

# Withdrawal/Redaction Sheet

## Clinton Library

| DOCUMENT NO.<br>AND TYPE | SUBJECT/TITLE                                                                                     | DATE     | RESTRICTION |
|--------------------------|---------------------------------------------------------------------------------------------------|----------|-------------|
| 001. report              | Federal Learning Technology demonstration workshop - Incumbent<br>Workers list [partial] (1 page) | 12/12/94 | P3/b(3)     |

### COLLECTION:

Clinton Presidential Records  
Domestic Policy Council  
Michael Schmidt  
OA/Box Number: 7339

### FOLDER TITLE:

Learning Technology

2013-0968-S

sb33

### RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

- P1 National Security Classified Information [(a)(1) of the PRA]
- P2 Relating to the appointment to Federal office [(a)(2) of the PRA]
- P3 Release would violate a Federal statute [(a)(3) of the PRA]
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C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Personal record misfile defined in accordance with 44 U.S.C. 2201(3).

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# Learning Technology

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**PHOTOCOPY  
PRESERVATION**

# Learning Technology 2-25-94

## TRP Issue

- commerce ATP -- On-the-Job Training  
ARPA → Project on Education & Training
- Can small industry afford to get into this business?  
venture Capitalists must be convinced
- paperwork through on first round of TRP Funding
  - too late
  - no ed & training
- 2nd Round - \$100 million -- fund rejects that  
couldn't be funded in 1993
- 3rd Round \$ ? million - General, wide open  
round

## Requirements for TRP Funding

dual use (Defense & Civilian uses)  
S&T cost shared  
Technology research is basis  
Market & production plan

- Fed Govt must ~~provide~~ help provide market for ed technology
  - Most tech. in R&D training resides in Contractors
    - must convince/prod contractors to shift to commercial uses. - - problem; defense contracting rules so difficult; contractors grow up knowing only how to work to defense contracts.
- 

Make comments on paper by Monday

## TECHNOLOGY REINVESTMENT PROGRAM FOR EDUCATION AND TRAINING

The quality of the national workforce matters now more than ever. Well-educated, well-trained, motivated workers who can produce high-quality goods and services at low cost, enhance industrial productivity and competitiveness, and keep American living standards high. Education and training go hand-in-hand with productivity, quality, flexibility, and automation. High quality education and training pay off for the individual whose skills are upgraded, for the company seeking a competitive edge, and for the nation in achieving overall productivity and competitiveness. Our major foreign competitors place much greater emphasis on developing and maintaining workforce skills at all levels. Experienced production workers at Japanese auto assembly plants, for example, receive three times as much training each year as their American counterparts. Research in our country has shown that workers who receive formal job training are thirty percent more productive than those who do not.

A high quality and increasingly productive American workforce is the ultimate goal of this solicitation. High-quality education and training must become accessible and affordable to workers throughout their productive lives. A learning environment that reflects the changing workplace and its supporting technology infrastructure should incorporate technology-based software tools and materials for instruction that can be used effectively and efficiently through out a process of life-long learning. These software tools will enhance instructional capabilities in both the Defense and civilian sectors since both need the same new technologies. Substantial costs to develop them for the private sector can also be avoided by transferring those that have already been developed under DoD sponsorship to private use. The responsibilities and resources needed to transfer DoD-developed software tools and materials have yet to be identified and assigned.

Solicitations in this area should demonstrate and develop products that can be successfully applied to civilian education and training -- specifically to the creation of immersive, collaborative, problem solving environments. These tools and materials should be usable in K-12 schools, school to work transitions, at-home training, entry-level training, team training, and worker re-training. This program is also intended to promote assessments of these applications. We must find better delivery mechanisms, such as those provided by video games and movies on demand, to provide interactive coursework and re-training modules. We must determine what works and its cost and effectiveness in applying DoD tools and materials in this manner.

Solicitations should target DoD education and training software tools and materials that can be used in civilian applications to produce capable individuals and successful team performance. The products created should significantly advance education and training capabilities that successfully meet national challenges and international competition in both DoD and civilian sectors.

Solicitations should be considered the following areas of interest:

1. Provide innovative applications of the National Information Infrastructure (NII) in classrooms and at training sites without having to rewire the facility. These applications will provide mobile, distributed access to the NII for dispersed education and training sites.
2. Develop affordable and portable electronic learning devices for individuals. These devices would serve as the technology counterparts to textbooks, pens, and pencils of the 21st Century.

3. Develop enabling tools that allow educators and trainers to easily use the NII. Types of enabling tools may include the following:

- Interfaces.
- Intelligent navigation associates and similar tools.
- NII-oriented authoring tools to allow easy development of lesson plans, course materials, etc. These must be easily modifiable to meet local needs.

4. Establish regional, non-profit, self-supporting education and training technology centers to promote access and understanding of education and training products already developed and in use by the DoD and others. These products include all forms of interactive courseware, 2-D and 3-D simulations, distributed interactive simulation, virtual reality, multimedia instruction, and all forms of teletraining. The centers should be located at or near a recognized educational, training, and research organization with established ties to industry and local, state, and federal government training agencies. The center must form partnerships with all these participants with the goal of demonstrating easy to use, affordable, available and compatible products.

5. Conduct scalable demonstrations of current and emerging products for education and training that can be expanded to wide-spread use. These products should include distributed modeling and simulation for supporting synthetic and virtual learning environments in conjunction with the NII.

6. Provide innovative products with a clear path to commercialization for professional development to educators and trainers. These products should be accessible whenever and wherever they are needed to effectively use emerging NII-based capabilities.

This effort should provide an innovative approach to technology re-use that:

- Is dual/multi use
- Is of multi-agency interest
- Is timely
- Promises significant impact
- Requires collaborative research
- Does not overlap with other focus area
- Provides a marketable product
- Education and Training must be the principle beneficiary
- Must be usable at local state, regional level (affordable, scaleable, etc.)

