential part of the school's technology team. He sets up new student accounts on the school's local area network and maintains the school's "gateway" to the Internet. Several periods a week, he visits classrooms to assist teachers with problems. Kyle receives course credit for his work and has developed valuable workplace skills in the process.

Colleges and Universities

Institutions of higher education are essential to reaching every teacher by the year 2000. Every year, approximately 100,000 new teachers graduate from teacher preparation programs, and in the next decade, the nation's schools will need to hire about two million teachers (OTA p. 166). Over 40 percent of these will be first time teachers (NCES, Condition of Education 1994, p. 158). Some colleges and universities are actively working to incorporate technology into teacher preparation. One strategy is adopting curriculum guidelines for technology, such as those developed recently by the International Society for Technology in Education. Colleges could elect to adopt these guidelines, or develop their own. Another strategy is to encourage faculty to become model users. Since the majority of teacher education faculty completed graduate programs and taught in schools before technology became commonplace, it is not surprising that they tend to have limited experience with technology in education. But future teachers need practice to become skillful users of technology. Finally, it will be necessary to draw on a broader set of higher education resources, including university computer science departments and other faculty and departments that can join in the effort to prepare teachers to use technology.

DRAFT: 8/2/95

NATIONAL TECHNOLOGY HONOR SOCIETY

Purpose. The purpose of the NTHS is to (1) provide an organization through which students can help bring computing and communications knowledge and technology into their schools and (2) recognize and reward students who use their technological expertise to serve their schools.

Function. Members will (1) assist teachers, school administrators, and adult volunteers with integration and use of technology in schools; (2) train teachers, school administrators, classmates, and parents in the use of technology in the schools; (3) participate in mentoring programs with middle/elementary schools; (4) serve as computer system administrators for a class or teacher; and (5) perform other functions which serve the goal of increasing/improving the use of technology in education.

National Sponsor. National Association of Secondary School Principals will manage and guide the NTHS, which will be modeled on the National Honor Society (founded in 1926). NASSP will perform the following functions for the NTHS: create and maintain an organizational structure to support the NTHS on a national level; determine and publish guidelines for local chapters; and publicize the NTHS organization in schools. NASSP will also set NTHS membership selection criteria and define a reward structure.

Potential Faculty Sponsors. Computer science, engineering, tech prep, science, physics, and math teachers; media center managers; other faculty with computing expertise and interest.

Parental Involvement. NTHS can work with the PTA to educate parents on the use computers and the Internet in the schools.

Endorsement. The President's Advisor for Science and Technology, John H. Gibbons, has written NASSP in support of the NTHS concept.



The National Association of Secondary School Principals

1904 Association Drive • Reston, Virginia 22091-1537 • Tel: (703) 860-0200 • Fax: (703) 476-5432

15 August, 1995

It's a go!

Mr. Ed Fitzsimmons
Executive Office of the President
Office of Science and Technology Policy
The White House
Washington, DC 20500

Henry _____
Skip _____
Jack _____
This is a great one for
technology in schools!
Ed

Dear Ed:

First, I would like to thank you once again for inviting the National Association of Secondary School Principals (NASSP) into the discussion with U. S. Tech Corps concerning the formation of the National Technology Honor Society (NTHS). It is very exciting to be working on the foundations for a new organization that will recognize more outstanding students in America's secondary schools. You and your staff have been very helpful in assisting us in these initial planning stages.

I write to confirm the commitment of NASSP to this project. Our involvement in recognizing outstanding secondary students has been demonstrated since 1921 with the founding of the National Honor Society, and through the continuing support of the programs sponsored by our Department of Student Activities (DSA). We view the establishing of NTHS as a great opportunity to reach a group of young people that we currently do not reach and actively involve them in the improvement of America's schools. The link with U. S. Tech Corps in building new school/community partnerships is a unique and promising component of this planning.

Though our specific schedule for development of NTHS has yet to be approved, it is our current intention to move ahead in the planning stages. The existing organizational/administrative infrastructure at NASSP/DSA will allow us to build a strong new organization throughout the country. Our executive staff will be reviewing the concept over the next few weeks, therefore, I request respectfully to postpone providing you with a more precise statement concerning the genesis of the new organization until August 30. If this meets with your approval, I will plan to contact you or Gary Johnson at that point. In the days between then and now, I will forward any additional plans to you as they develop.

Thank you again for this opportunity. I look forward to our future collaborative efforts on behalf of NTHS. Until then, I am

Sincerely yours,

David Cordts
Associate Director, DSA

c: TKoerner, RMarano

Serving All Leaders in Middle Level and High School Education

Founder and Sponsor of: National Honor Society National Junior Honor Society National Association of Student Councils National Association of Student Activity Advisers

TIME WARNER "SOCIAL CONTRACT"

Goal

Time Warner Cable (TWC) which passes approximately ten percent of the nation, has agreed to the following as part of a Social Contract negotiated with the FCC:

- Service connections at one outlet in 100% of the public K-12 schools passed by TWC cable systems free of charge. (This is already provided to most schools.)
- Wiring for additional outlets in public schools without charge if TWC can coordinate with other comparable wiring installations (i.e. in the case of a rehab or new building) or at cost to TWC in all other cases.
- Unlimited service connections in each secondary private schools that receives funding under Title I of the Elementary and Secondary Education Act of 1965 at cost to TWC.

Assuming successful development by Time Warner Cable and Time Inc. of the on-line service for personal computers they are currently test-marketing, TWC will provide all public schools and Title I private schools whose local cable system provides this service:

- Free access to the TWC/Time Inc. on-line service for use during the school year and a free modem.
- Additional modems provided at cost and free service to each additional modem.
- A free monthly educational program guide with curriculum support ideas to assist educators in effectively using the new services.

The on-line system currently being test marketed includes access to the Internet as well as Time Inc.'s Pathfinder, news, weather and other information.

Actions

The FCC and Time Warner Cable have reached agreement on the proposed "Social Contract." The comment period on the proposed Contract ended on September 15th. A reply comment period closes on September 25th. After the Commission may act on a final order.

The Contract would resolve nearly 1,000 pending cable rate complaints involving TWC, provide \$4.7 million in refunds for subscribers, provide for \$4 billion in upgrades to TWC systems and provide schools with new teaching tools.

Barriers/Potential Downsides

Ratepayers will be charged an additional \$1 per year under the Social Contract over the next five years as a result of TWC's planned upgrades to service, in addition to increases due to inflation and certain increased cost.

TWC is just beginning to market an on-line service. Thus the scope of the service and whether it will be successful is unclear at this time. This is also true of the connections Time Warner will provide inside the schools.

Other industries may object that the Contract allows Time Warner to subsidize school connections on the backs of cable subscribers. More broadly, the Contract may open debate about the Cable Act and cable regulation.

Message

Reinventing government. The FCC is deregulating, lowering rates *and* networking schools by being proactive and goal-oriented.

**TIME WARNER
CABLE****FOR IMMEDIATE RELEASE****Contact: Michael Luftman
Time Warner Cable
(203) 328-0613****Peter Costiglio
Time Inc.
(212) 522-3927**

July 17, 1995

**TIME WARNER STARTS TEST OF HIGH SPEED ON-LINE COMPUTER SERVICE
Trial to Bring Wide Range of Services to PCS in 500 Homes in Elmira, N.Y.**

Time Warner Cable and Time Inc. have begun a market test of their new, high speed on-line service for personal computers at Time Warner's cable system in Elmira, N.Y. The two divisions of Time Warner Inc. announced in May they would jointly develop the service.

