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Review of the E-Learning Component
of Military Individual Training
and Education

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SYNOPSIS

The Department of National Defence/Canadian Forces (DND/CF) is on a continuing journey to integrate learning technology into the military training and education process. This report presents the results of a review of e-Learning activities for military individual training and education (IT&E), and is part of a more comprehensive Chief Review Services (CRS) Evaluation of IT&E. The Canadian Forces is investing significant energy in e-Learning, with approximately 40 people as part of the Defence Learning Network (DLN) team, but some have other secondary duties. A proposal for $96.525 million to fund the DLN project to 2009 was approved by the Program Management Board (PMB) in July 2004. Funding for additional human resources is included in this proposal. However, there are obstacles that are impeding rapid progress to support innovative continuous learning opportunities.

Knowledge is considered corporate capital, and knowledge management (KM) systems are created to assist people in obtaining the information that they need. E-Learning also provides crucial knowledge and information, and an e-Learning system should have the ability to exchange information with the KM systems to maximize an organization's intellectual assets.

National Defence is committed to providing a continuous learning environment through the central DLN. However, we found that Managing Authorities (MAs), who are responsible for military training and education, are each pursuing multiple independent e-Learning initiatives and thus contributing to a potential proliferation of systems. A governance structure for the DLN, to provide a shared vision and eliminate duplication and inefficiencies, has not yet been established. As a consequence, no single Level One (L1) has a sufficient mandate to coordinate the acquisition of independent systems or determine which priorities should be pursued from a DND/CF perspective.

The review also found that although electronic course development is a critical success factor to sustain the e-Learning investment, a coordinated department-wide course strategy has not been developed. Equally important to success is the availability of supporting technology that provides learners with a quality experience. The DND/CF technology has security and firewall restrictions that are preventing learners from accessing e-Learning applications widely within the workplace. In our assessment, a coordinated approach to the development of an e-Learning strategy, built around a shared technology platform, would allow the DND/CF to rationalize training and associated overhead costs more broadly to achieve efficiencies.

We have observed that some other militaries are more advanced in pursuing e-Learning strategies to complement their training capabilities. Lessons learned and best practices offered by these organizations suggest:

- *A single, centralized technology platform for e-Learning obtains the greatest benefit from the investment by spreading costs over a large target audience;*

- *Do not underestimate the time and money needed for course development, along with planning for the ability to re-use content; and*

- *A strong partnership with the information management group is vital to support ongoing and seamless access to e-Learning by all users.*

Ultimately, the DND/CF could profit from the strategies of other leading organizations, including those within the international defence community. The DND/CF has identified internal lessons learned and participates in international fora on the topic of e-Learning. The opportunity exists to better exploit learning technologies to augment the capacity and effectiveness of military training and education.

The key recommendations of this review are focussed on improved coordination for strengthened progress in advancing e-Learning:

- *Develop a comprehensive DND/CF vision and objectives for e-Learning that is integrated with the IT&E learning strategy, and supported by a shared technology platform;*

- *Establish a well-defined governance and accountability framework for managing e-Learning and technology strategies;*

- *Develop a coordinated course strategy and implementation plan for electronic delivery, with full MA commitment, that justifies the corporate learning investment, and identifies content needs that can be addressed collectively or independently;*

- *Define performance measures for both the quantitative and qualitative benefits and implement a system to monitor return on investment associated with e-Learning; and*

- *Develop a strategy to resolve the Information Management (IM) infrastructure obstacles to allow full user accessibility to the DLN.*

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RESULTS IN BRIEF

INTRODUCTION

Leading military organizations recognize the strategic opportunity presented by learning technologies. E-Learning is generally accepted by learning experts and organizations as a critical and cost-effective strategy to enhance training capability. In an era when capacity to provide face-to-face training is constrained by budget realities, e-Learning has emerged as a viable technological innovation to complement traditional learning methods and improve the efficiency of training administration.