- link to effort to train teachers to use technology in schools -- must reform/rewrite curriculum

THE WHITE HOUSE

WASHINGTON

February 9, 1994

MEMORANDUM FOR DAVE BARRAM  
HENRY KELLY

FROM: PAUL DIMOND  
BONNIE DEANE  
TOM KALIL

SUBJECT: LEARNING TECHNOLOGY R&D

**GOAL.** Our goal over the next several weeks is to answer the following questions:

Can the Administration's relevant federal R&D programs (e.g., TRP, ATP, NTIA, DOEd Technology, DOL Labor Market/One Stop, NSF, NIE) play a role in stimulating, seeding, or otherwise fostering a new learning industry?

If the answer is yes, what is the nature and scope of this role and how can it be successfully implemented?

**PREMISES.** Our major premise is that we are on the cusp of advances in a number of domains that will enable curricula and learning games to be offered in a way that engages the learner in content **and** encourages the learner to choose his or her own pathways to knowledge, tutors, peers, networks, and learning performance-oriented outcomes. One early stab at supporting this major premise is attached -- for your information or amusement.

Our first minor premise is that federal R&D programs -- if the RFPs and bidder conferences are properly structured -- can catalyze the requisite consortia both (a) to develop the advances and synergy in the diverse technology domains and, perhaps even more important, (b) to stimulate the diverse contents and learning games that will engage learners. Our second minor premise is that there will be a substantial and increasing market demand for such learning levers, once developed, from firms (including associations and consortia of firms), the federal government (e.g., DOD), homes (children, parents, incumbent workers, learners of all ages), and learning centers (libraries, community colleges, Universities, pre-schools, K-12 schools, a new set of interactive distance learning firms).

**NEXT STEP.** To enable us to test these premises against reality, we agreed at our meeting yesterday to attempt to outline RFP specs for the next round of TRP challenge grants. Henry Kelly agreed to take the lead in exploring the potential market demand, defining the terrain for potential R&D advances and bidder consortia, and canvassing a few prior reviewers and potential bidders and users. He will then provide a draft outline of RFP

specs for our review and discussion when we next meet -- on **February 24 at 8:30 a.m. in Room 230 OEOB**. Hopefully, this process will also help to inform how to proceed with the other relevant, federal R&D funding programs.

cc Bill Galston  
Jack Donohue ✓  
Linda Roberts  
Dorothy Robyn  
Doug Ross  
Mike Smith



## IT'S LEARNING, STUPID!

We need to consider whether we are on the cusp of a technological revolution that will enable us to choose a new direction for lifelong learning for all Americans. Consider three, related shifts in paradigms:

1. It's Learning: Let the Learning Lever Begin. It is learning--not education, training, or schooling--that is at issue. From this perspective, the major hurdle has always been that we know that every person is different and unique. If we could invent efficient and effective means of learning, therefore, we would not be satisfied just by finding the common needs of most learners. Instead, we would try to customize the means of learning to serve each learner and to allow learners to proceed at their own pace, in their own styles, including by working at learning with one another in pairs or larger groups, as well as alone, at home, on the job or at school. Such a reinvented vision of learning might seem to depend on having all variety of tutors for virtually every learner. Yet the primary work is done by the learner, not by the tutor or teacher. As a result, we can begin to imagine a system where the learner connects up with tutors at various times, but can also do much of the work of learning on her own (or, together, with peers and parents). What would be most helpful to such a reinvented system of learning are a wide variety of levers to assist the learner (and peers, parents and tutors, firms and co-workers) along a wide variety paths to learning. We, therefore, call these new tools: Learning Levers.

2. It's technology: Let the Interactive Rebellion Begin. For such a learning revolution to proceed, of course, we will need a technological revolution as well. And, one is on the horizon if not already upon us. To date, most computers have been linear--yes-no, stringing words and bits together in a line, computing numbers, most triggered by a numerical/alphabetical keyboard. But icons, images, sounds, non-linear information and insights, rolling frames and stop action, interactive multi-media are all coming together. Miniaturization, compacting of data, new means of transmitting images, sound and information, and so much more are upon us. The potential for creating all variety of Learning Levers is a rebellion in the making.

3. It's Interactive Entertainment: Let The Games Begin. Finally, the smashing revolution may be that the real variety (and payoff) is not in the hardware or the systems software of Learning Levers: it's in the content, the programs, the entertainment, the production of the plays and the provision for the interactions with the players. Current estimates are that 1% of the revenues, profits, and jobs are in making the hardware, up to 4% in the systems software, and something like 95% in the content. Imagine if CD's, games, entertainment, interactive multi-media, and all manner of engaging content and multiple pathways to knowledge all came together with the revolution in technology and interactive communication!

Now, here is a potentially burgeoning new industry where the U.S. has a competitive edge on the rest of the world. If the 21st Century is to be an American Century as Ben Wattenburg argues, then Learning Levers could be a key to translating what he assumes is our current cultural dominance into a major economic advance for our firms and for our people. If the 21st century will belong to those firms and nations who learn how to increase productivity in ever expanding service sector as Drucker argues, then Learning Levers could provide the means to increase the skills of all Americans, the productivity of our workforce, and the competitiveness of our firms in the emerging global economy of information and knowledge.

## **Technology as a Lever to Promote Productivity of Learning**

### **Background:**

The challenges faced by military trainers are substantial now and can be expected to increase in the future. There are several reasons for these challenges, including: a decreasing supply of eighteen-year olds; an increasing number and complexity of military systems; and the costs of training are increasing at a time when resources are less available. It is not surprising to find military trainers seeking new approaches to meet these challenges. It is also not surprising to see them turning to our most powerful new technologies to meet these training needs. Computer-based training requires students to participate actively in the training environment. It allows students access to high-quality simulations of systems that could not otherwise be made available to them. When the capabilities of computer-based training are combined with teletraining technology, both the content and interactions of high-quality training can be distributed to widely dispersed sites.