The new on-line service will deliver a wide range of information through the company's recently upgraded fiber optic and coaxial Elmira network. Customers will have access to Time Inc.'s Pathfinder™, one of the most popular sites on the Internet, new services developed by Time Inc. with a local partner, the Elmira Star Gazette, and popular existing on-line services such as America Online and CompuServe.

The market trial will include 500 homes, schools, libraries and government offices in Time Warner's Paragon Cable system, which serves nearly 27,000 customers in the Elmira area. The company will initially test a basic monthly charge of \$14.95, for which customers will receive a range of services including local, national and international news, shopping, sports, weather and e-mail, as well as information about local entertainment and activities, schools, government and libraries. For an additional \$9.95 per month, customers will receive high speed access to the Internet.

The basic monthly charge includes rental of a cable modem that, combined with the broadband capacity of Time Warner's fiber and coaxial network, allows information to be reproduced on computer screens 100 times faster than through standard telephone lines.

(more)

Page 2

Advances in modem technology are expected by the end of this year to allow speeds 1,000 times faster than telephone lines. Hewlett-Packard Company has been commissioned as the systems integrator for the project, including the design and development of the server complex as well as providing operations and support planning and training services. The HP Broadband Interactive Data Solution integrates the delivery and management of the on-line services, internet access and multimedia functions, as well as network and subscriber management.

The test deploys readily available cable modem technology from Zenith using its HomeWorks unit.

"Time Warner believes high-speed on-line services for personal computers can be an important part of a wide range of future offerings that will include local telephone service and interactive television," said Glenn Britt, president of Time Warner Cable Ventures. "Time Warner is the only company that combines large, well clustered, technologically advanced cable systems with vast creative resources in news and information."

"This makes us ideally positioned to succeed in creating a service that offers what home computer users want: high speed and compelling content," said Paul Sagan, senior vice president of Time Inc. New Media. "For the first time, people will be linked to their neighbors and the world at speeds that can reshape the way they become informed and entertained."

Of the 500 modems to be distributed for the trial, 100 will be provided at no charge to schools, government offices and libraries with the rest to be marketed to paying customers. The company has not set a specific duration for the test, but says it will continue at least until the end of 1995.

Time Warner Cable is the nation's second largest cable television operator, serving with affiliated companies 9.7 million customers in 37 states. After the closing later this year of the Cablevision Industries acquisition, the company will serve 11.5 million customers. It is a unit of Time Warner Entertainment, L.P.

Time Inc., America's largest magazine publisher and one of the largest book publishers, is a wholly-owned subsidiary of Time Warner Inc.

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GETTING GOOD COMPUTERS INTO THE CLASSROOMS

Barrier: Today, too few classrooms have the basic computer hardware necessary to ready our children for the 21st century economy. While schools now average 12 students for every computer, about half are so old they don't even have a hard drive. In fact in California, the computers in elementary school are on average older than the children themselves. And surprisingly, most high schools still teach keyboarding on typewriters.

Goal: By the year 2000, we need to ensure a modern computer in every classroom – that is a computer with at least a hard drive. One important component of any plan to put computers in the classroom is refurbishing surplus federal computers for schools.

Issue: The federal government contributes millions of dollars worth of surplus and excess computer and related equipment to schools every year through GSA surplus transfer and direct transfer from agencies through a Bush Executive Order. These computers are often more modern than those already in classrooms that lack hard drives. Also, with simple refurbishing, these computers, often made available through government downsizing, can be upgraded or made into network servers and play an important role in modernizing the classroom. For instance, 25% of 286 computers can be converted to a modern 486 computers with an investment of less than \$300 dollars – significantly less than what a new computer would cost. These computers are also more useful with basic operating systems and applications loaded.

The existing Executive Order that allows for surplus government computers to be given to directly to schools, unfortunately, does not allow those computers to be given to non-profit groups that refurbish used private sector computers and give them to schools. Additionally, the Executive Order does not make clear that other associated equipment, like telecommunications equipment and other essential equipment can be transferred directly to schools. Also, the nation's schools need to be better informed about surplus federal computers and how they can access this equipment.

Possible Actions:

1) Amend Executive Order 12821

Amend Section 1 to read "Assistance in Mathematics, Science and Computer Education."

Amend Section 1 by adding: "(iv) each office within each agency that has expertise in computer operations,"

Amend Section 2[b][1] to read "Identify and transfer excess education-related equipment at that agency that can be transferred to elementary and secondary schools or community-based non-profit organizations in collaboration with schools that will refurbish and upgrade the computers and make them available at no or low costs to

schools or educational institutions in the community by"

Amend Section 2 by adding after education-related Federal equipment "including telecommunications equipment,"

- 2) Instruct GSA to keep a record of the number of computers and other equipment going out through direct transfer and surplus equipment to schools. Report back to the President in six months.
- 3) The President can announce the creation of the GSA Federal Disposal System (FEDS), a computer data base listing all available surplus federal property. The FEDS will allow state surplus agencies to quickly access information on available surplus equipment and request equipment on-line thus speeding up the process of moving the computers out of the government into schools. Goals for GSA FEDS program include: a paperless transfer of computer equipment (all on-line), matching schools wish lists with computers available, getting on the Internet and training state agencies to use FEDS. FEDS will provide a one-stop shop for schools to make requests and find out about availability of equipment.
- 4) Consider targeting the computers to those schools that need it most -- disadvantaged communities (enterprise zone/enterprise communities) through Chapter 1 funding or new orders.
- 5) The President could direct the DoD to free up computers and telecommunications equipment from bases that are closing to send to schools. (Non-profits are having problems cutting through the red tape at the DoD to get used computers from closed military bases). The President could order agencies to cut the red tape to move surplus equipment to schools.
- 6) Challenge the private sector to support and help create Foundations like the Detwiler group, which refurbish and upgrade computers (through community colleges and prisons) and provide computers free to schools by matching the number of computers the schools get themselves.

Author: David A. Lytel at ostp

Date: 8/23/95 5:34 PM

Priority: Normal

TO: Edward A. Fitzsimmons

TO: Henry C. Kelly

TO: Julie M. Swisshelm

CC: Lionel S. Johns

CC: David A. Lytel

Subject: improving distribution of excess federal property to schools

----- Message Contents -----

The Internet Access Contract for state and local govts is not going to get anywhere quickly. However, we may have some things we can say and do to accelerate the distribution of surplus Federal computer equipment.

There are two ways that used computers can get from govt agencies to educational institutions. The normal donation program is through State Agencies for Surplus Property. They have access to all property listed as surplus. GSA has created a closed online system called FED that lists all properties that have been designated surplus so states can match up their needs with what we have. Right now it is available to all Federal agencies. GSA is preparing to make it available to all state agencies for surplus property, who will be able to dial into it and query by types of commodity they are interested in, or location, or other parameters. May be about three months away from making it available to state agencies. In FY94 about \$79M went to state surplus agencies through the normal donation program. (But note that the value that is used is acquisition cost, which greatly inflates what this equipment is worth).

However, the EO makes it possible for agencies to make equipment available directly to educational institutions BEFORE it is designated as surplus. This makes the donation more direct but also creates a problem for GSA since the exchange is likely to be unreported. Under the EO federal agencies are supposed to report the amount of activity they have, but all we really have is anecdotal information. The best figure we have right now only covers DOD and only a portion of FY94, but under the EO \$51.7M went from DOD directly to 356 schools in 43 states. This was about 39K items, all of which were computer equipment of some kind. We are still waiting responses from NSF, NASA, DOE and USDA. The total figure is probably around \$100M.

Here are three concrete actions we can take to accelerate this activity:

1. Instruct agencies how they can comply with this EO: GSA is now getting ready to go out with a Federal Property Mgmt Bulletin reminding agencies of the reporting requirement under the EO and setting up a reporting mechanism. That should go out within the month.