Organizations are eager to find ways of reducing training costs, while ensuring that people are acquiring the intended skills and knowledge. For purposes of this review, e-Learning "*refers to training and education that is delivered digitally, which includes multimedia computer-based training and other forms of technology-assisted learning*".[1] The Canadian Forces (CF) is committed to creating and implementing a continuous learning environment for its members. In 2001, the Department established the Defence Learning Network (DLN), which is a large-scale jointly sponsored Assistant Deputy Minister (Human Resources – Military) (ADM(HR-Mil)) and Assistant Deputy Minister (Human Resources – Civilian) (ADM(HR-Civ)) initiative to enable virtual learning "anywhere, anytime, just-in-time" within the DND/CF. Joint sponsorship and management of the DLN project is a distinguishing feature and response to recommendations that affect the DLN will be coordinated between ADM(HR-Mil) and ADM(HR-Civ). The civilian component and civilian Level One (L1) organizations were excluded from the scope of this review, since the review is part of the CRS Evaluation of Military Individual Training and Education (IT&E).

Demographic trends, the rate of attrition of experienced personnel and the continued emphasis on recruitment are placing pressures on the demand for training and education services that are already overtaxed. As a result, drivers for investment in e-Learning technology include a desire to increase capacity, reduce instructor-led training time, improve access to learning resources and provide improved quality of life.

E-Learning is emerging as a dynamic solution that can create productive and engaging learning environments if implemented appropriately. E-Learning can deliver a broad range of solutions to enhance knowledge and performance to accommodate the diverse needs of working adults. The benefits of e-Learning are just-in-time training, flexibility and convenience for the learner, the ability to rapidly reach a large number of learners and satisfy the training needs of a geographically dispersed workforce without a large investment in travel and living expenses. Research has demonstrated that individualized learning environments can result in learning retention rates that are equivalent to a traditional classroom lecture. However, achieving the benefits of e-Learning requires a significant investment in time and money, and return on investment may be longer term, or in the form of increased capacity to deliver training. In this regard, e-Learning can augment conventional training and capitalize on opportunities offered by new learning technologies.

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[1] The definition of e-Learning has been adapted, based on the Glossary from the Defence Learning Network (DLN).

As suggested in the October 2003 Report to the Minister of National Defence by the Advisory Committee on Administrative Efficiency, e-Learning and distributed learning initiatives provide the opportunity to significantly reduce training-related costs. The business case for the DLN project is focused on benefits to increase operational effectiveness of the DND/CF, but does not identify cost savings nor a specific return on investment (ROI) target. Expected productivity increases may not result in immediate cost savings, but may result in increased output for the same level of resources. The DLN project intends to conduct an ROI analysis during the Definition Phase to quantify the cost savings associated with launching a project of this nature.

Severed under Section 21 of the AIA Advice, etc.

In fiscal year 2003-04, planned spending for the DLN was $4.5 million. A further planned expenditure on e-Learning of $4.67 million was reflected in a combined forecast for all Managing Authorities (MAs) responsible for military training and education. A proposal for funding the DLN project to 2009 ……………………. was approved by the Program Management Board (PMB) in July 2004. The capital construction component of Learning and Career Centres (LCC) accounts for $11 million[2], although only a portion of LCC services are directed to support independent e-Learning activity. IT&E spending is estimated to be approximately $1.6 billion annually. Relative to the total cost of IT&E, recurring funding to support the learning network and capital infrastructure after the project is closed in 2009 is estimated at $15 million annually. Additional ongoing funding will be required for course development to maintain the DLN and support the vision for continuous learning. The importance of the commitment for National Defence to become an innovative, proactive learning organization has led to this review of military IT&E e-Learning activities.

BACKGROUND

The objectives of this review were to:

- Assess the status of e-Learning development and implementation activities for military training and education;

- Research e-Learning best practices and trends in other military and leading-edge civilian organizations;

- Identify opportunities and constraints in the internal environment; and

- Develop strategic recommendations in support of the e-Learning initiative.

The review was conducted in 2003 and the review team recognizes that e-Learning continues to progress within the DND/CF.