### **DoD Use of Technology:**

The courses presented by the DoD range in length from less than a day to more than a year. The format of this instruction ranges from traditional platform lectures using textbooks to correspondence courses to field exercises involving actual equipment and live ammunition. The instructional technology used also spans the full range and includes lesson plans, study guides, workbooks, instructor guides, overhead transparencies, textbooks, workbooks, programmed textbooks, audio cassettes, films, videotapes, computer-assisted instruction, computer-managed instruction, interactive videodisc instruction, CD-ROM instruction, teletraining, part-task simulators, two-dimension simulators, high-fidelity simulators, laser-simulated weapons fire, networks of simulators, and actual operational equipment (e.g., engines, radars, etc.).

Increasingly, the DoD relies on interactive, computer-based courseware (ICW) and teletraining to support its instructional needs. There are several reasons for this:

(1) **Stability.** The development of movable type and books provided a capability to capture the content of high-quality instruction and deliver it inexpensively to many people. However, the effectiveness and efficiency of instruction varies if content is presented using different rules and procedures. In addition to content, computer technology captures the interactions of high-quality instruction and makes them widely, inexpensively, and reliably available to many people. ICW programs cannot yet supply all the interactions of an individual tutor working with an individual student, but they can capture a significant portion of it. What interactions they do provide-along with the instructional content--can then be delivered in a stable, autonomous fashion to learners, with a minimum of the variability that is characteristics of human instructors.

(2) Effectiveness. There have been enough reviews of the effectiveness of computer-based instruction that a review of the reviews (Niemiec and Walberg, 1987) has been published. It indicates an improvement of about 14 percentile points in student achievement through the substitution of computer-based instruction for more conventional approaches. A suggestion of the improvements to be expected in the wider world of ICW using multimedia approaches were provided by Fletcher (1990), who found improvements of about 19 percentile points through the use of interactive videodisc instruction.

(3) Cost-effectiveness. One significant measure of cost when students are being paid by the organization that trains them is time spent in training. A very stable finding for ICW has been that it reduces training time by about 30 percent over more conventional means (Orlansky and String, 1979; Fletcher, 1990). A second source of cost reductions through the use of ICW involves its ability to substitute simulation for actual equipment without adversely affecting student achievement. Use of simulations that may cost a tenth or even a hundredth of the actual equipment used in military systems has provided a powerful cost incentive for using ICW programs to train operators and maintainers of military systems.

Several actions to improve the management and use of ICW programs within the DoD have been initiated. These actions include the development of policies, technical standards, and a new automated reporting system and data base that will improve the sharing of materials inside the DoD and outside, with non-DoD activities. They center on two areas: (a) ICW portability; and (b) development and management of ICW.

### **Portability:**

Interactive courseware (ICW) portability refers to the ability to operate the same software across many different hardware platforms. Portability (1) reduces the costs and increases the usability of both computers and their software, (2) strengthens the market for both, and (3) helps institutionalize their use in many diverse applications.

Without portability for ICW programs, routine and widespread use of this promising technology is seriously handicapped. These handicaps include excessive cost, difficulty of use, technological inertia, and unnecessary complexity in courseware design, development, delivery, and implementation. These handicaps are removed by designing interactive courseware to be portable.

Interactive courseware can be portable if developers use standard practices to create it. Consequently, the topic of portability is also a topic of standards -- military standards, federal information processing standards, national standards, and international standards. Implementation of these standards represents a significant opportunity and

requirement for cooperation at all levels of technical development and across all communities concerned with the use of ICW programs.

Portability means different things to different people. Transportability, transferability, convertibility, and related terms are used to discuss the same concept. A restricted, but straight-forward definition has been articulated as "the ability to move and application from one component to another unchanged and get same results" (Dahlstrand, 1984, p.17). The DoD definition is not much different. DoD Instruction 1322.20, "Development and Management of Interactive Courseware (ICW) for Military Training" defines portability as "the capability to run courseware and associated application programs without modification on a delivery system other than the one for which they were originally designed."

Courseware portability will increase the sharing of ICW within each Military Service by providing ICW programs that can be used with little, if any, reprogramming across a full range of within-Service instructional settings including initial skill training, advanced skill training, garrison training, job-site training, officer education, and Reserve Component training.

Courseware portability will also increase the sharing of ICW across the different Military Services. All the Services teach basic courses such as electricity, electronics, hydraulics and motor vehicle repair. It is not unreasonable to suggest that materials for these courses, or some portion of them, be usable by all Services. This sharing is neither an administrative nor political impossibility. Joint training is now offered in 62 inter-Service courses or skill areas (Military Manpower Training Report, 1991), and the need for it will increase as training budgets decrease.

Finally, portability makes the transfer of ICW from the DoD to the private sector technically feasible and practical. It provides a foundation for the DoD to meet the requirements of the Training Technology Transfer Act of 1988 with minimum impact on its resources and maximum opportunities for transfer.

### **Management:**

Military Standard 1379D, which includes the ICW portability standard, is the principal DoD standard for training. It establishes: (1) procedures to follow when developing training programs, including guidelines for writing contracts and delivery orders for training; (2) requirements for using DoD Computer-aided Acquisition and Logistics Support (CALS) for training documents; and (3) requirements for using the virtual-device interface.

Additionally, DoD Instruction 1322.20, was developed and issued on 14 March 1991. The objective of this instruction is increased cost-effective use of ICW for military training, and it applies to all interactive courseware developed by or for the DoD. The instruction sets five policies for the development of new and substantially modified ICW

programs and the management of both new and existing ICW programs in the DoD. These policies are the following:

(1) ICW programs are to be designed to promote portability, following the standard DoD programming protocols developed under the DoD portability initiatives and other technical requirements prescribed in MIL-STD-1379D.

(2) Payment of royalties, recurring or run-time fees, use taxes, or similar additional expenses for ICW and associated materials developed for or by the DoD are to be eliminated.

