

e-learning

The Truth Shall Set You Free

e-Learning is becoming ever more popular but challenges remain. *Grant McDonald* takes a look at e-learning and how it has the potential to transform training.

"We are getting laptops back with bullet holes in them so we know they are used close to the front," says one e-learning insider. With over 150,000 coalition troops in Iraq, and thousands more deployed in Afghanistan, the US, UK and other coalition members face growing pressures to ensure personnel achieve formal training objectives. The cycle of operations, leave and preparations for a subsequent deployment means training must be squeezed in wherever possible. Training resources are consequently being revolutionised and re-distributed to better match requirements, with e-learning technologies in the vanguard of enabling capabilities.

A key player is the Advanced Distributed Learning (ADL) organization backed by the US Department of Defense (DoD). ADL "...employs a structured, adaptive, collaborative effort between the public and private sectors to develop the standards, tools and learning content for the learning environment of the future. The vision of the ADL Initiative is to provide access to the highest-quality learning and performance aiding that can be tailored to individual needs and delivered cost-effectively, anytime and anywhere."

Underpinned by ADL technology is the Joint Knowledge Development and Distribution Capability (JKDDC), one of the pillars of US DoD Training Transformation. JKDDC "is designed to be a library of training courses available through various online outlets that can be taken "just-in-time" or when a soldier is assigned to a unit in which the training is required," says Dr Paul W Mayberry, Deputy Under Secretary of Defense for Readiness.

ADL Initiative's Director is Doctor Robert Wisher who says, "we have a close relationship with Joint Forces Command (JFCOM)

[which has operational control of JKDDC] and we work very closely with the Advanced Concepts Component of JKDDC. We will orientate some of the ADL prototype programme to the future JKDDC requirements and we see them as a tremendous reachout opportunity to obtain feedback on the effectiveness of the technology."

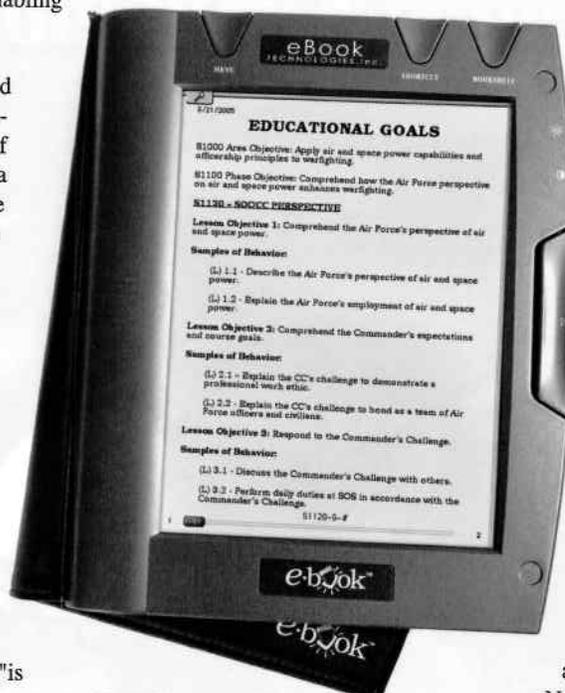
NATO Initiatives

NATO is also taking an active interest in e-learning. Part of the Allied Command Transformation based in Norfolk, Virginia, the NATO Training Group has a working group on individual training and education development.

"They are doing an ADL survey through the NATO nations and partner countries on their capabilities and plans over the next several years, how many courses online now, and infrastructure capabilities right now, plans for the future," says Dr Wisher who says survey results are expected soon. The NATO working group is also compiling an ADL Handbook.

Furthermore, Allied Command Transformation are preparing an ADL Directive containing recommendations on how to use ADL's Shareable Content Object Resource Management (SCORM) and registering content. Elsewhere within NATO, the school at Oberammergau in Germany is also considering moving courses online.