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[2] Total proposed funding consists of $13,918,000 for the Definition Phase; $45,117,000 for the Implementation of Learning and Career Centre infrastructure of which $11,000,000 is for capital construction; and $37,490,000 for implementation of the balance of the DLN, including the Learning Management Platform and the National Centre of Excellence.

OVERALL FINDINGS AND CONCLUSIONS

A coordinated approach to the development of an e-Learning strategy, built around a shared technology platform, has not yet taken place, but would offer the potential to rationalize scarce learning resources. The review concludes that the DND/CF is currently investing significant resources in the DLN, with a proposal to invest $96.525 million over the next five years. At the same time, there are serious impediments that are preventing rapid progress to support innovative continuous learning opportunities. The DLN offers a central learning platform for e-Learning, but MAs are still each pursuing independent initiatives, which can lead to fragmentation, duplication and inefficient use of funds. Information Management (IM) is also critical to e-Learning success, and currently access to e-Learning applications is not available to most CF members from their work stations. Solutions to address security and firewall restrictions are being examined, but progress has been slow.

Amidst the IM challenges, the DLN is being tested and refined through a Proof of Concept (PoC) phase. The purpose of the PoC is to test a preliminary design of the DLN in a controlled setting, with the intent of developing a detailed statement of operational requirements. However, development of the DLN has not been based on a commitment to achieve cost savings nor a return on investment target.

Successes include launching the PoC and maintaining a website, http://hr.ottawa-hull.mil.ca/dln-rad/, that provides information to all DND/CF learners. The PoC approach is lengthy and full implementation is targeted for 2006-07. In the interim, MAs are proceeding with separate initiatives which, while timely, do present a risk that parallel initiatives will work against the success of the departmental investment in e-Learning. In addition, relevant and useful electronic courseware[3] is a critical success factor for an e-Learning initiative, yet a coordinated DND/CF-wide plan to convert and design new courses has not been developed. The DLN project office is dependent on the MAs to provide courseware to be delivered through the DLN. A courseware plan would articulate how the MAs intend to utilize the DLN to support their learning requirements. Most MAs have limited expertise to develop electronic delivery formats for courses. The PoC has few courses running, but did trial different types of courses, and used a range of e-Learning applications.

E-Learning also involves an organizational culture change to embrace non-traditional ways of conducting and delivering IT&E. A governance structure is not yet in place to resolve horizontal challenges that are department-wide in scope, nor is there authority vested with a single process owner for e-Learning who can control the acquisition of multiple learning systems. Sustained progress towards the resolution of challenges will require continued joint effort and cooperation between the DLN project team and MAs, as well as other L1s.

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[3] "Courseware" is defined as any type of instructional or educational course delivered via a software program or over the Internet. Source: Learning Circuits, American Society for Training & Development's Source for E-Learning.

The opportunity exists to exploit learning technologies to augment the capacity and effectiveness of military training and education. The DND/CF can profit from the strategies of other leading organizations. For example, the U.S. Navy, Cisco Systems, and Central Texas College have live systems with robust functionality and large numbers of users. The Australian Defence Force (ADF), and the U.K. Ministry of Defence (U.K. MoD) are positioned to realize the implementation of centralized systems and are either finishing up procurement processes or well into implementing commercially available off-the-shelf systems.

	DND/CF	ADF	U.K. MoD	U.S. Navy	Cisco	CTC
Vision & Strategy						
Unified vision	Some	Significant	Significant	Significant	Significant	Significant
Program Implementation & Growth						
Coordinated investments	Some	Significant	Significant	Significant	Significant	Significant
Executive champion and sponsorship	Significant	Significant	Significant	Significant	Significant	Significant
Demonstrated growth	N/A	N/A	N/A	Significant	Significant	Significant
Infrastructure & Support Services						
Accessible systems	Little/no	N/A	N/A	Significant	Significant	Significant
Integrated support services	Little/no	N/A	N/A	Significant	Significant	Significant
Learner Outcomes						
Curriculum definitions	Significant	Significant	Significant	Significant	Significant	Significant
Content availability	Little/no	Little/no	Little/no	Some	Significant	Significant
Return on Investment	Little/no	N/A	N/A	Significant	Significant	Significant