(3) The Defense Instructional Technology Information System (DITIS) is established to provide and maintain an inventory of DoD ICW programs for use by all DoD components. DITIS is also significant for non-DoD workforce issues because it provides essential information for determining the potential of DoD ICW programs for transfer to the private sector.

(4) Reproduction master materials must be archived for the life cycle of each ICW program.

(5) DoD Components must ensure the availability of all materials necessary to modify ICW programs throughout their life cycle.

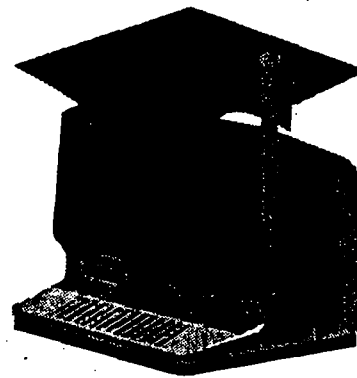
#### **Potential Applicability to Private Sector:**

The problem of making substantial improvements to the skill levels of the national workforce is complex and unlikely to be solved by any one action such as increased use of technology. It is clear, however, that the DoD experience has shown that portable, quality controlled instructional materials (such as those provided by ICW programs) can significantly help by making education and training more efficient and effective.

Attachment 2

~~Henry~~

# **Federal Learning Technology Demonstrations Workshop**



**Sponsored by the  
Subcommittee on R&D  
and the  
Interagency Technology Office**

**12, 13 December 1994**

# **School to Work Out-Brief**

**Mike Harrington (MITRE)**

**Jonathan Hoyt (DoED)**

**Greg Parham (USDA)**

**Margaret Rivera (AACC)**

**13 December 1994**

## **Outcome Desired**

**Assist all youth to acquire the knowledge, skills, attitudes and labor market information needed to:**

- Make a smooth and effective transition from school to career-oriented work**
- Obtain further education and training**



# Customers

- **All youth between the ages of 12 and 25 who have not yet made the transition to full-time work (i.e., not yet incumbent workers)**
- **All educators helping with this transition**

# **Essential Criteria Related to School-to-Work Program**

- **Integrate academic and occupational training**
- **Integrate school-based and work-based learning**
- **Address state and local education goals**
- **Be a part of comprehensive school reform efforts, such as curriculum changes and teacher professional development activities**

## **Desirable Criteria**

- **Provide broad-based and equitable access to information and expertise that supports school-to-work programs**
- **Create digital applications and electronically-based resources that support school-to-work programs**
- **Provide all youth with equitable, convenient access to simulated work environments, irrespective of time, income, or geographic locale**
- **Link youth to work environments that are as realistic as possible via interactive applications on networks**

## **Examples of Possible Demonstration Programs**

- **Electronic multi-media simulated work environments featuring:**
  - “Day-in-the-life” interactions between student and “supervisors,” “co-workers,” and “customers”
  - Typical problems and typical skills needed
  - “End-of-day” system-assisted self-assessments
- **On-line job market database with description of requirements, credentials, and prospects by experience level, region, and locality**
- **On-line self-assessment tools focused on job-related skills and attitudes**

## **Example Demonstration Programs (Concluded)**

- **Problem:** individuals seeking to enter workforce have insufficient information on:
  - **Attitudes and skills needed in the workplace**  
(i.e., what do employers want?)
  - **Problems faced and skills needed in specific careers**  
(i.e., what does a specific industry want?)
  - **Own aptitudes and attitudes relevant to these careers**  
(i.e., what do I want?)
- **Outcomes:** more realistic view of possible careers, better skills, and better self-appraisal
- **Methods:** in collaboration with employees, establish multi-media environment for specific jobs or professions that allow user to confront and solve typical problems in workplace
- **Benefits:** better skills, better “fit” between worker seeking job and job market, more specific reasons to obtain job-oriented knowledge
- **Agency collaborations:** many

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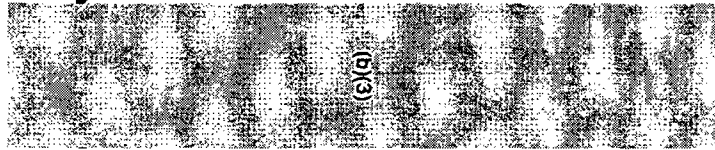
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# **Incumbent Workers**

**Steve Funk (NSF)**

**Bryan Shea (FU ASSC/DOL)**



**Jon Grand (EPA)**



**Mary Ann Tatman (VA)**

**Tom Fowler (MITRE)**

**13 December 1994**

# Customers

- **All workers, but particularly non-supervisory workers, including those with physical challenges or English-language deficiencies**
  - **Does not exclude professional development/continuing education requirements**



# Outcome

- **Just-in-time skill/knowledge training tailored to use, available on-demand anywhere, regardless of language or physical disadvantage**

# Attributes of Outcome

- **Training programs that ...**
  - **Customize to user (smart)**
    - **Learning style**
    - **Level of knowledge, skills, and abilities**
    - **Language**
  - **Transparent interface**
    - **No need to be “computer literate”**
    - **Accessible by physically handicapped**
  - **Special courses/modules**
    - **“Learning to learn”**
    - **English as second language**

## **Attributes of Outcome (continued)**

- **Time and Place Independent**
  - **Virtual digital repositories (e.g., digital libraries, courses)**
  - **Worldwide mentor/peer networks for worker collaboration (networked “extension agent” for information age)**
  - **“Best practices”/lessons learned networks for trainers**
  - **“Clearinghouse” network services that have course ratings and evaluations**
  - **Electronic Performance Support Services (EPSS)**
  - **Platform independent**
  - **Accessible from work, home, library**
  - **Innovative delivery organizations (e.g. professional organizations, chamber of commerce)**

## **Attributes of Outcome (concluded)**

- **Measurable**

- **Student skill certification/licensing**
- **Learning diagnostic assessment**
- **Course effectiveness evaluation**
- **System delivery evaluation**
- **Cost/benefit and selection models/aids**