Raysono is a German company where Doctor Uwe Katzky is an Account Manager. "One of our latest and most interesting e-learning work is the Virtual Reality Team Trainer (VRTT), a system that was developed to support soldiers converting to the 'Amphibie M3' vehicle. Soldiers first learn how to use the M3



Portable means flexible. (see feature on Maxwell AFB on page 30)

(Source: eBook Technologies)

with an e-learning application. After that basic course they learn to couple up to four vehicles to a ferry within a team. We will present the system at ITEC," says Dr Katzky.

"Our other current work is the Virtual Reality for Mine Divers package. We built a system that is scalable by implementing various mine types and numbers so that the soldier can dive in a virtual scenario to recognize the mine types he discovers," says Dr Katzky.

British soldiers are now able to take courses via e-learning modules delivered by the Defence Learning Portal (DLP). This programme is currently being implemented and will be Europe's largest e-learning system with the potential to accommodate up to 300,000 users from across the UK Ministry of Defence (MoD), military and civilian alike. The deal follows a successful DLP pilot between November 2004-March 2005, under an initial agreement with BT worth £24m (\$43 million).

In the expanded contract, BT is implementing heightened levels of security to enable users to access both unclassified and restricted course materials. Unclassified training materials are being made available via the internet to personnel anywhere in the world. Users also have round the clock access to all courseware including classified materials via PCs connected to BT's secure Restricted LAN Interconnect (RLI) service. This network is being delivered by BT within the framework of the Defence Fixed Telecommunications Service (DFTS).

Rear Admiral Simon Goodall, former Director General Training and Education at the MoD, comments, "training people for military operations involves the development of a range of attributes such as leadership, teamwork, ethos and courage, which predominately requires human interaction. Classroom learning has an important role to play in training, however e-learning has become increasingly valuable. It offers personnel greater flexibility and control over their development, and critically helps to minimise time spent away from home or their normal workplace."

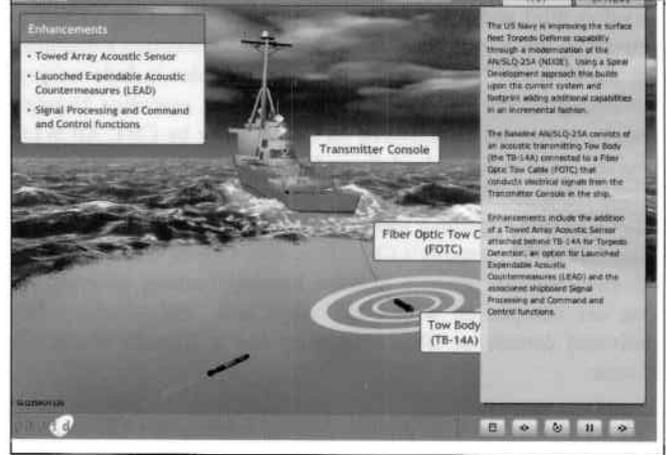
Gary Bullard is Managing Director at UK BT Global Services. He says that, "for the MoD, this consolidation of training resources will also deliver significant efficiencies and cost savings."

The DLP incorporates a Learning Content Management System (LCMS) and users will be able to tap into training and education resources via the Learning Management System (LMS), which will provide controlled access to a host of materials, and track a user's progress through the courseware. For the first time the MoD will hold comprehensive, centralised information about employee development.

Neil Gosling is BT's Training & People Director and responsible for DLP. "We've ambitions to link directly with defence knowledge and provide on the job training and performance support on a just in time basis. You can now create a piece of digital content that can be used many different times in maintenance, training and performance support," says Gosling who says trials are taking place to provide better through life support to some of the equipment programmes.

Keeping Track

Going back to e-learning on deployment, Gosling says, "the challenge is how do you deliver rich media content to locations that aren't necessarily served with a lot of bandwidth. We are currently carrying out trials with the Content Delivery Network (CDN) so we can trickle feed digital content to the point of delivery during the 'dark hours' as it were." Content is cached at the edge of the network but controlled from the centre for consistency.



