

Guided by extensive advice from business, teachers, parents, and others, we have launched a series of focused activities which can have enormous leverage on this problem.

1. We are working with businesses and school systems around the country to improve the way education technology markets operate. This involves full cooperation by the local and state school organizations in a position to make real procurement decisions and potential vendors of advanced instructional materials. An effective procurement requires (a) that schools clearly specify what they want from vendors (including some way of communicating standards for educational outcomes), (b) that their expectations encourage real competition by vendors while remaining realistic, and (c) assurances that the products will be tested and evaluated in a way that is consistent with the specifications. Our effort includes actions targeted in each of these areas.

With the exception of the DoD project, all of the efforts are being led by groups not formally associated with the federal government. All are, however, anxious to operate under the umbrella of a White House effort. The national effort gives the organizers visibility and the President's national challenge imbues their work with a sense of importance that would otherwise be very hard to achieve.

- a) *Creating a model series of procurement for the Department of Defense school system.* DoD will draw on (a) software procurement expertise within DoD and (b) experts on educational materials from the Department of Education and their contacts in civilian school systems. We will invite other national school systems to participate in the procurement if they choose to do so.

Announcement: DoD prepared to announce by January 30

High-Level help required: None. Tyson made the needed call.

- b) *Encouraging state school officers and local school procurement officials to form purchasing consortia and improve procurement methods for educational technology.* The Council of Chief State Officers is taking the lead in doing this and will build upon a series of nascent regional collaborations already underway. Preliminary proposal attached.

Announcement: Amabach has proposed a collaboration of existing procurement groups that can announce a new effort to ensure effective procurement of software and other educational technology tools. Meeting a January 30 deadline depends on timing of meetings this month.

High-Level help required: None.

- c) *Encouraging school systems to clarify educational objectives and measure educational outcomes using these objectives without imposing Federal standards.* The College Board is taking the lead in convening organizations that provide standardized tests for schools (including advanced placement, achievement, and SAT tests) to ensure that these tests reflect ambitious standards. The tests themselves are migrating to computers which opens the

potential for probing a student's capabilities much more carefully than standard testing.

Announcement: College board can announce existence of a group of testing organizations that will work with states to ensure that tests match emerging standards and work with information industries to ensure that new tools are used appropriately. Meeting a January 30 deadline depends on timing of meetings this month.

High-Level help required: None.

- d) *Encouraging the adoption of documented, inter-operable software components for educational use and creating an efficient market for these components.* Markets for components of this kind are rapidly developing in response to consumer and business needs. A number of software vendors are anxious to work with us and the federal agencies (the HPCC program -- ARPA and NIST in particular) to develop an efficient mechanism for ensuring that reusable objects are developed for educational purposes. (see attached material framing an upcoming meeting)

Announcement: Not appropriate for WH announcement.

High-Level help required: None at this time.

2. We are working to ensure that firms increase their investment in long-term R&D targeted at educational technology in addition to the development work needed to meet specific procurement requests.

- a) *Challenge Grants.* The President announced the winners of the Challenge Grant program which opened new lines of communication between school systems, businesses, and universities. We hope to expand this in FY96 barring disaster in the budget.

Announcement: DoED should be ready to announce a new round by January 30 [check on impact of government shutdown]

High-Level help required: None.

- b) *Summer Olympics* We are working to introduce a White House educational software Olympics at the end of the summer where students would compete using software systems developed over the summer by high-school students working with university teams. This can stretch the state-of-the art, showcase what is possible in contests ranging from one-act-play contests in cyberspace to engineering competitions, and develop a set of reusable tools built to an emerging standard.

Announcement: Much activity underway and several universities have projects that work well.

High-Level help required: Concrete commitments to adopt an olympic event by Microsoft, Disney, and Lucas would instantly make this project real.

- c) *Re-chartering Public Broadcasting* Public broadcasting stations, which are often associated with local colleges and universities, have a long history of working with local colleges, businesses, and school systems to make creative use of new communication technologies in education. The stations have come together to reaffirm their mission in developing educational materials using the communication tools of the next century.

Announcement: Re-chartering vision statement endorsed by most public television stations and their major organization will be ready by January 30.

High-Level help required: None.

- d) *Coordinated R&D* Many federal agencies are funding software development for mission-specific learning tools. The Federal government trains astronauts, FAA flight controllers, systems engineers, and CIA translators often using state-of-the-art instructional software. An interagency consortia has been assembled to help these agencies collaborate with school systems that may have similar needs and encourage "dual use" development in private contractors that can serve both mission agencies and the nation's school systems.

Announcement: Not appropriate.

LEARNING TECHNOLOGY PROGRAMS
Council of Chief State School Officers

TO : Henry Kelly
FROM : Frank B. Withrow 
DATE : January 5, 1996

SUBJECT : Content Development

There are several agencies that have brought states together to pursue various technology initiatives. I mentioned SERB and WICHE. The Agency for Instruction Technology in Bloomington, Indiana is perhaps the oldest of these cooperative ventures. They originally were a cooperative designed to develop television programs but have expanded to include all forms of technology. They have sought membership from various states and Canadian provinces that identify a given curriculum need and then prepare a cost analysis for the production of such curriculum materials and then bid it to states. Participating states receive the final products at a reduced cost and the products are marketed nationally and internationally at a commercial rate.

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Options to stimulate better content among curriculum producers.