# Criteria

- **Needs of experienced workers to become lifelong learners**
  - **Show path to affordability**
  - **Scalability**
- **Improve accessibility and quality of materials available to incumbent workers**
- **Improve match between instructional resources and need for a competitive world-class workforce**
- **Measurable assessment plan**
- **User community/workplace involvement in development and pilot**

## **Example (continued)**

- Install common nodes, “check-out” computers to use in training and on-the-job EPSS**
- Develop “extension agent” network and group of “mentors/peer leaders” with world-wide access**
- Outcomes**
  - Life-cycle learning, portable skills**
  - Consortia-developed competency standards**
  - Build baseline resource base and methodology for building/maintaining**
  - Improved accessibility, scalability**

## **Example (continued)**

- **Benefits**

- **Rapid updates**
- **Reduced time off job**
- **Cost reduction curves vs. scaled-up (bigger consortia, wider number of users)**

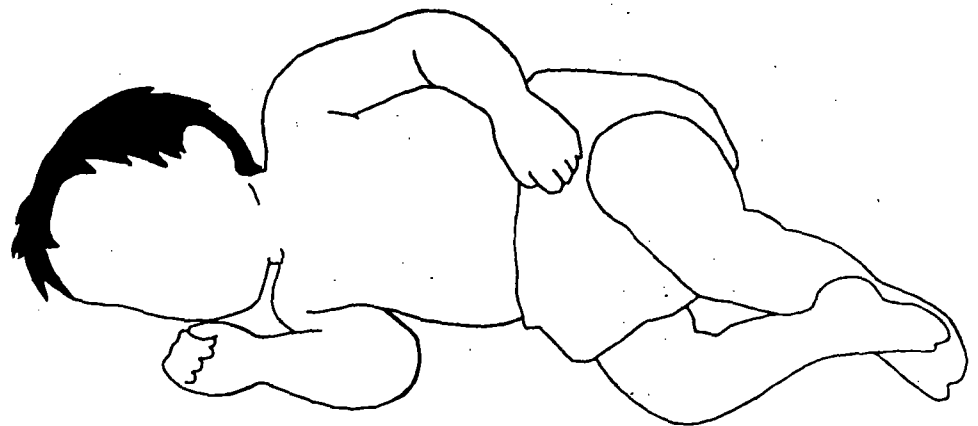
## **Example (concluded)**

- **Cross-agency collaboration**
  - **DOL**
  - **DOC**
  - **Business or professional organization (ASTD, industry association)**
  - **DoED**
  - **Agriculture**
  - **SBA (SCORE/ACE, private industry council)**
  - **Technology providers/developers**



# EARLY CHILDHOOD

NAOMI KARP (DoED)  
CINDY WILES (OSTP)  
JANET WEISENFORD



12/13/94

# **OUTCOME**

- **RESOURCES FOR LEARNING ENVIRONMENT**
  - **HOME, SCHOOL, DAY CARE**
- **RESOURCES INCLUDE:**
  - **SIMULATIONS**
  - **DELIVERY METHODS**
  - **INDIVIDUALIZED INSTRUCTIONAL MATERIALS**
  - **TOOLS FOR CREATING INSTRUCTIONAL MATERIALS**
  - **ASSESSMENT TOOLS**
  - **RESOURCES FOR FAMILIES**

# **CUSTOMER**

- **CHILDREN: BIRTH TO EIGHT**
- **TEACHERS**
- **CHILD CARE PROVIDERS**
- **FAMILIES**

# GENERAL CRITERIA

- **INCREASE INSTRUCTIONAL EFFECTIVENESS AND LEARNING PERFORMANCE OF LEARNERS, TEACHERS, CHILD CARE PROVIDERS, FAMILIES, AND EMPLOYERS**
- **INCREASE ACCESS FOR EDUCATION & TRAINING**
- **PROMOTE LINKAGES AMONG ALL LEVELS OF EDUCATION, GOVT, THE PRIVATE SECTOR, & COMMUNITIES**

# **GENERAL CRITERIA (CONTINUED)**

- **DEMONSTRATE TECHNOLOGY-BASED LEARNING SYSTEMS THAT ARE AFFORDABLE AND CAN BE SCALED-UP TO SERVE A BROAD SET OF POPULATIONS & SETTINGS.**
- **INVOLVE THE USER IN THE DEVELOPMENT PROCESS.**
- **PROMOTE SYSTEMIC EDUCATION REFORM, SUPPORT INSTITUTIONAL CHANGE, AND OVERCOME BARRIERS TO THE USE OF TECHNOLOGIES FOR EDUCATION & TRAINING TO IMPROVE LEARNING PRODUCTIVITY.**

# **SPECIFIC CRITERIA**

- **MUST ADDRESS DEVELOPMENTAL NEEDS OF YOUNG CHILDREN (BIRTH-8), THEIR FAMILIES, TEACHERS, AND CHILD CARE PROVIDERS.**
  - **SOCIAL EMOTIONAL**
  - **COGNITIVE/LEARNING**
  - **MOTOR SKILLS**
  - **LANGUAGE**
  - **INTRODUCE CONCEPTS TO FOSTER PRE-READING, READING, SCIENCE, LANGUAGE & MATH.**

# **SPECIFIC CRITERIA-CONT**

- **PROVIDE NEW ASSESSMENT TOOLS THAT:**
  - **IDENTIFY & BUILD ON STRENGTHS**
  - **IDENTIFY & PREVENT PROBLEM AREAS**
  - **PROVIDE BASELINE DATA**
  - **SUPPORT MONITORING PROGRESS**
  
- **EXTEND SKILLS, KNOWLEDGE, & TOOLS FOR EARLY CHILDHOOD**
  - **TAKE ADVANTAGE OF EMERGING, MORE EFFECTIVE PARADIGMS OF EDUCATION**
  - **IMPROVE LEARNING PRODUCTIVITY OF YOUNG CHILDREN**
  - **INCLUDE BOTH PRE-SERVICE & IN-SERVICE**