The latest in eLearning from Hybrid. Shown here is part of the company's sonar courseware for the AN/ALQ-25A NIXIE.

(Source: Hybrid Learning Systems)

Content has been delivered slowly for access through the DLP but it is now gaining a higher profile and more courses are being made available, such as from the Defence Academy. Training for the Defence Information Infrastructure (DII) and Joint Personnel Administration (JPA) will be delivered over DLP and possibly modules for the BOWMAN communications system.

DLP will probably be a fundamental part of the Defence Training Rationalisation (DTR) programme. "The challenge set out in the DTR contract absolutely relies on the conversion of some training delivery to other means," says Gosling at BT which is bidding for DTR. "Our experience has proven that a high degree of training can be transferred to e-means." A decision on DTR is expected in the autumn.

Another programme which is affected by the DLP and possibly the DTR are the Royal Navy (RN) Waterfront Learning Centres (WLC). Rowland Marshall is VEGA's WLC Project Manager. "All of our training modules have been developed to be SCORM conformant, using a web browser for delivery via the DLP."

Contracted by the MoD under an 'enabling arrangement,' four companies – VEGA, Serco, Lockheed Martin Canada and BurrIDGE Courseware – are currently analysing numerous training courses with the aim of migrating training from the traditional schools at HMS Collingwood and HMS Sultan to the new WLCs at Faslane, Devonport and Portsmouth.

Marshall says, "to date VEGA has already produced a blended learning solution to help the training of Operator Maintainers in various Internal Communications equipment fitted to Royal Navy warships. The training solution uses instructor led Computer Aided Instruction (CAI) as well as student-centred CBT and Computer Based Emulation (CBE)."

The company has also produced two SCORM conformant equipment emulations for the fuel control systems fitted to the Tyne and Olympus gas turbine engines. These emulations model the behaviour of over 40 individual components, each with its own list of possible faults and maintenance procedures.

Neal Oliver is a Solutions Architect at VEGA. "We see a convergence between e-learning and support information so that both become parts of performance support systems," he says.

The British Army, with VEGA, has been developing officer training e-learning and VEGA has also been working with the Eurofighter to

providing the Royal Navy with SCORM conformant e-learning for the First of Class Type 45 Destroyer. Modules include weapon systems, platform management system, and an executive acquaint course, which can be delivered on CD-ROM or by CBT. All WLC courses could in future be delivered over the DLP too.

Another MoD e-learning supplier is Line Communications Group. Piers Lea is the company's Chief Executive Officer (CEO). "We are commissioned to produce blended learning training programmes that are compatible with DLP," says Lea. The company has delivered courses on Ship Husbandry and a Tornado Manager's Course.

"We have won work to provide cultural training for UK military being deployed in different areas of the world," says Lea. The company cites being a relatively small player and obtaining security clearances as barriers to working overseas for other nations though the company has begun discussions with NATO. Many e-learning vendors tend to be small to medium sized companies.

Over in America, Hybrid Learning Systems is a recent startup in Pittsburgh. Kris Rockwell is the company's President and CEO. "Military demand is up. In the US the airline market is difficult at the moment," says Rockwell. Hybrid currently has two main projects. The first is the development of CBT training for a GEN-4 Communications Receiver System developed by Argon ST for a Foreign Military Sale (FMS). Hybrid's CBT system is said to deliver the existing training programme for operators and maintainers in half the time.

Training Growth

In addition to the traditional CD-ROM and web based delivery, Hybrid also provided the training on a Linux-based Nokia 770 Internet Tablet as a proof of concept prototype, which "...opens up a number of new training opportunities and demonstrates exactly how flexible our CBT software is in terms of delivery platforms," says Rockwell. The Nokia device has wireless connectivity but such a capability is not always compliant with security requirements.

