

“Learning on Demand” Challenge Grants (Kalil Draft 11/11/97)

Summary:

The Clinton Administration has an ambitious national strategy for integrating technology in to the K-12 classroom, with computers, educational software, technology training for teachers, and connectivity to the classroom. We have no similar strategy for promoting the use of technology (the Internet, intranets, CD-ROM, satellite, interactive TV, etc.) for life-long learning. As a component of a broader Administration “learning on demand” initiative, this paper proposes a \$75 million challenge grant program that would create new partnerships to deliver “anytime, anywhere” access to affordable, high-quality learning opportunities. The program would be administered by the Department of Education.

Benefits

The potential advantages associated with the use of technology for life-long learning (both higher education and training) include reduced costs, expanded access, and increased quality.

1. Cost: Technology could reduce the costs associated with both higher education and training. One study suggests that “governments would get a lot more for their money by investing in a first class distance program than in more second class physical campuses.” The Department of Defense has found cost benefits associated with use of technology based training over the past decade. Studies by the Institute for Defense Analysis indicate that computer-based instruction led to reductions of about 30% in the time it takes students to reach a variety of instructional objectives.

2. Access: Already, 5 million working adults are enrolled part-time in American colleges and universities. The number of college and university students over 25 has increased from 28 percent in 1970 to 41 percent in 1994. An even larger adult population would like to take college courses, but can not attend a traditional college due to inconvenient class hours, campus inaccessibility, family responsibilities, business travel, or physical disabilities. Computer-based learning could provide adults with “anytime, anywhere” access to education and training opportunities. Nearly 60% of employed workers under age 50 already use a computer at work and nearly half have computers at home and usage continues to grow. Computer-based training would give these adults opportunities to learn and improve their skills by delivering training where they need it, when they need it.

Computer-based training could also increase opportunities for people in transition. The new Loring Job Corps Center is an example of how computer-based training is being deployed for professional development with at-risk youth. Computers are being used to train students for future jobs, among them software development, programming, and graphic design

3. Quality: There is also the possibility that technology could improve the quality of

instruction, particularly compared to large lecture-based courses. The Sloan Foundation, for example, has been funding a series of pilot programs to explore the use of "Asynchronous Learning Networks." Students are able to send and receive e-mail and files with the instructors and other students. In response to questions about an ALN-based course at Drexel University:

- 85 percent of the students felt that they had more access to the instructor than in conventional classes;
- 80 percent felt that conventional courses were more boring than the ALN-based course; and
- 70 percent felt that they learned more in the ALN-based course.

Used correctly, new technologies provide a unique opportunity to escape some of the limitations of traditional classroom learning. Computer-based training can tailor the learning experience to the specific needs of each individual. For example, a program can be designed to recognize the need for remedial instruction before moving on to new concepts. Self-paced, tailored, interactive instruction delivers training in an engaging, cost effective way with measurable outcomes.

New Institutions, New Partnerships

Taking advantage of new technologies to provide "learning on demand" will require new institutions, new business models, and new forms of collaboration. We are beginning to see some of these new institutions and partnerships emerge:

- Since 1995, the Western Governors have been working to design a "Western Governors University." Some of the goals that they have identified include:
 - providing a means for learners to obtain formal recognition of the skills and knowledge they acquire through advanced technology-based learning at home, on the job, or through other means outside the formal educational system; and
 - shifting the focus of education to the actual competence of students and away from "seat time" or other measures of instructional activity.
- The State of Michigan, Michigan State University, the University of Michigan and other Michigan colleges and universities have recently formed The Michigan Virtual Automotive College. It will begin offering courses in the fall of 1997 that are targeted to the Big 3, automotive suppliers, UAW, and people interested in getting jobs in the automotive industry.
- The Colorado Electronic Community College was founded in 1995 to broker the courses

offered by its 13 college state-wide system. Course work is delivered by a variety of technologies including print, videotape, audiotape, cable broadcast, Internet and CD-Rom. Communication such as presentations, discussions, study groups, with classmates and faculty occurs through a voice-mail system and e-mail. CECC has a multi-million dollar digital video and multimedia production and training facility located in Denver, Colorado called the Education Technology Training Center.

- The EDUCOM National Learning Infrastructure Initiative -- a coalition representing more than one hundred higher education institutions, publishers, hardware and software companies -- is working together to develop an Instructional Management System. These standards will allow software “modules” to be shared across institutions and wide range of technical environments.
- JSTOR -- a non-profit organization that received seed funding from the Mellon Foundation -- is in the process of digitizing all of the back issues of 150 core scholarly journals. Although it is not cost-effective for a single library to digitize journal articles to free up shelf space, there are savings if the costs are shared by multiple libraries. JSTOR now has over 200 universities and research centers as members.