2. Remind school districts where they should go to request equipment: The EO set up a coordinating committee that issued an interim report, which was distributed to school districts nationwide. It describes systems available to them to under the EO. It lists the state agencies for surplus property. These are now listed on GSA's Web site at: <http://www.fss.gsa.gov/property.html>.

3. Make it easier for school districts to peruse the list of equipment electronically and place their request electronically: Today there

Making Government Computing and Networking Expertise and Resources Available for Educational Use

Summary

Issue an Executive Order which directs agencies to (1) allow the use of release time or flextime by Federal employees for the purpose of volunteering in schools; (2) streamline the process by which excess or surplus government computing, networking and other technologies are transferred or donated to schools; and (3) make available 5% of agency computing and networking resources for educational use. In the message we could note the Bush Administration EO, which was a good first step (but limited the use of such resources for improving math and science education), and emphasize that we are going to go full speed ahead to publicize and implement the new EO provisions.

Background

In November of 1992, President Bush signed Executive Order 12821 directing agencies to assist in the mathematics and science education of the nation's students, teachers, parents, and the public. There are two key provisions in the EO. One allows excused absences for federal employees to assist with science and math education. The second states that highest preference be given to elementary and secondary schools in the transfer or donation of education-related federal equipment. While this EO goes a long way toward making government resources available to schools, it unnecessarily limits assistance to math and science education. This administration can broaden the order to apply to technology for education in any subject area.

Impact

This action would (1) greatly increase the potential size of the pool of talent for the Tech Corps by making all federal employees with computer and networking know-how available; (2) provide a significant infusion of technology into schools which otherwise may not be able to afford it by stimulating the supply of computers and other technology for recycling and refurbishing; and (3) allow schools to get access to federal network and computing resources which are not necessarily used to full capacity. While it certainly does not make sense to dump obsolete computers into schools, it does make sense not to waste resources which can be used (or can be made usable by some intermediary agent).

Specific Actions

Revise Executive Order 12821 (see attached). Amend Section 1 to read "Assistance in the Use of Technology for Education." Amend Section 1(a) to add "(iv) each office within each agency that has expertise in computing and networking technologies." Amend Section 1(a)(1) changing the phrase "mathematics and science education" to "use of technology for education" and "knowledge of mathematics and science" to "ability to use technology effectively for education." Amend Section 1(a)(2) changing "assist in the conduct of mathematics and

science education programs" to "volunteer in their local schools." Amend all occurrences of the phrase "Committee on Education and Human Resources of the Federal Coordinating Council for Science, Engineering, and Technology" to the "Committee on Education and Training of the National Science and Technology Council." Amend Section 2(b)(1) to read "Identify and transfer excess education-related equipment at that agency to elementary and secondary schools or community-based non-profit organizations that will refurbish and upgrade the equipment and make it available at cost to schools or other educational institutions in the community by". Amend Section 2(b)(4) changing "mathematics and science" to "educational technology." Amend Section 3(a) adding "including telecommunications equipment" after "related peripheral equipment" and change "mathematics and science" to "any appropriate subject area."

Additional Actions suggested by OVP

1. Instruct GSA to keep a record of the number and type of educational technologies which are transferred to schools under the Executive Order, with a report to the President after six months.
2. The President can announce the creation of the GSA Federal Disposal System (FEDS), a computer database listing of all available surplus federal property. The FEDS will allow state surplus agencies to quickly access information on available surplus equipment and request equipment online, thus speeding up the process of moving excess/surplus computers from the government into schools. Goals for the FEDS program include: paperless transfer of computer equipment; matching school wish-lists with available equipment; making FEDS available on the Internet and training State agencies to use the database. FEDS will provide a one-stop shop for schools to make requests and find out about the availability of equipment.
3. Consider targeting surplus/excess equipment to disadvantaged schools/communities through Title I funding or new orders.
4. The President could direct the DoD to give preference to schools when disposing of computers and telecommunications equipment from base closings. (Non-profits are reporting difficulty with red tape at DoD in getting surplus computing equipment from closed military bases.)
5. Challenge the private sector to create and support private non-profit enterprises which refurbish and upgrade computing equipment and provide them at cost to schools.

Executive Order 12821 of November 16, 1992

Improving Mathematics and Science Education in Support of the National Education Goals

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the provisions of the Stevenson-Wydler Technology Innovation Act of 1980, as amended (15 U.S.C. 3701, *et seq.*), and the Federal Property and Administrative Services Act of 1949, ch. 288, 63 Stat. 377 (codified as amended in scattered sections of the United States Code), and in order to ensure that Federal departments, agencies, and laboratories assist in mathematics and science education to meet the National Education Goals, it is hereby ordered as follows:

Section 1. Assistance in Mathematics and Science Education. (a) Each executive department and agency (hereinafter referred to as "agency") that: (i) has a scientific mission; (ii) employs significant numbers of scientists, mathematicians, and engineers; or (iii) has a Federal laboratory; as determined by the Committee established by section 2(d) of this order, shall, to the maximum extent permitted by law:

(1) Assist in the mathematics and science education of our Nation's students, teachers, parents, and the public by establishing programs at their agency to provide for training elementary and secondary school teachers to improve their knowledge of mathematics and science. Such programs, to the maximum extent possible, shall involve partnerships with universities, State and local elementary and secondary school authorities, corporations, and community based organizations. These activities shall be coordinated with other relevant Federal teacher training programs (e.g., those administered by the National Science Foundation, the Department of Education, and the Department of Energy). Because of its extensive experience in teacher training programs at its Federal laboratories, the Department of Energy, when requested by other agencies, shall assist in the development of these activities.

(2) Provide brief periods of excused absence for Federal employees to assist in the conduct of mathematics and science education programs, in accordance with guidelines of the Office of Personnel Management.

(b) Develop, within 6 months of the issuance of this order, an implementation plan to fulfill the requirements of this section. The plan shall be consistent with approved agency budget totals. The plan shall be coordinated through the Committee on Education and Human Resources of the Federal Coordinating Council for Science, Engineering, and Technology.

Sec. 2. Transfer of Education-Related Federal Equipment to Elementary and Secondary Schools. (a) To the maximum extent permitted by law, all agencies shall give highest preference to elementary and secondary schools in the transfer or donation of education-related Federal equipment. All such transfers to the schools shall be made at the lowest cost permitted by law.

(b) Each agency, to the maximum extent permitted by law, shall:

(1) Identify and transfer excess education-related Federal equipment at that agency that can be transferred to elementary and secondary schools by:

(A) Direct transfer of excess Federal research equipment in accordance with the provisions of subsection 3710(i) of the Stevenson-Wydler Technology Innovation Act of 1980, as amended (15 U.S.C. 3710(i)). The transfer of such excess equipment shall be reported to the General Services Administration (GSA); or

(B) Reporting such excess equipment to the GSA for donation when declared surplus in accordance with the provisions of section 203(j) of the Federal Property and Administrative Services Act of 1949, as amended (40 U.S.C. 484(j));

(2) Allow the elementary and secondary schools sufficient time to select available education-related Federal equipment before it is disposed of elsewhere;

(3) Provide training and technical assistance, where possible, to recipients of education-related Federal equipment to ensure that the equipment will be utilized to its full capability; and

(4) Attempt to provide education-related Federal equipment to those elementary and secondary schools with the greatest need or to the recipients of federally funded mathematics and science projects where the equipment would further enhance the progress of the project.