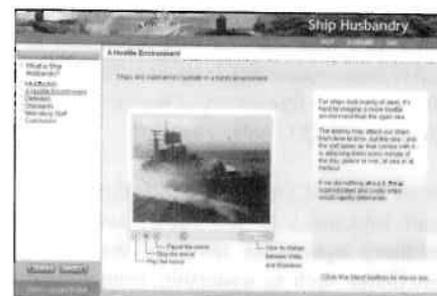
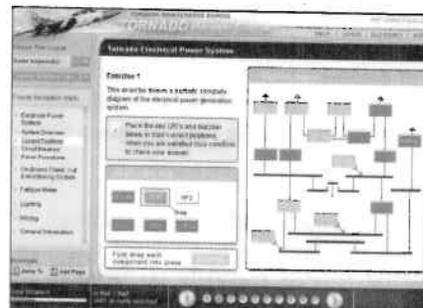
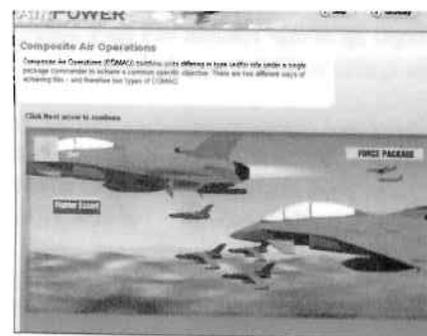
"We're tailoring it right now to each individual customer of Argon's. We've built our CBT so all of the screens are tied together through a simple XML file, so by editing we can re-organise the screens and take out information and add info as necessary," says Rockwell.

"The end goal for simple sequencing to put a test at the beginning so the user can demonstrate what he or she knows so then an LMS can compile on the fly an XML file that could then render the training required." The second project concerns delivery to Argon ST of new courseware under a modernization programme for the torpedo counter-measures AN/SLQ-25A NIXIE system.

Most of Hybrid's employees have their background in airline flight training and are closely associated with the Airline Industry CBT Committee (AICC). Rockwell comments, "SCORM certainly developed in part from the work of the AICC. We do follow it for the US military and find it useful but I've the feeling from some people that it's always been a bit nebulous in some of its definitions," says Rockwell.

SCORM Feedback

Asking industry for their thoughts on SCORM was akin to opening the flood gates. Back at VEGA, Nick Webb is an e-learning developer. "Aside from being associated with web-based training material, SCORM has been designed to offer interoperability, reusability and student tracking," says Webb. The



The UK is investing heavily in eLearning although its flagship DTR Rationalisation Programme has shifted to the right.

(Source:UK MoD)

introduction of SCORM 2004 has brought additional benefits. Webb says, "SCORM 2004 includes one significant change over SCORM 1.2: The introduction of Simple Sequencing and Navigation (SSN)...has a huge impact on the design process because it starts to really harness the potential for reusability, subject to the courseware being designed with reusability and SSN in mind."

Over at the company Line, developers found SCORM 2004 to be very useful. "SCORM 2004 improves on SCORM 1.2 in two key areas. First, technical improvements to the run-time standard, which make coding robust SCORM content easier, by standardising and simplifying names and data fields, and allowing SCOs to re-initialise connections to the LMS API adaptor multiple times during a session," says a Line developer.

"Secondly, support for the sequencing of content e.g. allowing one SCO, such as an assessment, to influence which other SCO's are made available to a learner. The increased power and flexibility that SCORM 2004 derives from sequencing support does increase the complexity of developing SCORM 2004 content, and the need for content packaging good tools is greater than for SCORM 1.2, although this is not a disadvantage per se."

"However, there are some areas where we would have liked to see SCORM 2004 go further, namely allowing one SCO to launch another SCO...there are situations where you want to take advantage of the sequencing capabilities of SCORM 2004, for example, to deliver targeted learning content but would like to be able to refer a learner to other material, for example, more advanced



The UK's BOWMAN training programme makes maximum use of e-learning technologies.

(Source: Agusta Westland)

material for eager learners where appropriate," continues the Line developer.

