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### Feature Article

## Advanced Software Bolsters Distance Learning Program

by Stephen Willingham

The Defense Department is taking advantage of the Internet to deliver high-quality online education and training programs inexpensively to U.S. armed services personnel.

The concept, known within the Pentagon as Advanced Distributed Learning (ADL), has strong backing from the administration, as demonstrated by Army Secretary Louis Caldera's decision this summer to commit \$600 million to ADL programs over the next six years. This money will help provide soldiers with tuition assistance, textbooks, laptops, printers, academic counseling, and Internet access.

The department took a major step in making ADL a reality in January, when it released new software called the Sharable Courseware Object Reference Model (SCORM).

Previously, the Pentagon had been unable to distribute distance-learning courses because many of the computer systems employed throughout the department were incompatible, officials said.

SCORM will make it possible for those systems to communicate with each other, said Philip Dobbs, a software developer and consultant with the ADL Collaborative Laboratory (Co-Lab) at the Institute for Defense Analyses (IDA) in Alexandria, Va. Dobbs has worked on distance learning concepts for the last 18 years.

"For too long, the technology wasn't coming together fast enough," Dobbs said. "We are trying to provide a leading catalyst role, not reinvent the wheel. But content has to be sharable and interoperable."

Therefore, Dobbs explained, it has been necessary to develop integrated standards that allow different computer systems to communicate with one another.

Dobbs described SCORM as a "best-practices guidebook" that was developed to solve file-sharing problems. For ADL to deliver what it advertises, he said,

it is "absolutely essential" to be able to move courseware from one server to another.

### Moving Content

When work began on SCORM, Dobbs said, courses couldn't be distributed because there wasn't any common, interfacing software that permitted computer networks to communicate with one another. "If you could move the information, then you couldn't find it when you went to look for it," he said. "There was no search capability."

The advent of SCORM, Dobbs said, has provided the key to connecting various elements of this network into a reciprocal, exchange service. In this way, the Defense Department is acting as a facilitator for integrating learning software that is being developed by private industry, he said.

The ADL initiative began in November 1997, when the Pentagon joined the White House Office of Science and Technology Policy, in an effort to take the latest advances in computer and net-based learning technology and make them available throughout the federal government.

"A number of industry organizations already have initiated distance learning for their employees," said Janet Weisenford, director of the Joint Services ADL Co-Lab, which is located at the Naval Air Warfare Training Center in Orlando, Fla.

The Defense Department has been "playing catch up" in distance learning, "but [it] is starting to lead" in some areas, Weisenford said. "What we want to do with ADL is reuse old content by recombining it with new content," she said.

To speed up the process, the department started the ADL Co-Lab system, Weisenford explained. The Co-Labs were created to coordinate the expertise of government, business and academia and to avoid redundant software development. Each Co-Lab has "core teams [from government, business and academia] to keep up with the explosion in technology," she said. "It's a wave of the future, and, at the same time, it's already upon us."

Weisenford described the ADL process as a series of "building blocks," with reusable content providing a foundation for the latest generation of learning courseware. "We are trying to replicate human-to-human tutoring," Weisenford explained.

Another challenge for ADL developers is creating smaller increments of learning time, Weisenford explained. "In the past, we were dealing with 'instructional hours,'" she said. "With ADL, we will have 'instructional minutes.' This is shedding cultural attachments, like when we shifted from buggies to horse-less carriages."

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ADL requires a lot of customized computer engineering to meet individual needs, she said. "The user has to be able to locate, access and interpret information efficiently," Weisenford said.

#### A Critical Element

Dobbs and Weisenford stressed that computer-to-computer interface remains one of the most critical elements to be accomplished for full-scale implementation of ADL, which could be four or five years away, they said.

The military services, however, could begin to convert instructional content to ADL during the next 12 to 14 months, officials said.

ADL is not like other defense acquisition programs, which provide a specific, single product, one official explained. "We are riding an innovation wave of IT (information technology)," the official said. "We are [and will be] constantly changing."

Presently, the Joint ADL Co-Lab in Orlando, in partnership with private industry, is developing models or prototypes of workable and sharable courseware. The goal is for government to leverage the latest in commercial-off-the-shelf (COTS) products from private industry. The Joint Co-Lab currently is developing 16 separate courseware models, Weisenford said.