(c) The GSA shall:

(1) To the maximum extent permitted by law, ensure that elementary and secondary schools are notified of the opportunity to obtain education-related Federal equipment, and, where practical, provide to elementary and secondary schools a current listing of education-related Federal equipment that is available for transfer, and, when requested, provide a current listing of this available equipment to agencies; and

(2) Maintain a record of the education-related Federal equipment provided to elementary and secondary schools pursuant to this order.

(d) There is hereby established a Coordinating Committee on Education-Related Federal Equipment (Committee). The Committee membership shall include, but not be limited to, representatives of the Departments of Defense, Education, Energy, and Health and Human Services, the National Science Foundation, the General Services Administration, and the National Aeronautics and Space Administration.

(1) The Co-chairs of the Committee shall be the Administrator of General Services and the Secretary of Education, or their designees.

Executive Orders

EO 12822

(2) The Committee shall assess the availability of appropriate education-related Federal equipment and mechanisms for expeditious notification and transfer of the equipment to elementary and secondary schools and shall resolve issues that may arise in implementing this order.

(3) The Committee shall inform, as necessary, non-Federal groups (e.g., National Governors Association, State Agencies for Surplus Property, etc.) of issues concerning the transfer of education-related Federal equipment.

(4) The Committee may consult with the Committee on Education and Human Resources of the Federal Coordinating Council for Science, Engineering, and Technology concerning activities outlined in this order, particularly those activities listed in section 1 of this order.

Sec. 3. Definitions. For the purposes of this order:

(a) "Education-related Federal equipment" means excess or surplus personal computers and related peripheral equipment, research equipment, and education-related equipment that is appropriate for use in mathematics and science curricula in elementary and secondary school education.

(b) "Elementary and secondary schools" means individual public or private educational institutions encompassing kindergarten through twelfth grade, as well as public school districts.

(c) "Federal laboratories" has the meaning set forth in the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710a(d)(2)).

(d) "Research equipment" means excess or surplus Federal property appropriate for mathematics and science education activities at the elementary and secondary education levels, as defined by and in accordance with the regulations of the agency that owns the research equipment.

GEORGE BUSH

THE WHITE HOUSE,

November 16, 1992.

Training Teachers

Draft: 9/8/95

Goal

By the year 2000, the nation's 2.9 million teachers will have the skills to use technology for effective teaching and learning. Today, approximately ten percent of teachers are proficient users of instructional technology. 500,000 additional teachers must receive training each year from now to the year 2000.

Executive Actions

- *Teacher Training Summit.* The Secretary of Education has committed to providing leadership and visibility to a national effort to train every teacher in the use of technology by the year 2000. In partnership with national organizations and the private sector, the Secretary will convene a summit in December to examine how to improve teacher preparation and scale up current efforts in order to reach more teachers. The use of technology to provide professional development; changing state certification requirements for teachers; individual teacher grants; and the Tech Corps, a voluntary organization of technology professionals who provide training and advice to schools are all strategies that will be discussed.
- *Tech Corps and National Technology Honor Society.* Both of these organizations will encourage badly-needed support for school staff who are beginning to use technology.
- *Regional Technology Consortia.* Six Regional Technology Consortia (RTC's), recently funded by the Department of Education, will push for new ways to reach more teachers. One priority for the RTC's is to help teachers and administrators integrate technology into classrooms through professional development and information and resource dissemination. Teacher training efforts in technology are also supported by the Department of Energy, NASA, the National Science Foundation, and dozens of federal research and development centers across the country -- reaching tens of thousands of teachers every year.
- *Funding.* The Eisenhower Professional Development Program and Title I provide teacher training funds by formula to states and school districts, mostly in mathematics and science. As there is no limit to how much of these funds can be used for professional development on the use of technology, this program can become an important means of supporting technology professional development.
- *Teacher networks.* Teachers report that they find great value in electronic networks that encourage teachers to share resources, information, techniques, and professional know-how. The Department of Education and other agencies will expand electronic teacher networks through federal programs such as Star Schools, the Challenge Grants, NSF's Applications of Advanced Technologies, Networking Infrastructure for Education, and

Teacher Enhancement programs, and the Department of Commerce's
Telecommunications and Information Infrastructure Applications Program (TIAP).

Private Sector and State and Local Actions

States

States are a crucial partner. Today, states contribute to teacher training for technology by providing funds for training to districts, by providing training through statewide training centers, by supporting statewide networks of teachers, and by setting new teacher certification standards. Many more states will need to adopt these strategies to meet the goal.

- *Funds for training.* The Florida legislature allocated \$55 million for educational technology for the 1993-94 school year. Districts applying for these funds were required to set aside 30%, or over \$16 million, for training.
- *Statewide electronic networks.* As of early 1995, 37 states had statewide telecommunications networks of some kind. Funding for these networks has grown eleven-fold in the last two years, from \$18 million in 1993 to \$207 million in 1995. These networks provide free or inexpensive access for teachers to the Internet and have a strong focus on teacher professional development. Many provide on-line courses for teachers and resources such as lesson plans.
- *New teacher certification or in service requirements.* State certification requirements for teachers are set by state legislatures. In 1994, at least 18 states required training in computers or technology for all teachers seeking certification. This represents a 50% increase from 1987, when only 12 states had such requirements. Alabama requires that teachers receive at least some training each year on the use of computers. Vermont strongly recommends that districts do so.

Private Industry

Summer courses for teachers and encouraging employees to volunteer their technical know-how to schools are just a few ways businesses can support teacher training. If a business commits to training one percent of the teachers in a state or community in which it does business, each of those teachers can be asked to train ten of their colleagues, greatly expanding the impact of the initial investment.

High-tech companies can work with universities and school systems to develop the next generation of teacher training strategies. They can also offer equipment or software discounts for teachers.

DRAFT: 8/1/95

CHALLENGE GRANTS FOR TECHNOLOGY IN EDUCATION

The Challenge Grants for Technology in Education are designed to build alliances between educators, the private sector, and others to develop a new generation of interactive learning tools. These five-year grants will support partnerships that include at least one school district and other organizations seeking to meet educational goals through the use of technology – particularly in underserved and urban areas.

The first Challenge Grant competition is currently underway, and 505 applications were received by the June 2, 1995 deadline. Such a large number of applications indicates that the "Challenge" to local school districts, companies, universities, and other organizations to work together to develop new educational solutions involving technology has been very successful. Notable in these applications is strong participation from the private sector, universities, and non-profit organizations:

- Two-thirds of proposals have one or more private companies as partners, with one-third being telecommunications companies.
- More than half of the proposing agencies partner with institutions of higher learning (for a total of 900 colleges and universities).
- Over 300 libraries, 250 museums, and nearly 1000 non-profits are included as partners.
- Proposals have been received from every state.

Funding for Challenge Grants is \$9.5 million in FY 95. These funds will leverage millions more in private sector support and local community involvement in education. The grants are administered by a team led by Thomas Carroll at the Interagency Learning Technology Office. Approximately 19 grants will be awarded in September.

CHALLENGE GRANTS FOR TECHNOLOGY IN EDUCATION

Location (by state)

Focus

San Diego, CA

The "Triton Project" will improve student performance in mathematics and science, using a combination of technologies in an active learning curriculum with an ocean exploration theme. San Diego public schools will be networked with each other and with several area museums, research centers, and Aquariums. Partners include: Sea World; Scripps Institution of Oceanography; Pacific Bell; San Diego State University; San Diego Supercomputer Center at U. C. San Diego; the Naval Command Control & Ocean Surveillance Center; and San Diego Data Processing Corporation.