At ADL, Dr Wisher says, "we have considered [one SCO launching another] from the very beginning and everything considered it's better to have that logic on sequencing embedded in the LMS rather than in the individual shareable contents," says Dr Wisher.

Back at Line, a second area where the company would have wished development to go further concerns, "allowing one SCO to reference data from another SCO in the same content organisation or the content organisation as a whole."

ADL's Dr Wisher notes such comments and says, "we have a very active 'ask the expert' and helpdesk. These questions arise in the specification groups we work with. A consensus is built on the best way to build a one size fits all."

"We realise the limits in that which is why we are not adding additional functionalities to SCORM rather we see ways where you can become creative and clever not through a specification and reference model but rather through architecture, data models and other software solutions that would add that functionality while retaining all the characteristics of SCORM on the content."

The ADL initiative is entering its eighth year and SCORM 2004 is in fact the third and possibly final version. Around 60% of underlying SCORM 2004 specifications have gone through the International Electrical and Electronic Engineer (IEEE) association validation process.

Equally on the international stage, an International Standards Organisation (ISO) subcommittee is examining SCORM as "a global standard." There is also discussion, it is said, on convergence between AICC and SCORM standards.

Meanwhile at VEGA, Courseware Designer Chris Harris highlights some other drawbacks with SCORM. "One disadvantage with all versions of SCORM however is the overhead in producing the metadata descriptions for all assets and SCOs."

"Although SCORM includes provision to protect copyright and Intellectual Property Rights (IPR), there is no effective way of policing reuse other than accepting it on trust. If any SCORM material produced is to be repurposed and reused, is there any method of ensuring an appropriate payment is made to the original developer or owner?"

Such e-commerce and IPR issues arise with ADL's Content Object Repository Discovery and Registration Architecture (CORDRA). For example, a new course being designed might require content from repositories held by private industry outside the US military.

According to ADL, "CORDRA is an open, standards-based model for how to design and implement software systems for the purposes of discovery, sharing and reuse of learning content through the establishment of interoperable federations of learning content repositories."

Dr Wisher says, "working with others, we've invested in the CORDRA architecture and now have up and running our first instance of CORDRA, which is the ADL Registry (ADLR). This is working in the US at the Defence Technical Information Center."

"SCORM conformant content within the US DoD would be centrally registered in the ADLR. We're registering the metadata which describes the content not the content itself, which will remain in control of separate repository managers in a Service like the United States Air Force (USAF)."

The next CORDRA milestone is to federate other groupings and repositories and have a federation of federations that would allow users to search all the registered federations. While ADL is able to define goals and specifications as regards SCORM and CORDRA, it has a hands-off approach when it comes to using games technology in e-learning.

"Games are self-motivating captivating and we believe they have tremendous training value for the military but didn't want to come up with a standard or specification for games as creativity in the field is incredible," says Dr Wisher who adds he is keen to work with game developers and games within ADL's SCORM environment.

One possibility might be looking at an individual SCO launching into a game and then come back to a SCO that reports results back to the LMS. This approach is being developed under the DARWARS programme sponsored by the Defense Advanced Research Projects Agency (DARPA). Along with games technology developments, companies identified several other trends. E-learning would continue to be delivered at the point of need through a variety of means, from video conferencing to remove the dependence on the presence of an instructor at the student's location to traditional CBT on laptops and ruggedised handheld devices for use in theatre. Most companies also saw the arrival of more targeted delivery of e-learning modules.

Whatever the future does bring, most companies were optimistic and saw their sales stable if not growing in e-learning. The rampant pace of technology coupled with global military training transformation will both enable and stimulate demand for sometime to come.

The risk for the military, however, is buying technology which is superfluous and in excess of the actual training need, which is why venues like ITEC and I/ITSEC will continue to be a good guide to what the market as a whole can offer. Industry would agree that an educated interlocutor in military e-learning procurement is their best bet for winning business. As one US agency says at its entrance, "ye shall know the truth and the truth shall set you free."