Legend
● Little or no progress made
○ Some progress made
● Significant progress made
N/A-Not Available

In comparison, the DND/CF can benefit from the experiences of these organizations, particularly the international defence community, as suggested in the chart below. Although the e-Learning initiatives of comparative organizations may differ in scope, the DND/CF can benefit from lessons learned from other organizations for the way ahead. A significant feature of the DLN is the provision of a learning network that will be accessible to both military members and civilian employees, LCCs at CF Bases and support infrastructure. The DLN has also focussed on custom military training, rather than simply selecting off-the-shelf courses.

Notes

The **DND/CF** DLN will provide a learning network to military and civilian Defence personnel, along with Learning and Career Centres and support infrastructure.

The **Australian Defence Force (ADF)** has approved funding for the procurement of an e-Learning system for military and civilian Defence personnel. This will include a Learning Management System and a Learning Content Management System.

The **United Kingdom Ministry of Defence (U.K. MoD)** is in the process of soliciting a bid to implement a single, coherent and mandated method of delivery and management for e-Learning material across the whole of Defence.

The **United States Naval Education and Training Command (NETC)** initiated a plan to standardize and integrate the requirements, systems, and network architectures to support the Fleet, the Sailor, the Learning Centers, the schools, the training managers, and the civilian workforce.

Cisco Systems is a leader in providing networking solutions for the Internet. Cisco's e-Learning delivery framework is a single, on-line point of entry that plans, tracks, develops, and measures skills and knowledge. The global site links Web-based learning aids and job-specific learning paths with corresponding individual histories and access to on-line assessment tools and certification examinations.

Central Texas College (CTC) is one of the largest providers of web-enabled education to the United States Army, Navy and Marines.

PRINCIPAL OBSERVATIONS/ISSUES

Vision and Strategy

The DND/CF is committed to creating and implementing a continuous learning environment for all members of the Defence Team. However, a clearly defined vision and coordinated plan has not yet been developed to guide the achievement of desired outcomes with e-Learning technology.

E-Learning technology lends itself to shared learning management platforms (LMP), supported by a coordinated vision, that produce economies of scale for maximum return on investment. A single, centralized learning platform includes the overall system for the management and delivery of various forms of e-Learning such as web-based training, conferencing, virtual classrooms, and online libraries.

The DLN project and each of the MAs have independent visions to provide continuous learning. The DLN e-Learning PoC was delayed 13 months due to resource challenges. MAs continued to pursue their own related technology initiatives in the absence of a functioning central DND/CF solution that met their needs and timelines. Although there are some differences in how MAs intend to use the DLN, MAs support the DLN as a central solution. However, L1s or Environmental Commands can purchase a Learning Management System (LMS), which could result in a fragmented approach to e-Learning and increases the potential for duplication of systems, along with costly integration challenges. There is still a need to ensure that a coordinated strategy for e-Learning is maintained and that MA initiatives are closely monitored with those of the DLN, while allowing for the unique needs of MAs. The planned aggregate expenditure on e-Learning is significant, and dispersed across the CF. In 2003-04 planned expenditure for the DLN was $4.5 million, while the MAs estimated combined planned expenditure was $4.76 million for the same period. In addition, ongoing expenditure will be required to support individual learning systems, which will diminish the DND/CF corporate investment.

Research on other organizations that have established e-Learning capabilities indicates that taking a decentralized approach will work against the success of the investment in supporting a centralized e-Learning platform. Lessons learned from best practice research indicates that successful organizations typically support a coordinated e-Learning strategy with a centralized technology platform. That said, some best practice military organizations, such as the U.S. Navy, allow training commands to customize a separate technology platform for unique needs with the support of a business case.

The need to address the LMS proliferation was identified at the Senior Review Board (SRB) for the DLN project in April 2004. Commitment to a clear vision and a shared learning platform that is supported by a DND/CF learning strategy is required and should assist in addressing this concern.