Redwood City, CA

Working through a consortium known as Smart Valley Inc., the Silicon Valley community is transforming its education system into learning communities that prepare students for the 21st century. Reform plans developed by teams of high schools with their feeder elementary and middle schools will receive infrastructure support from Silicon Valley's high-tech corporations. The Challenge Grant will support curriculum development and teacher training to meet the objectives of Goals 2000. Seventeen corporations have each pledged up to \$1 million in resources over three years in support of school reform. They include: Adobe Systems; Apple Computer; Applied Materials; Cirrus Logic; Hewlett-Packard; Robert Noyce Foundation; Silicon Graphics; Wells Fargo Bank; Bank of America; Intel; Logitech; NetMange; Network General; Symantec; Pacific Bell; Sun Microsystems, the 21st Century Education Initiative; and the Bay Area Multimedia Technology Alliance. Other partners include: SRI International, the Institute for Research on Learning, and Customers and Technologies.

Dover, DE

Telecommunications will connect families and schools, extending the time and place for learning and improving communication between parents and teachers. Content is focused on reading and arithmetic in early elementary grades. Activities are explicitly focused around Goals 2000. Cost-effective video based on set-top TV boxes will link the home and school. Partners include Lightspan Partnership; Bell Atlantic; and Delaware State Education Dept. --An initiative to connect every home and school in the state within five years.

Waukegan, IL The "Technology Learning Collaborative" will provide a comprehensive program of staff development, technology/curriculum integration and parent and community involvement to increase student performance in mathematics and science in the Waukegan School District. Engaged learning through project-based, collaborative teaching, high performance learning technologies, and extended day programs will be used to improve the workplace readiness of students. Partners include: Abbott Laboratories; Apple Computer; Legat Architects; U.S. Cable; Waukegan Public Library; YMCA; North Central Regional Education Laboratory; Northern IL Assistive Technology Consortium; four colleges; and the Illinois State Department of Education, among others.

Andersen, IN General Motors, the largest industry in Andersen, recently announced it will have no unskilled jobs at its Andersen facilities by the year 2000. In a community where education has not been highly valued in the past there is now a strong demand for all children to meet high academic standards -- leaving school with strong language skills, mathematics competency, mastery of new technologies, and collaborative work skills. The project will expand on the "Buddy" project to link homes and schools with computers and modems so that parents, teachers and students can work together on improving education. Teachers will receive support as they develop new curriculum and instructional strategies. Partners include: Andersen Area Chamber of Commerce; Andersen Federation of Teachers; National City Bank; TCI of Central Indiana; the Corporation for Educational Technology; Public TV; four local colleges, and the Indiana Department of Education.

Indianapolis, IN

"The Learning Cooperative", consisting of Indianapolis Public Schools, the Chicago Public Schools, Walled Lake Consolidated Schools, the North Central Regional Education Laboratory, and Ameritech will develop an affordable, scalable, and equitably distributed telecommunications infrastructure to deliver instructionally sound curriculum and technical support to schools, as well as effective professional development to all teachers in these schools.

Natchitoches, LA

The Louisiana Systemic Initiatives program, in conjunction with the Louisiana Department of Education and Northeast Louisiana University will integrate Internet resources with curriculum reform to help meet National Education Goals in the school districts of five communities with high percentages of undeserved students. Telecommunications will be used to increase achievement in: school readiness; professional development; parent involvement; school-to-work transitions; and life-long learning. Partners include: Bell South; Shell Oil; five universities; the Governor's Goals 2000 office; and 17 other community based organizations, libraries, museums, and agencies across the state.

Baltimore, MD

New technologies will strengthen the school-to-work transition in an Enterprise Zone / Empowerment Community. Electronic networks will link high school students with employers in real work experiences. State-of-the-art technology will give students access to digital video on demand for science and mathematics projects from the Discovery Channel. Partners include U. Md, College Park; Johns Hopkins U; Discovery Communications, Inc.; Apple Computer; Bell Atlantic; MD Public TV; American Training Standards Inst.; Learning Matters, Inc.; MD Business Round Table; Magic Me; two MD teachers associations; and ten other organizations. The U.S. Department of Education will partner with the U.S. Department of Labor on this Project.

White Cloud, MI

Newaygo County School District, the County Government, the Gerber Memorial Hospital, the Newaygo County Multi-Agency Consortium, the Public Libraries and five other school districts will form a network to improve educational opportunities and social services in this extremely rural, low income community. Local area networks in every school building will provide workstations and training for every teacher. A fiber optic network will link the schools, libraries, and over forty community service providers in a "no wrong door" approach to services. The Fremont Area Foundation will fund construction of the fiber optic network, and the Gerber Companies Foundation will provide significant project support.

Omaha, NE

Westside Community Schools and Prairie Visions: The Nebraska Consortium for Discipline-Based Arts Education will use telecommunications and digital technology to link urban and rural schools to the art collections of five major museums across the country. Activities include: an Electronic Art Museum in the Classroom, computer based instruction, curriculum design, and professional development. The project will begin with five Nebraska school districts and extend to schools across the U.S. Partners include: The Smithsonian National Museum of American Art; Joslyn Art Museum; Sheldon Memorial Art Gallery; The Getty Museum; The Kennedy Center for the Performing Arts; Pacific Imaging Center, Inc.; M Power, Inc.; Digital Visions, Inc.; Apple Computer; Far West Laboratory; Prairie Visions (a consortium of 100 school districts, three museums, the Nebraska Art Teachers Association and others); five school districts; and nine other art education institutes and teacher organizations.

Manchester, NH

Manchester is an active Goals 2000 community. To achieve high standards in core academic subjects it will create a multi-mode instructional technology network for audio, video, and data communications among nine school districts serving 25% of the state's population. It will involve all schools, community

resource centers, libraries and colleges in professional development, curriculum development, and administrative applications. Outreach will create improved lifelong learning opportunities for all community members. Over forty partners will participate in this program, including: Cabletron; Continental Cablevision; Cyber-Space; NH Public TV; Multimedia Systems, Inc; several Parent Teacher Organizations; eleven school districts and colleges; and the State Department of Education.

Laguna, NM Integrates new technologies with curriculum reform in Bureau of Indian Affairs Schools. Using Indian children's real life experiences, and building on the content of Native American cultures, the "Four Directions" project is an indigenous education model that will help students in BIA schools meet high academic standards. Telecommunications will link BIA schools across the country with a variety of university, museum, library, and Internet resources. BIA schools include: Ahfachkee Day School (FL); Indian Island School (ME); Quileute Tribal School (WA); Takini School (SD); Dilcon Boarding School (AZ); Laguna School (NM); Hannahville Indian School (MI); and Fond du Lac Ojibwe School (MN). Other partners include: the Heard Museum of Native Culture and Art; the University of Kansas; Southwest Indian Polytechnic Institute, Intel Corp.; and Sandia National Laboratories.

Cuyahoga Falls, OH

In consultation with the Center for Leadership in School Reform, the Summit County Office of Education and the Technology Academy will support teachers who are creating "new work" partnerships with their students -- work that meets the high academic standards embodied in Goals 2000, work that engages children, work in which children persist, and work that results in real accomplishments. The effort includes a technology work experience in which high school and college students operate a nonprofit company dedicated to rapid response support for classroom applications of technology. Partners include: Ameritech; LOGAL; the Akron Regional Development Board; the U. of Akron; Ashland U.; and Kent State U.; among others.