Included in this first set of prototypes are learning programs for Navy EA-6B—electronic warfare aircrews, depot maintenance personnel, civilian supervisors, and Army armor captains. Solicitations for proposals for the next fiscal year will be announced soon, Weisenford said. Incentive awards for proposals judged to offer the most innovative ideas could run as high as \$1 million.

SCORM was demonstrated this summer at PlugFest 1, in Alexandria, Va., Dobbs said. PlugFest is a plug-and-play learning environment, where experts and laymen alike try out SCORM. This event allowed a diverse set of players to critique and fine tune the system, Dobbs said. The result was an updated Version 1.1 of SCORM that will be released in a few months, he reported.

The reason that SCORM is important is its ability to bring together disparate software programs, explained Dobbs. Nobody builds software the same way, he said. Because of industry proprietary concerns, "the right hand does not know what the left hand is doing," he added. "The vendors are all islands, who are not connected.

"Without the ADL initiative, SCORM might be reinvented four or five times," he said. Eliminating redundancy is one reason why the Co-Labs were created.

To gain industry's cooperation, Dobbs said, the Pentagon laid its cards on the table. Industry representatives, he said, were told: "If you don't [help to develop SCORM], the Defense Department will, and you know we will get it

wrong. So why don't you do it?"

Trying to please everyone in a competitive marketplace "is kind of thankless," Dobbs continued. "But, this time, it worked."

Even Microsoft came on board, helping "develop the operating system, but not learning content," he said. Microsoft's participation is remarkable, Dobbs said, because the firm previously has "not been known exactly for cooperation." Recent months have seen a sharp increase in cooperation among academia, industry and the Defense Department, he observed.

#### Enlightened Self-Interest

"The ideal is to get everybody to cooperate because they realize their self-interest can be met only through cooperation," said Dobbs. "I call this enlightened self-interest."

SCORM was demonstrated again recently at PlugFest 2—hosted by the University of Wisconsin academic Co-Lab in Madison, Wis.—where it was well received, said Dobbs.

Version 2.0 of SCORM will be out in about a year, Dobbs predicted, but he sounded a cautionary note: "There needs to be a calming period between innovation bursts." He recommended cooling off periods that would allow time for analysis.

Don't look for the pace to ease immediately, however. PlugFest 3 is scheduled for the Interservice Industry Training Simulation Education Conference (I/ITSEC) in Orlando, Nov. 27-30, said Weisenford.

The objective will be to see how easy or hard it is to use SCORM, she said, previewing the technical forum. The purpose of the "PlugFests is to demonstrate interoperability," Weisenford said. "At I/ITSEC, we will showcase content development and assemble course models as the conference progresses."

Weisenford attributes rapid ADL success to a special agreement that allows the government to share costs with private industry.

She added that maintenance training and referencing is one area of concentration that shows considerable promise. "We are moving away from [hard] text to visual," Weisenford explained. "It's easier to capture images and then share them."

Many of the interoperability problems between the United States and its NATO allies that became apparent in the Kosovo air operations could be solved by an ADL interface between U.S. and European forces, Dobbs said.

The United States is moving toward joint operations, said Don Johnson, director of the ADL initiative. But there is still a preoccupation with spending

director of the ADL initiative. But there is still a preoccupation with spending money on expensive simulators and "monolithic simulation exercises with [thousands] of people involved," he said, in an interview. "We don't need to do it that way anymore. [With ADL] it is now possible to enter into distance, multi-player participation."

Whether we want to admit it openly or not, "we are U.S.-centric," said Johnson, who recently returned from Geneva, where he briefed NATO allies on ADL.

"Europeans are making significant investments in wireless technology," he said. "They will leapfrog us if we aren't careful."

The migration to wireless is particularly apparent with NATO's Partnership for Peace program, which is aimed at increasing cooperation with former Soviet Bloc and neutral countries, Johnson observed. The proliferation of inexpensive wireless technology, which can be used for a diverse set of tasks—from buying a soft drink to operating an automatic teller machine—is causing a flurry of activity in Eastern Europe, where investment funds are limited, Johnson said.

"They will do ADL themselves if they have to," Johnson said. "We can lead, if we want to. But, first, we have to stop being so American-centric."

Language, for instance, used to be one of the biggest problems for the United States, when it came to communications with NATO allies, Johnson said.