The very fact that we have created National content standards and state standards enable software producers to match their products to those standards. Consequently the market place has aligned products more than ever before to meeting those standards. However, few of these efforts have been comprehensive. For the most part they have been piecemeal and companies have produced narrow and specific products to meet selected standards objectives. No one seriously produces any mathematics software that they do not claim meets some of the NCTM standards. This tends to result in duplication of effort. By this I mean that company A has produced a product that meets 80% of the objective and Company B decides to do the same object and may even produce a product that meets 85% of that same object. Unfortunately, many of the standards and objectives are not met.

I. Management and standards matrix

One of the greatest needs is a matrix that identifies standards and matches them to current products. Chancery's Orchestrator tries to do this, but is under funded and has not reached the level of sophistication needed.

The government through DODEA schools could foster the development of this matrix and management tool. The work with ISX is moving in the right direction. Using standards templates so that each state can enter their own standards goes a long way towards meeting this need. This type of product is beneficial to the producers as well because if developed properly will identify the gaps in materials.

II. Cooperative Purchases

The power of purchasing can go a long way into shaping the development of comprehensive content software. If we were to take specific standards and develop perhaps with DODEA schools taking a stimulus lead specific procurement requirements for any given content area we could shape the market into a more comprehensive development of in depth content. I know that the history standards have come under criticism, but state and local standards are in place. If a procurement was made that dealt with only American history and template procurement was devised I believe that we could get some remarkable products that meshed together even though segments were produced by different companies. Such a procurement might look like following:

1: All products developed under this procurement will meeting the following technical requirements:

Learner interface

1.1. End user computer will be state-of-the-art pentium or comparable

systems.

1.2. High level color screen display unit

1.3 Installed on-line system that operates at least at a 28.8 baud

Product Interface

2.1 All products will have sufficient alternative components to allow for extensive learner exploration. Products may be developed as both CD-ROM and on-line services.

2.2 All CD-ROM product will have internet access components.

2.3 All audio components will carry encoded captions for the hearing impaired and all visual elements will have augmented audio for blind students.

2.4 Products offered under this procurement may be existing products, altered products or newly developed products that meet the content requirements of this procurement.

2.5 Products may be any form of telecommunications or computing product, but the offerer must justify the selection of the format. For example, some segment of the Civil War period might well be video tapes, but there must be a clear justification as to this selection and how it meets the content standards.

CONTENT STANDARDS

Products under this procurement must meet the following standards with respect to the American Revolution.

1.1 Period 1700-1770: Products must be designed to help the student understand the condition of the American colonies during this period.

1.1.a. Settling and expansion of the original settlers. What was their life like? Why did they immigrate to the new world? What were the conditions the Europeans found when they arrived? What happened to the native Americans?

1.1.b. How were the colonies governed?

1.1.c. What was the economic development within each colony?

1.1.d. How did children learn? What was entertainment like in the colonies?

1.1.e What were the growing trends that led to the rejection of England by colonies and why did Canada remain loyal to the crown?

2.1 Period 1770-1800: The American Revolution...the constitution..the new

government.

This gives you an idea of the kind of procurement that could be made. Cooperatives that decided that they wanted to develop such a procurement would have several incentives.

1. They would define both the technical platform the products would be delivered on.
2. Collectively they would establish the content standards that met their needs.
3. Costs to the investors would be reduced because of economies of scale.
4. For those products developed specifically for this procurement there would be cost reductions for participating states.
5. Based upon agreed upon principles related to risk capital invested by the cooperative there would be returns to the cooperative to upgrade and expand the specific content area.

III. Government Product Research and Development

Even in tight times the government does continue at NSF, USED, and other agencies stimulate the production of courseware.

1. Develop an Interagency fund of sufficient scope, size and duration to have a reasonable potential for creating a viable content area. Literacy is a universal need across all content areas.

1.1 Develop a research, development and operation literacy program with multiple agency funding that is of sufficient size and scope to have a reasonable expectation of success.

1.2 Grant should be of sufficient size and scope. At least five years and with an annual budget of \$4,000,000. (This is possible within today's budget limitations if we seek multiple agency participation.)

1.3 Require private sector partners that will match the government funding.

1.4 Develop products for the world wide web and use the NETSCAPE approach of free distribution of the original development and then nominal fees afterwards.

Henry, these are my rough ideas in the middle of the night.

Creating a Market for Reusable, Interoperable Software Objects for Education

The Need: Objects that are:

- portable to different platforms without major damage to anyone's mental health
- reusable beyond the software systems for which they were developed
- interoperable -- objects from different designers can work together predictably (will my virtual frog swim in your virtual pond)
- documented with clearly traceable authorship, ownership, and reviewed/reviewable (Whose frog is it? Has its croak been declared frogworthy and by whom?)

Current Reality

- Enormous investment in objects for different applications: business, government, entertainment, education
- While details vary, there is little doubt that the core of most applications will be objects which encapsulate data and methods for operating on the data, some of which will be protected for internal use and others public
- Competing formats and little certainty about the final form
- Clearly should not impose formal or rigid standards
- Absence of any agreement about interoperability or reusability could retard development of an efficient market

Needs: A forum for agreeing or at least discussing

1. Technical features of interoperability including formats for carrying copyright and peer-review information.
2. A business model which permits a market for reusable objects. Objects may be developed specifically for development tool-kits or re-purposed for secondary markets after initial use in a specific application. They may inherit features of objects developed for other purposes. Business models must ensure traceability of copyrighted material and provide an efficient payment mechanism.