Program Implementation and Growth

User requirements for DLN functionality have changed due to rapid advancement in technology and rising pressures to adapt to the respective environments, yet an effective governance mechanism for adjusting e-Learning system specifications and technology strategies is lacking. As a result, there is little evidence of significant program evolution across the DND/CF.

The implementation of large-scale e-Learning initiatives requires adherence to an effective project management framework. Such a framework must include clear accountability structures that permit timely decision-making and the resolution of obstacles. Successful corporate-wide learning initiatives are generally driven from the top of the organization by senior champions who encourage support for the use of e-Learning.

The development strategy for the DLN is based on the PoC approach, which was initiated in 2001 with L1 funding. The PoC was designed to be an 18-month test phase to define and validate the full infrastructure requirements to support e-Learning. The DLN project adopted the standard Defence Management System (DMS) approval process upon amalgamation of the joint military and civilian initiative. Initially, roles and responsibilities were not clearly understood, resource challenges have initially plagued the team, and day-to-day issues have been difficult to resolve.

Project implementation and growth of the DLN have been slow. Although the DLN project team has been successful in launching the LMS and opening six LCCs, it has experienced difficulty in meeting MA expectations for a robust centralized learning platform. There is a gap between what the PoC can provide today and what MAs state they need now. MAs are seeking online collaboration and virtual classroom tools to provide interactive learning that the PoC cannot deliver. MAs stated a need to adopt e-Learning technology faster, but MA e-Learning growth has also been slow. Technology infrastructure obstacles are also preventing access to many DND/CF learners, which limits how quickly progress can be made. An additional challenge will be a gap between the end of the PoC test phase in 2004 and the launch of the final solution in 2007. The DLN project team is working on a bridging solution, and MAs have agreed to the proposed way ahead, although they have some concern that interim options may not satisfy their collective needs for an effective solution.

A governance structure for the DND/CF e-Learning initiative is not in place. The DLN, as a project office, does not have authority to provide governance to MAs or to other parts of the Department. There is an opportunity for the DLN project to act as a catalyst in developing the governance structure based on the cooperation of all MAs and L1s. Currently, no-one has a sufficient mandate to coordinate the acquisition of independent LMS systems or determine which priorities should be pursued from a DND/CF perspective. As more individual investment is made in independent parallel initiatives, the risk is that MAs are less likely to migrate to a central system once it becomes operational. This fragmented approach places the DND/CF at risk of duplication of effort, not achieving economies of scale and the inefficient use of training dollars for the e-Learning investment.

Best practice research provides evidence that large-scale e-Learning initiatives can be successfully implemented in a timely manner. The U.S. Navy launched a live, operating system in less than 24 months and has registered 300,000 users. In addition, lessons learned from another military organization identified that a highly decentralized implementation that did not have sufficient authority from senior sponsorship experienced a proliferation of individual systems, which led to fragmentation and the inefficient use of resources.

The phased PoC approach was formally endorsed by the SRB in February 2003, with expected implementation of a complete solution in 2006-07. A new project management structure has now been implemented, but the governance of the DLN is still under review by the project team and this has been acknowledged by the SRB held in April 2004. A clearly defined governance and accountability structure is essential to ensure the appropriate authority is provided and exercised for decision-making throughout the DLN project, particularly as MAs are proceeding with e-Learning initiatives. A transition plan is needed to ensure continued service from the termination of the PoC to the launch of the e-Learning solution. Also, the change management strategy needs to include the technology component as a key target in the action plan for future progress.

Learner Outcomes and Return on Investment

An overarching plan with designated funding for the conversion and development of e-Learning courses has not been developed. Without a commitment to a coordinated plan, the DLN courseware will be insufficient to achieve a critical mass, and the corporate learning investment will be diminished.

The development of quality courseware is a critical success factor to sustain an effective e-Learning investment. An overall courseware plan provides an inventory of all courses that need conversion and development, along with a schedule to identify the timing and required funding within the DND/CF. This would include identifying the priority for courses that are most suitable for e-Learning delivery and that have the potential to reach a wide target-audience and to achieve economies of scale.