# **SPECIFIC CRITERIA-CONT**

- **ENCOURAGE HIGH DEGREE OF FAMILY INVOLVEMENT IN ACTIVITIES**
- **CONSIDER DIVERSE FAMILY STRENGTHS AND CULTURES INCLUDING:**
  - **TEEN AGE PARENTS**
  - **SINGLE PARENTS**
  - **WORKING PARENTS**
  - **FAMILIES WITH LIMITED ENGLISH OR READING SKILLS**



# **SPECIFIC CRITERIA-CONT**

- **USE NATURAL ENVIRONMENTS TO PROMOTE:**
  - **FAMILY LITERACY**
  - **CONTINUOUS LEARNING**
  - **DISTANCE LEARNING**
  - **PARENTING EDUCATION**
    - **PRENATAL CARE**
    - **NUTRITION**
    - **HEALTH CARE**
    - **CHILD DEVELOPMENT**
    - **SAFETY**

# **CONFLICT RESOLUTION EXAMPLE**

- **LEARN TO RESOLVE CONFLICT**
  - **WITHOUT FORCE**
  - **VALIDATE FEELINGS**
  - **RESPECT OTHER'S VIEW**
  - **COLLECTIVELY DEVELOP  
SOLUTION**
  - **CHILDREN SOLVE; ADULT AS  
MODERATOR**

# OUTCOMES

- CHILDREN LEARN:
  - RESPONSIBILITY FOR ACTIONS
  - CONSEQUENCES OF BEHAVIOR
  - RESOLUTION WITHOUT FORCE
- ENCOURAGES SOCIAL RESPONSIBILITY
- ENABLES ARTICULATION OF ISSUES  
FOSTERS TEAM SKILLS

# METHODS

- COLLECT EXPERTISE
- DEVELOP INTERACTIVE  
MULTI-LINGUAL COURSEWARE
  - STAND ALONE
  - NETWORKED EXPERT SYSTEM
  - QUERY CAPABILITY

# BENEFITS

PUTS INFORMATION AT FINGERTIPS  
AGGREGATES EXPERT APPROACHES  
ALLOWS FOR INTERACTION

- COLLECTIVE PROBLEM SOLVING
- SHARES INNOVATIONS

ACCESSIBLE

- ON DEMAND
- ANYWHERE

PHOTOCOPY  
PRESERVATION

# AGENCY COLLABORATION

- DoEd
- DoD
- HHS
- USDA
- STATE & LOCAL
- INDUSTRY PARTNERS

# ISSUES

- **WHAT IS STATE OF THE ART?**
  - **RELATIVE TO ENVIRONMENT**
  - **RELATIVE TO CURRENT STATE**
  - **NEW PARTNERSHIPS**
- **NEED TO PRODUCE RAPID RESULTS**
  - **REDUCES TIME SPAN TO CONDUCT R&D**
  - **EMPHASIZES DEVELOPMENT VS RESEARCH**

# **K - 12 Teacher Prep Working Group**

**John Cradler**

**Michael Haney**

**Brian Lindow**

**James Mitchell**

**Malcolm Phelps**

**Karen Reshkin**

**Peter Sharfman**

**Dee Shepp**

**Denise Wiltshire**

**13 December 1994**



# Customers

- **Children K - 12**
- **Educators**
  - **Teachers**
  - **Librarians**
  - **Counselors**
- **Administrators**
- **Policy makers**

## **Outcomes (1 of 2)**

- **Increases student employability:**
  - **Student performance**
  - **What they know**
  - **Should be able to do**
  - **Attitude toward learning**
- **Encourages collaborative work**
- **Promotes engagement in learning**
- **Improves analytical skills**
- **Teaches process and application**
- **Transfers to other learning areas**
- **Prepares and motivates further learning**

## **Outcomes (2 of 2)**

- **Increase understanding of subject matter**
- **Furthers understanding of the ability to incorporate technology into teaching**

## **Specific Criteria (1 of 3 )**

- **Must address the learning needs of students and teachers in K-12 learning environments**
- **Must extend learning environments beyond the confines of classrooms to include home, community and workplace resources for enhancing teaching and learning**
- **Must help alleviate bottlenecks in the current K-12 instructional paradigm, such as:**
  - **Isolation of teachers**
  - **Lack of student motivation**
  - **Lack of time to address individual learning needs**
  - **Lack of resources to implement the program**
  - **Extensive administrative burdens on instructional staff**
  - **Technological barriers for teachers**

## Specific Criteria (2 of 3)

- **Must promote effectiveness of learning by improving interactions between teachers, students, parents, and/or administrators**
- **Must be classroom ready**
  - **Must include all elements necessary for successful classroom implementation**
- **Must exemplify emerging education standards, new curricula , and new student assessment methods**
- **Must include specific provisions for training teachers, administrators, and other school staff in application of hardware, software, and courseware required for the demonstration**
- **Must include a strong evaluation plan appropriate for the project**

## **Specific Criteria (3 of 3)**

- **Must promote active problem solving and higher order thinking skills**
- **Must be original**
- **Should help the teacher become and remain current with the subject matter**
- **Should describe how the program can be integrated into current and emerging educational initiatives (e.g. Goals 2000, School-to-work, special education, etc.)**

## **An Example (1 of 3)**

- **Context:** Global change research program
- **Agencies:** NASA, NOAA, EPA, NSF ... DOE, USGS, USDA
- **Problem statement:** broaden understanding of global environmental change by the k-12 community of learners

## **An Example (2 of 3)**

### **● Outcomes:**

- Prepare students and teachers to gather, use interpret, and analyze digital data**
- Use data-analysis tools**
- Understand important earth processes (carbon cycle, etc.) that affect global change**
- Practice collaborative problem solving activities**
- Understand scientific approach to problem-solving and data interpretation**