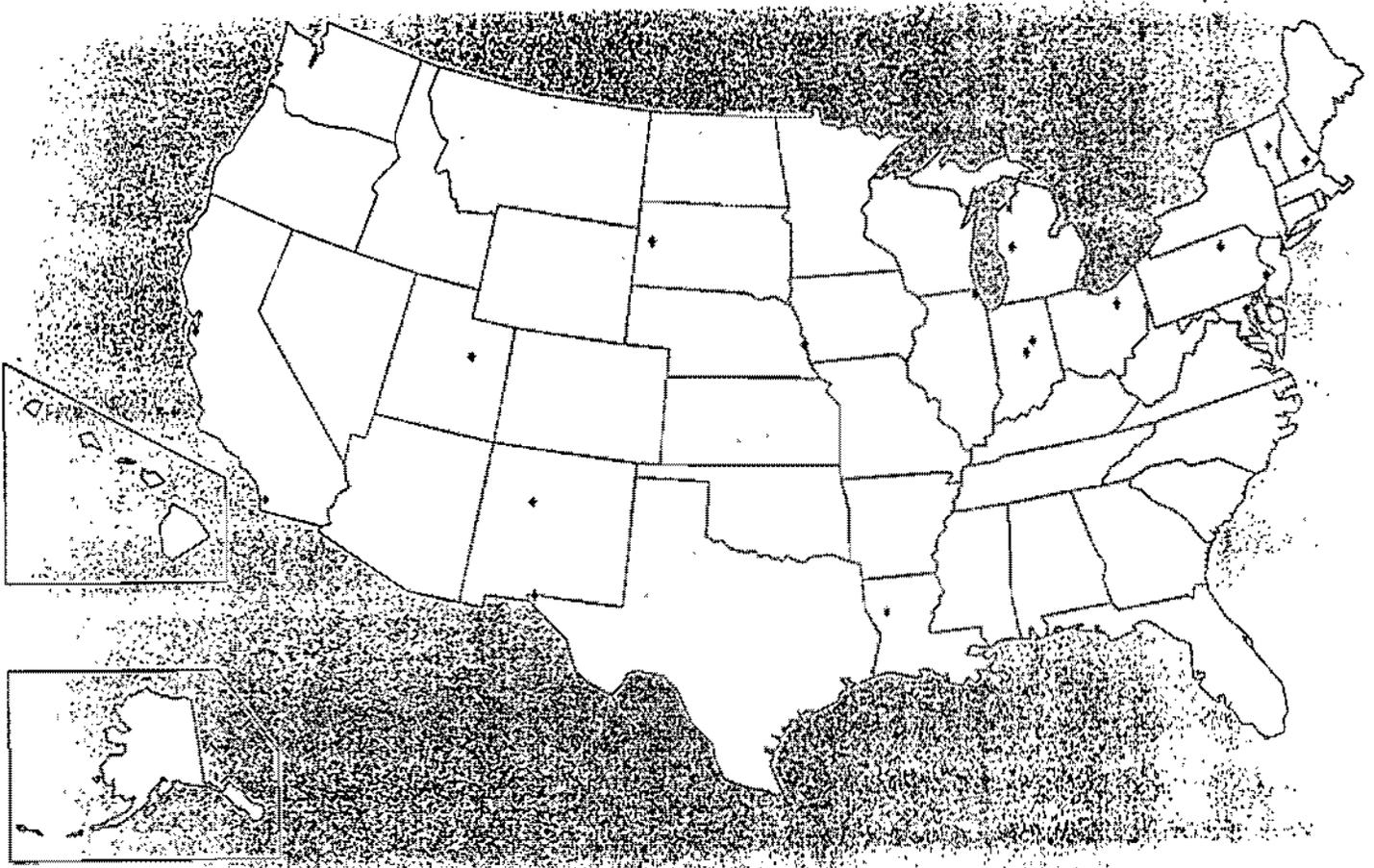
Philadelphia, PA

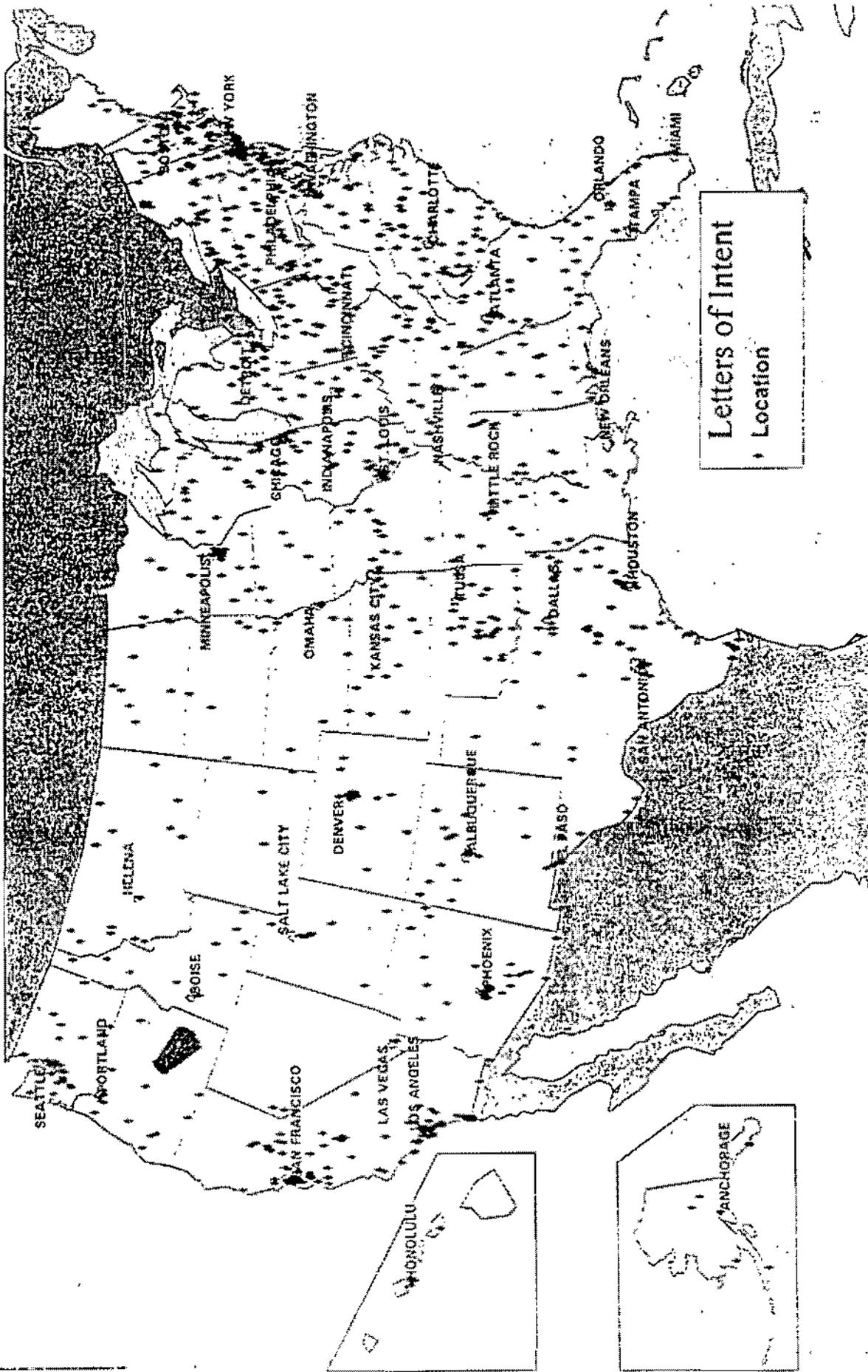
New technologies will support a comprehensive school reform strategy in a large urban school district (Enterprise Zone / Empowerment Community). Learning Communities consisting of high schools linked with clusters of elementary schools, middle schools and a college are forming "Virtual Schools", which support professional development for teachers and extended time and place for student learning. Partners include: Bell Atlantic; Unisys; IBM; Public TV; five colleges & universities; and the Private Industry Council.