An overarching plan with designated funding to develop e-Learning courseware for either the centralized PoC or MA initiatives has not been developed. The DLN project does not make provision for courseware development. Responsibility and funding for courseware development reside with the MAs, but funds have not been committed to support electronic courses to be delivered through the DLN. MAs are developing some courses now, but most MAs lack the required expertise to develop interactive e-Learning courses. The Navy intends to convert courses when a rigorous business case or enhanced operational capability supports the investment in course conversion. Some MAs also do not have available resources to provide subject matter expertise required to guide external courseware development. Many of the courses offered electronically are not advanced in terms of sophistication of interaction. The DLN only hosted 7 courses in the first 6 months and there are no more than a few dozen courses on all other MA systems combined, although there are many hundreds of courses that offer potential for conversion to some extent. The PoC did trial

different types of courses, and used a range of e-Learning applications. The PoC phase does not have authoring[4] tools, which decreases the ability to take advantage of the highly creative instructional design and robust interactivity that e-Learning offers. An additional challenge is to overcome the departmental technology infrastructure obstacles that are currently limiting learner access to e-Learning. Maintaining and providing quality courseware by MAs is dependent on the availability of supporting technology for learning.

Without sufficient quality courseware, the DLN is at risk of failure. The DLN project is dependent on the MAs for developing courseware and their participation is critical for the ultimate success of the DLN. With multiple solutions being implemented by MAs, they may be duplicating the creation and conversion of electronic course components that could be shared for some courseware. The DND/CF will develop an e-Learning system that may not have sufficient courses to optimize the investment.

MAs recognize that e-Learning holds the potential to provide a high-quality, lower cost strategy for enhancing training capacity and improved quality of life for members. However, the development of the DLN has not been based on a commitment to achieve cost savings nor to meet a specific ROI target for the DND/CF. Although developing ROI targets is challenging, performance measures for monitoring return on investment associated with e-Learning need to be defined by the DLN, in partnership with MAs. The DLN intends to develop an action plan to address this. MAs do not have costing systems that easily allow for the collection of data needed to evaluate the cost/benefit of their activities.

Best practice research organizations, such as the U.S. Navy and Cisco Systems, have recognized that courseware development is the greatest challenge and at the same time a critical component of success. The potential savings can be significant; for example, Cisco Systems has identified that they have achieved a 40 to 60 percent cost savings through the increased use of e-Learning applications.

A DLN Working Group has been established in an attempt to avoid duplication and to share development opportunities, which contributes to successful collaboration. In addition, it was clarified at the SRB in April 2004 that MAs must secure required funding for courseware development through the business planning process. The DLN project team was also requested to develop a plan for courses that require conversion. Successful implementation of the DLN requires an overarching and comprehensive courseware plan that includes all MA and L1 courses to secure the DND/CF investment in e-Learning.

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[4] "Authoring Tools" is a software application or program that allows people to create their own e-Learning courseware. Based on the Glossary from the Defence Learning Network (DLN).

Infrastructure and Support Services

The IM infrastructure that supports the DLN PoC is not accessible to the large majority of users because of security and firewall issues, nor is it integrated with other corporate systems at this time. These challenges impede progress of e-Learning within the DND/CF.

Developing collaborative working relationships with Human Resources (HR), IM and key users is important to the success of e-Learning initiatives. Learning is expected to drive the business results, but at the same time, a strong partnership with IM is required to remove technology obstacles to ensure that e-Learning is widely accessible. The DLN team has been working with Assistant Deputy Minister (Information Management) (ADM(IM)) representatives in this regard.

Technology infrastructure impediments prevent rapid progress for e-Learning within the DND/CF. The intent of the DLN is to provide access to learning for all employees/members within the DND/CF. However, the current IM infrastructure cannot support the departmental vision for e-Learning "anywhere, anytime, just-in-time". The PoC is inaccessible to the vast majority of users due to limited bandwidth and firewall policies that prevent access to learning applications from the Defence Wide Area Network (DWAN) work stations. Only the most rudimentary courses can be accessed from the DWAN. Currently, the only way for members to participate in interactive e-Learning is to connect to the DLN from home using a personal computer, or have exceptional office access to the General Purpose Network (GPNet) which connects to interactive learning applications. Access will also not be available to ships and operational theatres in the foreseeable future since satellite connections are too costly.