Early in ADL development, reports suggested that English be instituted as the standard language for future communications and networking with NATO partners. "Americans are more intimidated by language than Europeans," observed Johnson. "Many Europeans speak several languages, because their countries are close together," Johnson said. "Language is not such a big deal for them."

The English-only commonality has since been abandoned, Johnson confirmed, because advanced translation software is available.

As a result, Johnson said that he no longer considers language to be much of a problem. Bandwidth, on the other hand, is another matter. "I am getting impatient about wide bandwidth," he commented. (Bandwidth is the communications pipeline through which information is transmitted.) "We are constantly being told by the experts that it is on the way. Whatever the case, it's not coming fast enough."

In another way, he continued, it has been good to deal with a more constrained environment. "If we had the bandwidth, we wouldn't have developed open architecture," he said. "It's like the difference between seeing a glass as either half full or half empty. Multimedia development has happened as a result [of a lack of bandwidth]."

Multimedia devices such as wireless cell phones, with Internet capability, and hand-held information storage devices will proliferate in spite of current limits on bandwidth, Johnson predicted. Technology, in his assessment, is the one area where it is important to maintain a lead.

With the Co-Labs working to bring together government, technology developers, business and academic interests, Johnson thinks the United States has positioned itself to retain a technological advantage.

However, there are several disturbing trends that could knock the United States out as a front-runner, he said. "There is a serious lack of vision that affects business and politics as well. Business and politics are concerned with what immediately needs to be done either today or tomorrow. These communities don't seem to focus much beyond that point," he concluded.

"We are in an incredible paradigm shift," Johnson said. "Perhaps one way to cure the vision deficit is to put together a science-fiction version of where we are going."

Johnson cited traditional popular-culture examples, such as Buck Rogers, the Star Trek television series and H.G. Wells' stories, which generally are considered visionary today. He believes that past cultural icons helped people to understand that if they could dream it, they could make it happen.

"With ADL, we are customizing instruction to individual needs," he stated. "It is possible."

Without needed changes in outdated policy, however, distance-learning development will be thwarted, warned Mike Parmentier, ADL technical manager for the office of the defense undersecretary for personnel and readiness.

"We need to change laws to reflect the times," said Parmentier. "Our institutions and rules have not changed with technical developments. Joint learning wasn't even conceived of when Goldwater-Nichols was passed."

Congress enacted The Goldwater-Nichols Act in 1986, to foster more cooperation between the armed services.

To help remedy educational inequities, Army Gen. Hugh Shelton, chairman of the Joint Chiefs of Staff, in February promised to submit a list of changes to eliminate what he termed unnecessary, cumbersome administrative requirements that now stand as obstacles to joint professional military education.

"Let's broaden Goldwater-Nichols to include everybody, not just the best and the brightest," Parmentier suggested.

"[So far], everybody is working to their own self-interest," he said. "We need to work together if we are going to reduce redundancy and save a lot of

to work together if we are going to reduce redundancy and save a lot of money and time."

Parmentier said that an ADL learning environment created across the federal government would offer what he called "the ilities." Those "ilities" are:

- Accessibility—immediate ability to reach everyone, any time, anyplace.
- Interoperability—ability for everyone to be able to talk to one another.
- Adaptability—ability to tailor content to individual needs.
- Reusability—ability to use content again and again.
- Durability—ability of a program to last for long periods of time, despite technical changes.
- Affordability—inexpensive to operate.

One of the biggest problems currently facing the ADL initiative is ensuring that everyone on a military base has equal access, Parmentier explained. This is what he termed, "the last-mile problem."

"We can get it there," to a military base, he said, "but the problem then is getting it to individuals, either at their homes or at their work places."

Major savings would be realized through bringing learning to the people, instead of the usual practice of moving people to learning, Parmentier indicated. "Most education costs now come from moving people around from place to place," he said.

Parmentier pointed to studies that anticipate a projected 30 percent savings in time, housing and travel for students. Another 30 percent can be saved in travel expenses. Then, there are savings on course materials, facilities and instructional time.

"More savings are realized through organization efficiency and increased productivity," Parmentier calculated. He advised departments and agencies to "keep the savings by reinvesting it for more course content and [wider] distribution of learning software."

"This way, ADL would help pay for itself," he said. "There is a digital renaissance in learning happening, and ADL provides the platform. ... In the new world, organizations are becoming learning providers, something that they never saw themselves being before."