Challenge Grants:

Experimentation, creation of novel partnerships, and diffusion of successful models could be greatly accelerated by a new competitive grant program. This grant program should solicit proposals that address key barriers to achieving the “learning on demand” vision - but also be open to other ideas. The grant program should solicit proposals that would:

1. **Create an infrastructure of support services for adult learners:** Some adult learners may be totally self-sufficient, and able to search the Internet catalogs of multiple virtual education providers. Others (those making the transition from welfare to work, displaced workers, under prepared learners, those with no prior college experience) may need a range of services -- including assessment, counseling, help in navigating through the range of options, selecting appropriate courses and programs, and monitoring their progress. [Note: Some of these services could be provided through the DOL-funded “one stop shops.”]
2. **Achieve a “critical mass” in the higher education/life-long learning market for software and networked courses.** Currently, the lack of “economies of scale” often prevent commercial publishers and other institutions from investing the amount of money that would be required to develop high-quality educational software and other distance learning offerings. These economies of scale are incredibly important for software and other information technology products - which often have high fixed costs and low (sometimes approaching zero) marginal costs. Critical mass might be achieved by encouraging a consortia to share courses, instructional material, or software to avoid

duplication, and combining existing offerings to offer complete certificate or degree programs. Partnerships between commercial publishers and universities would also be encouraged, given that instructional software is often used only by the individual professor that developed it.

3. **Reach consensus on the competencies that are needed for specific education and training programs:** Curriculum/software developers and the assessment industry need to know what competencies are required for specific and education and training programs. This is particularly important in a virtual environment where “seat time” is no longer relevant. This requirements could be developed by representatives from professional associations, professional licensing or credentialing organizations, employers, and educational institutions.

Size of program/grants:

- The overall level of funding would be \$75 million in FY99, increasing to \$125 million in 2001 to allow for new starts.
- Grants would range in size from \$250,000 (planning grants) to \$3 million (major initiatives with significant regional or national impact) - with a duration of 1-3 years.
- Some funds (~ \$5 million) should be set aside for evaluation, conferences, workshops, and other leadership activities.

Grant criteria

Overall criteria might include:

- Impact on quality, cost and access of educational opportunities;
- Leverage (level of matching funds);
- Long-term sustainability;
- Degree of innovation;
- National impact.

Specific criteria for partnerships on instructional software might include:

1. Focus on high priority courses

One large community college that offered 2,000 courses found that 25 courses accounted for 44 percent of student enrollment. This distribution is typical in both community (44 - 52 percent) and four year colleges (35 percent). Focusing on these courses (the “1% solution”) could have a big impact on learning - and might also overlap with some elements of high-school curriculum and workplace learning requirements.

Other high priority courses might include basic/remedial skills, and fields where shortages of skilled workers is limiting the growth of a particular sector.

2. Uses technology in appropriate ways to improve student performance

Some of the potential benefits of technology include:

- Self-paced instruction available anytime, anywhere.
- Real-time, competency-based assessment.
- Allow student to “learn by doing” using techniques such as modeling and simulation. A good example of this an effort to develop an on-line biology lab called EvolveIT. This teaches the basic concepts of natural selection by allowing students to manipulate variables like variability, inheritability, and fitness - and observe the evolution of a hypothetical population of birds on a series of islands.
- Offer individualized instruction (e.g. intelligent tutoring systems that are “smart” enough to diagnose student strengths and weaknesses, recognize student errors and tailor instruction accordingly).
- Provide real-time and asynchronous communication between students and teachers to create “communities of learners.”
- Use multimedia to make instruction more engaging or explain concepts that are easier to communicate using multimedia (e.g. time and motion in physics, foreign language instruction); or the use of hypertext to allow students to explore a subject at various levels of depth depending on their interest and background.

Realizing these benefits requires that the software for technology-based training move beyond digitizing the material in a traditional textbook.

3. **Foster partnerships between universities and commercial publishers/software companies**

Many promising experiments with instructional software never move beyond one classroom because university professors lack the expertise and financial resources required for marketing, distribution, customer service and support, etc. University-publisher partnerships would combine the strengths of each party -- such as the content and pedagogical expertise of the universities and the business expertise of the publishers.

4. **Develop software that is modular, portable and based on open standards**

Instructors and students should have the ability to mix and match software modules from multiple sources. [This is analogous to the professor that creates a customized “reader” from multiple journal articles.] This would allow “learning objects” from multiple content providers to be combined and recombined to meet specific instructional requirements.

Of course, for this to be true, the software needs to be portable (works across different operating systems and computing platforms) and based on open standards. Without these characteristics -- it would be difficult or impossible to integrate content from multiple providers.