A governance structure for the steady-state has not yet been determined. The DLN is a large and complex DMS project involving several organizations within the DND/CF. The technology component is significant and critical to the success of the Department's e-Learning efforts. The DLN is intended to be a departmental system and the need for ongoing technical support will be an enterprise requirement. Ongoing IM involvement in the development of the DLN is essential to ensure that corporate visibility is maintained for the technology requirements.

Key insights from a Learning Forum on best practices identified that working closely with key organizational groups reduces implementation errors and integrates e-Learning into the corporate culture more effectively. Since any e-Learning initiative has a major technology component, a strong partnership with IM is necessary from beginning to end to create a supportive learning environment.

ADM(IM) has made a commitment to provide the DLN team with the expertise required and to find solutions to the infrastructure barriers as the DLN will be considered an enterprise solution. Sufficient IM human resources with the appropriate skills and knowledge will need to be provided throughout the life of the project to support the success of the DLN for the DND/CF. Roles and responsibilities must be formalized to ensure that business requirements drive learning and that technology provides the support needed to realize the vision for continuous learning.

PRINCIPAL RECOMMENDATIONS

A summary of all recommendations is provided in <u>Annex A</u>, including the identification of Offices of Primary Interest (OPI) and Offices of Collateral Interest (OCI). Key recommendations are listed below.

1. Develop a comprehensive DND/CF vision and objectives for e-Learning that is integrated with the IT&E learning strategy, and supported by a shared technology platform;

2. Establish a well-defined governance and accountability framework for managing e-Learning and technology strategies;

3. Develop a coordinated course strategy and implementation plan for electronic delivery, with full MA commitment, that justifies the corporate learning investment, and identifies content needs that can be addressed collectively or independently;

4. Define performance measures for both the quantitative and qualitative benefits and implement a costing system to monitor return on investment associated with e-Learning; and

5. Develop a strategy to resolve the IM infrastructure obstacles to allow full user accessibility to the DLN.

MANAGEMENT ACTION PLAN

	CRS Recommendation	OPI	OCI	Actions
1	Develop a clear DND/CF vision and objectives for e-Learning that is part of the broader learning strategy for IT&E, and that is supported by all MA senior leadership. Require that a central shared technology platform be adhered to by all MAs and L1s within the DND/CF, with the provision that a business case be developed for any unique operational needs that may justify investment in a stand-alone system.	ADMs: HR-Mil HR-Civ IM S&T	L1s	• Leverage DLN project to continue to evolve vision through already established SRB and DMS documentation (Concept of Operations (CONOPS), Statement of Requirements (SOR), etc.); • Transfer Project Leadership for Implementation to IM Group to facilitate enforcement of adherence to central platform [Upon Treasury Board (TB) approval of Synopsis Sheet (Preliminary Project Approval (SS(PPA))]; • Complete analysis of Proof of Concept data; • Complete Project Management Plan; • Obtain PMB approval; • Obtain TB approval (PPA);