- Towanda, PA An interactive network based on compressed video will connect 23 small rural school districts in three states (rural PA, NY, & NJ). The project will grow to establish one of the largest (geographically) interactive learning networks in the country. School districts will share teaching personnel, curriculum resources, and teacher training. Schools will be linked to technical centers, museums, and colleges to extend the resources available to students beyond the confines of classroom walls. Partners include: Commonwealth Telephone Co.; Claverack Rural Electric; PA Rural Electric Assoc; Pictoretel Inc.; N.E. PA Tech-Prep Consortium, International Paper Co.; and seven colleges, among others.
- Sturgis, SD The "Technology in Education Challenge Grant for Rural Education" (TEC-RAM), will integrate technology with curriculum in six community based systemic reform efforts across the state. This state-wide effort uses technology to achieve objectives of the recently passed: Improving America's Schools Act; Goals 2000 - Educate America Act; and School-To-Work opportunities Act. Partners include: Black Hills Special Services Cooperative; South Dakota Department of Education and Cultural Affairs; South Dakota Department of Labor; Black Hills and South Dakota State Universities; Spring Creek Video Productions, Inc.; and six local school districts.
- El Paso, TX A "Community of 21st Century Learners" will be created among 15 partner schools belonging to a city wide collaborative for academic excellence. New technologies will be used to network the schools and the local university for professional development and the integration of technology with curriculum reform. Computers will be made available to low income parents through parent centers and libraries staffed with educators who will train parents in the use of educational software with their children. Partners include: University of Texas at El Paso; El Paso Community College; three school districts; El Paso Chamber of Commerce; El Paso Hispanic Chamber of Commerce; Region XIX Education Service Center; El Paso Collaborative for Academic Excellence; and others.
- Price, UT The State of Utah Resource Web (SURWEB) will use telecommunications to provide quality educational opportunities in low income, rural, and culturally disenfranchised communities. Internet resources will be integrated with curriculum reform in several thematic areas, including: Native American Cultures, Western History, geology and paleontology. State Park and National Monument resources will be used to engage students in active learning projects. Partners include: Capitol Reef National Monument; Dinosaur National Monument; Far West Laboratory; Novell; Utah Office of Museum Services; U.S. West Communications; Utah State Parks; Utah State Office of Education; several Indian Councils, and others.

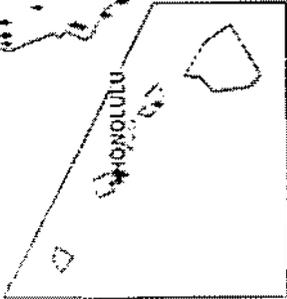
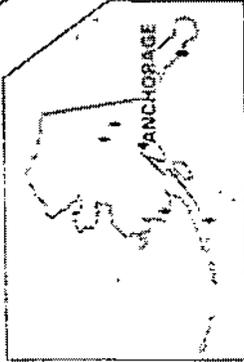
Montpelier, VT

Multimedia telecommunications will expand portfolio and performance based assessment of student achievement in the arts. Based on the Vermont Common Core Framework for Curriculum and Assessment, this technology creates a "WEB" of evidence of student performance in multiple learning domains represented by: sound, graphics, movement, data, and text. Partners include three VT school districts; VT Arts Assessment Project; VT Alliance for Arts Education; VT Center for Geographic Information; VT Institute Of Science, Math and Technology; and VT Department of Education.





Letters of Intent
 • Location



TECHNOLOGY LEARNING CHALLENGE DEMONSTRATION OF TECHNOLOGY INSERTION IN DOD SCHOOLS

BACKGROUND

The Department of Defense Dependent School system has provided an educational environment for demonstrating the insertion of leading edge information technologies into the school setting. Working with Defense agencies and the OSTP, a collaborative learning environment for physics based curricula was demonstrated using advanced network technologies. Students geographically located in Germany, Korea, and the United States were brought together electronically into the same common environment. Students were provided connectivity and sophisticated computer based simulations that allowed them to work together in real time redesigning and flying simulated Wright brothers aircraft. The demonstration clearly exhibited the power of high end technology insertion into a school environment that is analogous to a public school setting. Additional technology insertion programs are currently underway in the DoD dependent schools under the auspices of the Advanced Research Projects Agency and the National Science Foundation. A principle goal of this program is the evaluation of the efficacy of the technologies and their effect on learning outcomes.

GOALS

Establish partnerships between the DoD, NSF, the educational community, and industry to provide the hand-off of demonstrated technologies for further development and use in the public school sector.

Demonstrate to industry and the educational community the potential market for educational technologies in the public school sector.

Disseminate to the nation's schools, other federal agencies, and industry, the outcomes, lessons learned, and effectiveness of technology insertion programs in a school system.

ACTIONS

Currently there is a short term program of limited scope to develop and deploy leading edge technologies in the DoD Dependent schools. Support is available only to a few selected DoD Dependent schools in Germany. No funds are available to fund additional schools for robust demonstrations in Korea, the United States or other DoD Dependent school locations. No long term program is supported to conduct longitudinal assessments of the impact of technology on learning outcomes.

Action: Establish funding for a long term program of technology infusion in current DoD testbed and additionally selected DoD Dependent schools.

The DoD Dependent school technology demonstration program is directed exclusively at the DoD Dependent schools system without direct consideration for like-type schools in the public sector or the market impact of technology programs in education.

Action: Provide funding to incentivize the creation of pilot programs involving the DoD demonstration program with other federal agencies, educational community, and the private sector.

BARRIERS

* The DoD Dependent school system is an operating school system and cannot accommodate significant technology insertion programs at a few limited schools. Significant demonstration programs must include a larger number of available schools.

* The overall market impact of educational technology is unknown and while the DoD Dependent school system is much the same as any public school system, access to the marketplace is not as pervasive.

* Modification of the current demonstration program to "open it up" to other government agencies, educational interests, and the private sector would be difficult and would be better served in subsequent or follow-on demonstration programs.

* The value of technology insertion in any program requires long term assessments with longitudinal studies over time required.

POTENTIAL DOWNSIDE

* Funding of the DoD Dependent schools for an increased technology demonstration program may deflect funding from other critical defense programs.

* Some may question the use of a federal school system rather than a broad-based, eclectic collection of public schools with wider diversity in population, background, skills, etc.

CATCHY PHRASES OR BENEFITS

Leveraging the on-going activities of the DoD Dependent school system technology demonstration program may be more cost effective than starting new programs with federal dollars for what are essentially state-run programs. Use of the DoD Dependent schools exhibits to the public that DoD is making a national contribution to the nation's educational readiness. Use of the DoD Dependent schools is politically neutral since the schools are not in any one state and primarily have a federal constituency. Lastly, the nation can be seen as paying a debt to its guardians of freedom by ensuring their dependents have the same opportunities for a quality education as any kid in America.

WHAT IS BEING DONE

* The DoD demonstration program is being offered to the Interagency Learning Technology Office as a candidate for federal leadership and partnering for technology demonstrations under the Technology Learning Challenge.

* Other elements of the Federal government are participating at a low level in certain aspects of the current demonstration program.

* A plan is being developed to ensure the results of the current demonstration program are disseminated to agencies of the federal and state governments, our nation's schools, industry and the general public.

Action: Issue an Executive Order establishing a coordinating office for federal research in learning technologies. The office would provide an efficient way to coordinate national learning technology efforts by combining the skills of the Departments of Education and Labor with those of technology agencies. It would support focused research, development, demonstration, assessment and dissemination in learning technologies, coordinate public/private research partnerships (such as the TLC grant program), and provide a source of expertise on learning technologies for both federal and other organizations.