## **An Example (3 of 3)**

### **● Methods:**

- Provide interaction between schools and scientists. Also school-to-school**
- Private sector involvement -- to provide new approaches in transmitting new approaches in transmitting graphical data files via slow speed transmission lines commonly available to schools.**
- Utilize distance learning techniques to prepare teachers.**
- Develop network-based curriculum materials.**

**Technology  
Demonstration  
Workshop:**

**Higher Education**

**12, 13 December 1994**

# **HIGHER EDUCATION GOAL:**

**All higher education students will achieve learning and career goals in a highly personalized and efficient manner.**

## **Background**

**Student demographics (time, location, responsibilities, learning styles)**

## **Focus**

- **Technology: cooperative intelligent agencies, simulation, intelligent tutors, NII, electronic-based information**
- **Serve many populations**
- **Focus on first two years of college**
- **Science, technology and engineering**

# Criteria

- **Broaden access free of time, location and physical limitations**
- **Faculty “buy-in” and preparation**
- **Cognition-based testing**
- **Increase affordability**
- **Connection to workplace/real world**
- **Coherence/links**
  - **a) External: home/high school/workplace/community**
  - **b) Internal: within institution**
- **Cognition research on team work**
- **Consortium: Colleges and Universities, education technologies/industry, nonprofits, and government**

# Modalities of Operation

- **Multiple, diverse sites**
- **Testbeds and or pilots**
- **Management and administration**
- **Lessons learned, assessment, reliability**
- **Replicability to other domains**
- **Evaluation directed by funding agency or CET**

# **Example**

## **Key Features:**

- **Personalized Assessment**
  - **Extract student goals (career, life)**
  - **Assess current skills and knowledge relevant to achieving goals**
  - **Determine student's ability to benefit from available pedagogical strategies**
- **Develop a more fluid curriculum that is personalized for each student**
- **Process management**
- **Outcome evaluation**

# **Linking Home, School , and Community**

**Ed Wintermute, Nora Sabelli, David Allison,  
Nahum Gershon, Andy Molnar, and Lee Woodman**

**December 13, 1994**

# Problem Statement

- **To demonstrate the value of new technologies integrating Federal and local resources within a community to support education, training, and life-long learning**



# Outcome

- **Realize the vision in actual community**

**“To ensure all Americans access, anytime and any place,  
to quality education and training tailored  
to their individual learning\* and workplace needs”**

- \* **Communities also have learning needs**

## **Outcome (continued)**

- **Understand what are the**
  - **Needs**
  - **Costs**
  - **Benefits****to the community and its constituents**
- **Increase access for**
  - **Individuals**
  - **Community constituents**
    - **Real**
    - **Virtual**

## **Outcome (continued)**

- **Make more effective use of Federal information resources for:**
  - **Education**
  - **Learning**
  - **Training**
- **Add value through access and community interactions that are:**
  - **Pervasive**
  - **Integrated**
  - **Technology-mediated**

# Customers

- **People and their communities: both as users and providers of information**
- **Institutions: as resource providers or mediators**

# Criteria

- **Users are REAL people in REAL communities**
  - **Users will participate in demonstrations and their development**
- **Uses are REAL**
- **Agencies must be coordinated in their involvement**
- **Success is defined by compelling examples of major advances**

## Criteria (continued)

- **Demonstrations should**
  - **Leverage known successes**
  - **Be integrated with those of other groups, such as**
    - **Incumbent Workers**
    - **Special populations**
    - **K-12**
  - **Lead to self organizing community activities**
  - **Be innovative in**
    - **Education**
    - **Technology**

## **Criteria (continued)**

- **Demonstrations should**
  - **Be technologically upgradable, scalable, and extensible**
  - **Be explainable, affordable, reproducible, and user-oriented**
  - **Be based on community-based & distributed resources**
  - **Address an important challenge**
  - **Have several but limited areas of focus**

# Methods

- **Select a community that has begun goal-oriented technological modernization**
- **Engage with the community to define the project that**
  - **Focuses on several well-defined areas**
  - **Uses Federal resources to meet their perceived need**
  - **Demonstrates a compelling application of technology**
- **Ensure that focus conforms to the need of the Government agencies**



# Examples

- **A medium size city with an operational free net**
  - **Broadens its community involvement, e.g., to boys and girls clubs, service clubs etc., outlying rural areas**
  - **Links to Federal agencies, such as HHS, DOA, SI, VA**
  - **Distributes Federal information related to e.g., health care, course ware, training, cultural resources**
  - **Creates new uses of the information and new types of interactions with the agencies,**
  - **Leads to communities sharing and integrating information from disparate sources, e.g., young children helping the elderly, elderly tutoring children**

# **Demonstration Area #8**

## **Military Training**

## **Military Training: Customers**

**Military trainees and their counterparts in the civilian population**

**For example:**

- **Aviation technicians**
- **Crisis response teams**
- **Law enforcement personnel**
- **Medical technicians**
- **Language learners**

## **Military Training: Outcomes**

- **Reduced cost per certified graduate**
- **Proficiency that is developed and sustained any time, any place**
- **Increased operational/organizational efficiency and effectiveness**

## **Military Training: Specific Criteria**

- **Builds on existing R&D products**
- **Platform independent**
- **Addresses a critical skill area that:**
  - **Is difficult to train (e.g., involves high order cognitive skills)**
  - **Involves current and continuing shortfalls**
- **Distributable (essential)**
- **Interoperable (essential)**

## **Military Training Example:** **Aviation Maintenance**

**Problem:** Inadequate supply of job-proficient, certified aviation maintenance technicians in both military and civilian sectors

**Outcome:** Adequate, affordable capabilities that meet both military and civilian personnel needs for aviation maintenance

## **Military Training Example:** **Aviation Maintenance**

- **Description:**
  - **Emphasizes high-end aviation maintenance tasks -- especially troubleshooting**
  - **Provides knowledge-based, adaptable tutoring and job-aiding**
  - **Multiple, integrated delivery devices (desktop/head-mounted/voice-controlled/etc.)**
  - **Network access to remote data bases**
  - **Consistent access to information for both job-aiding and training**