Moniker: Schools can best deliver the skills needed in a high-tech economy if they state-of-the art themselves. Why not the best?

Impact: Provide the foundation for advances in learning technologies that will revolutionize classroom and home learning over the next 5-10 years. Highly visible demonstrations of advanced strategies involving creative business partners, universities, and schools during 1996/7.

Funding: *The office started under the executive order would require no new funds.* The office now plans to operate with a very small budget and staff on loan from agencies. However, limited funds present a major constraint on research opportunities. \$30 million in additional funding would fund five ambitious research demonstration projects -- projects which would test advanced with might be eligible for challenge grant awards when the next generation of hardware becomes widely available ins schools. The demonstrations would be selected on a competitive basis and cost shared with industry. Following the high-performance computer precedent, \$6 million could be put in the budget of five agencies and earmarked for the interagency office demonstrations.

Participants: Schools and businesses will participate as research partners/contractors in the sponsored research and demonstrations. A separate advisory group may be formed to review priorities.

Downsides: New funding requires Congressional approval and embroils the proposal in the budget debate. Federal applied research -- however well justified -- meets strong ideological opposition.

What's being done today: Approximately [\$200?] million is now being spent on education and training technology research in the agencies. Most of this is mission related with approximately 2/3 spent in DoD.

DRAFT: 7/31/95

**EXECUTIVE ORDER #####
INTERAGENCY LEARNING TECHNOLOGY OFFICE**

By the authority vested in me as President by the Constitution and the laws of the United States of America, including _____ (Public Law #####), and in order to establish an interagency learning technology office to bring learning technology to bear on the objectives of education, training, and life-long learning, it is hereby ordered as follows:

Section 1. Establishment. There is established the Interagency Learning Technology Office ("the ILTO").

Section 2. Purpose. The purpose of the ILTO is to initiate and support focused collaborations of the technology agencies with the Department of Education to create and demonstrate learning technologies for the 21st century.

Section 3. Functions. (a) The principal functions of the ILTO are, to the extent permitted by law:

- (1) To initiate and support focused interagency collaborations in the research, development, demonstration, assessment, and dissemination of learning technologies across the Federal government.
- (2) To identify and focus the knowledge and expertise on learning technologies that exist within each of the Federal Departments and Agencies.
- (3) To promote and coordinate public-private sector collaboration, investments, and partnerships for improving learning productivity.
- (4) To serve as a single point of access to the best available learning technologies within the Federal government for state and local governments, private companies, and individual Americans.
- (5) To assist Federal agencies with identifying and using technology in major education and training programs.

(b) The ILTO may, at the discretion of its Director and consistent with FACA requirements, convene advisory panels to assist in the performance of its functions.

Section 4. Direction. (a) The Chair of the Executive Board of the ILTO ("the Chair") shall be a senior official of the United States Government, whose oversight of

the ILTO shall be added to his or her existing duties. Assignment to the position of ILTO Chair shall be made by the President of the United States, and the Chair shall serve at the pleasure of the President.

(b) The Executive Board shall be appointed by the National Science and Technology Council.

(c) The Executive Director of the ILTO shall provide day-to-day management of the ILTO and shall be appointed by and will report to the Executive Board.

Section 5. Administration. (a) Professional and support staff of the ILTO shall be assigned to the ILTO by the supported Departments and Agencies. The Department of Defense, the Department of Energy, the Department of Labor, the Central Intelligence Agency, and the National Aeronautics and Space Agency shall detail, on a nonrefundable basis, at least one senior level representative to the ILTO. Additional individuals may also be detailed to the ILTO by the Federal agencies mentioned herein or other agencies as needed. Staff of the ILTO shall:

- (1) serve as the project leaders and principal points of contact for their supporting agency's learning technology demonstration program(s);
- (2) coordinate demonstration proposals and plans with the Office of Science and Technology Policy, the Office of Management and Budget, and other Federal agencies as necessary, as well as with the NSTC Committee on Education and Training;
- (3) draft and staff interagency agreements to implement demonstration projects;
- (4) help focus and coordinate related Federal research and development programs with public and private sector organizations.

(b) Initially, the Department of Education shall provide core administrative and financial support for the ILTO.

(c) The ILTO may receive and make use of additional funding from any Federal agency.

Section 6. Future Modification. If any subsequent Public Law (including, but not limited to, an appropriation of funds for the use of the ILTO) deals with the ILTO, those portions of this Executive Order which are not inconsistent with this Public Law shall remain in force.

8/2/95 – Modify Section 2, Purpose, to read as follows:

Section 2. Purpose. The purpose of the ILTO is to initiate and support focused collaborations of the technology agencies with the Departments of Education and Labor to create and demonstrate learning technologies for the 21st century. *It will also encourage the use of technology in all Federal education and training programs.*



Learning & Technology Themes



- **Expert Associates to Guide Individualized Learning (EAGIL)... Student, Teacher, & Parent Associates**
Intelligent guides (e.g. tutors and associates), which adapt to student learning styles, and respond to student progress, and support individualized learning
- **Collaborative Applications for Project-based Educational Resources (CAPER).... Tools for Development and Use**
Authentic, multi-media, synthetic environments (e.g. simulations) supporting involvement, experimentation, exploration and collaboration, in cross-disciplinary projects
- **Smart Navigators to Access and Integrate Resources (SNAIR)**
Intelligent agents for students, parents, and teachers which tailor access and integration of data and computational resources. Agents will make data and processes interoperable

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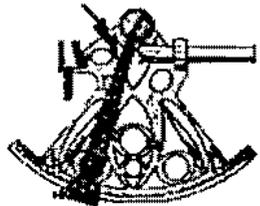
SNAIR

Smart Navigators to Access and Integrate Resources

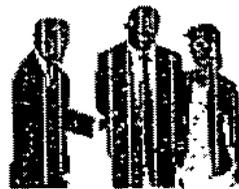
Search Engine Tools Dev



Integration technology for networked resources



Advanced
Navigation &
Text Browsing



Mediated
Collaboration
Teachers &
Students

Educational Goals:

- Improved skills in communication and collaborations
- Increased confidence in using networking systems
- Improved teacher efficiency..easier access to data and information

Components:

- Heterogeneous message passing
- Intelligent agents, repositories, and architecture
- Automatic generation of interfaces for multimedia

Project Types:

- Collaborative path authoring
- Automatic customization of networked resources
- Pulling in networked resources into collaborative environments



Initial Technology Insertion Teacher's Associate



154
California

The Teacher's Assistant is an electronic aide for planning and managing classroom instruction that provides:

- Graphical interface tools to help the teacher efficiently cope with information and actions required for:
 - Classroom management (attendance, grading, calendars,...)
 - Lesson planning and staff resources
 - Accessing instructional materials via the Internet
 - Student performance assessment and tracking
 - Preparation of reports for parents and others
 - School administration linkages (supplies, budget, ...)
- Curriculum planning
- Technology insertion planning



Initial Technology Insertion Shepherd

a Search capability



*UT
Arlington*

- **Shepherd is a personal assistant that helps the user:**
 - **Access remote resources in a user friendly fashion**
 - **Find materials of interest through a number of query and navigation systems**
 - **By modeling the user's preferences in:**
 - **Grade levels of interest**
 - **Subject matters of interest**
 - **Constraints on material types**
 - **Type of learner**
 - **Past productive resources**
 - **Visual material type strengths (graphical, textual,...)**
 - **Other material type strengths (auditory, kinesthetic, ...)**
 - **Requires high speed access to Internet**