## **Military Training Example:** **Aviation Maintenance**

- **Developmental areas:**
  - **Equipment simulation**
  - **Voice recognition**
  - **Spatial data management**
  - **Knowledge-based, adaptive tutoring and job-aiding**
  - **Simulation authoring**
  - **Data base access and compatibility**



## **Military Training Example:** **Aviation Maintenance -- Outcomes**

- **Increased:**

- **Student success and job-performance proficiency**
- **Student and management effectiveness and efficiency**
- **Requirements for actual equipment used in training**

**Reduced:**

- **Time to train**
- **Costs to train**
- **Time to perform maintenance tasks**
- **Errors in performing maintenance tasks**
- **Costs to perform maintenance tasks**

## **Military Training Example:** **Aviation Maintenance**

### **Agency collaboration:**

- **DoD**
- **DoL**
- **DoT (FAA)**
- **DoT (USCG)**
- **NASA**

# **Special Populations**

**Dinah Cohen**

**Larry Berger**

**Kathleen Bond**

**Kimberly Warren**

**December 13, 1994**

## Goal

**“High quality, life-long learning resources will be accessible to all members of special populations so that they can participate in quality education and training tailored to their individual learning and workplace needs.”**

## **Definition: Special Population**

**“Learners of all ages who need to access educational tools in a variety of modes due to physical, cognitive, or learning disabilities, cultural differences, or language challenges.”**

## Demonstration Criteria

- **Must incorporate user population in design, development, and deployment of new technology.**
- **Must capitalize on the unique assessment, integration and instructional tailoring capabilities offered by technology to special populations of learners.**
- **Must address & ensure that learning tools are useable and accessible by these special populations so that they can participate as more productive and independent citizens.**

# Outcome

- **Total accessibility of products in alternative modalities and media**
- **Integrated adaptive technologies**
- **Operate in/Conform to Open System Standards**
- **Allowing a person to select the adaptive technology which best fits their requirements**

# Customer

- ***Modality Challenged***
  - **Due to functional limitations**



## Example

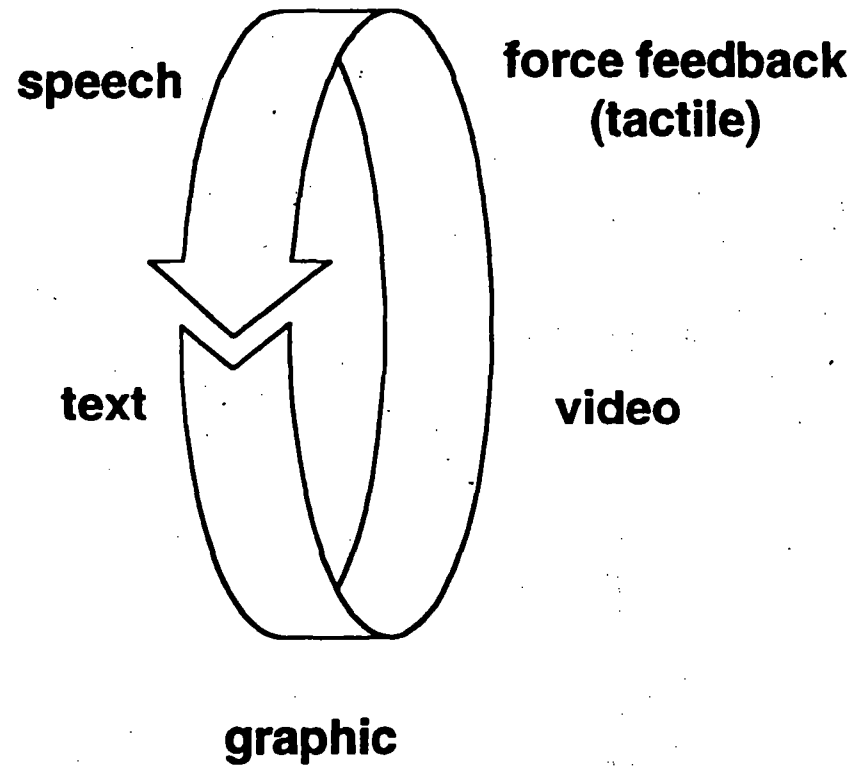
- **Problem Statement:** Technology is advancing at such a pace to be faster and fancier and multimedia, that the adaptive technology currently does not interface with the technology
- **Examples:** Development of systems providing alternative modes to support the learner's functional limitations and preference.
  - **System to provide a spoken front-end to Internet tools**
    - **Addresses:** dexterity, language, cognitive, and spatial impairments
  - **System to generate synthetic speech describing multimedia document (text, graphics, and video)**
    - **Addresses:** visual, language, and learning impairments

## Example (continued)

- **Outcome: Standards based education and training tools with a variety of alternate integratable input and output devices**
- **Methods:**
  - **Technical Approach**

| Input                         | Output                 |
|-------------------------------|------------------------|
| text                          | English translations   |
| speech                        | synthetic speech/audio |
| posture                       | graphic                |
| gesture                       | video                  |
| tactile (mouse, touch screen) | force feedback         |
| infrared                      |                        |

## Example (continued)



## Example (concluded)

### ● Benefits

- Special Populations benefit the *most* from increased attention to multiple media, multiple modalities, and communication - which will also benefit the population at large
- Special Populations can potentially contribute the *most* to the definition of the next generation(s) of multimedia, multimodal, and communication technologies
- Products can be used by a wider range of users
  - People with disabilities
  - Aging workforce
  - English as a Second Language population growing
- Greater participation by *everybody*

# Agency Collaborators

- **Collaborators:**
  - **No Agency is exempt from the need to collaborate and incorporate the needs of special populations in their technology developments**
- **All agencies currently participating in:**
  - **Multimedia research and development**
  - **Multimodal research and development**
  - **Assistive technology research and development**