	CRS Recommendation	OPI	OCI	Actions
				• Refine vision, collectively, through planned DLN Working Group activities during completion of Definition Phase, and document in DMS documentation (CONOPS, SOR, Synopsis Sheet (Effective Project Approval (SS(EPA)), Project Charter, etc.) (By EPA); • Implement the Change Management strategy and plan, including events such as a national conference, which will contribute to refinement of the vision (ongoing); and • Examine need for highest-level policy direction to ensure adherence to central platform, as part of policy review and governance deliberations (jointly, among OPIs shown). Document and promulgate as DLN Governance structure, and/or separate policy directive (the final governance structure will be tabled as part of EPA).
2	Establish a well-defined governance and accountability framework for evolving the e-Learning system specifications and technology strategies. Governance should include a senior advocate for e-Learning from each MA who will formally assist with promoting e-Learning, implementing DLN policies, finding working solutions to horizontal issues and removing impediments to success. An integrated framework will need to reflect the military and civilian differences at both the national and base/wing level.	ADMs: HR-Mil HR-Civ IM	L1s CDA DTEP 2 DLPDSP Base & Wing Comd	• Under IM Group leadership, identify the need for policies and directives that address the need for adhering to a central platform in future; • Expand model to address issues at the Base/Wing level, using the Base Learning Support Services project as a forerunner (jointly sponsored by Personnel Selection (PSel) Branch, CDA, and DLN); • Circulate the second draft to all stakeholders for input; • Continue as an iterative process until all stakeholders can live with product; and • Promulgate as DLN Governance model prior to DLN Project Implementation Phase (i.e. at EPA); • Continue the policy review work as the project evolves via the already established DTEP 2 Policy Working Group, reviewing membership to ensure adequate participation; • Continue the Centre of Excellence (CoE) Working Group deliberations to complete definition and establishment of the CoE federation, as described in the existing documentation; and

	CRS Recommendation	OPI	OCI	Actions
				• Incorporate associated requirements in the final DLN Project CONOPS and SOR (i.e. to be tabled at time of EPA).
3	As part of the accountability framework, formalize a collaborative working relationship between the DLN project office and MAs to progress development of a central technology platform linked to a common vision for e-Learning that will meet the operational needs of the DND/CF and avoid duplication of effort.	DLN Mg't	DLN AG LMP WG C/W WG CoE WG	• Continue the work of the Learning Management Platform (LMP), Courseware (C/W), and CoE working groups as an integral part of Definition and governance activities; • Identify and address opportunities for strengthening existing collaborative relationships as part of the governance model and CoE federation structure currently under review; • Roll-up ideas from all three WGs for endorsement by the DLN Advisory Group (AG) and determine with PD and PM staff if any new requirements raised should be addressed within the DLN project scope; and • With PM, amend project documents accordingly and seek project approvals for any changes of scope (by EPA).
4	Develop a transition plan to coordinate the interim period from completion of the DLN Proof of Concept to the launch of the selected e-Learning solution. Identify roles and responsibilities and critical requirements during the period, which should include information management stakeholders in the change process.	DLN Mg't	CDA LMP WG	• Post RFP for interim LMS solution; • Evaluate proposals; • Transition existing DLN personnel resources supporting the POC LMS to the CDA-led interim LMS project; • Implement "interim LMS"; • Reflect details and timelines in Project Management Plan (PMP) (Definition), which will include a distinct section on Change Management; • Establish a performance measurement framework to be used by training managers for determining the cost benefits of e-Learning interventions (by EPA); and • At EPA, the fully defined requirements will be tabled that address the transition of courseware on the "interim LMS" to the new steady-state LMP and the transition to in-service support agencies.

		CRS Recommendation	OPI	OCI	Actions
Severed under Section 21 of the AIA Advice, etc.	5	Develop a coordinated courseware strategy and implementation plan to provide an inventory of all courses that need conversion or development to support the proposed ……………….. investment. Obtain full MA commitment to identify course priorities and content needs that can be addressed collectively or independently to justify the corporate learning investment. Provide MAs with effective course authoring tools to support more rapid courseware development.	DLN Mg't	L1s MAs	- Continue work of Courseware WG to develop C/W strategy and plan; - Establish corporate priorities; - Identify associated development costs in either MA business plans, and/or substantive DLN costing for EPA; - Identify need for authoring tools through LMP W; and - Reflect basic required functionality in SOR and/or encourage MAs to identify requirement for any additional tools in business plans [by EPA].
	6	Build alliances with partners within the DND/CF and externally to leverage resources for course development, realize economies of scale and eliminate duplication of effort.	ADMs: HR-Mil HR-Civ	L1s MAs DGSC	- Continue to refine Change Management strategy and plan, identifying potential partners and ways to foster liaison (ongoing); - Establish periodic review of existing partnerships seeking ways to enhance the relationships (at least annually); - Leverage the evolving National CoE and CoE federation (e-Learning expertise of MAs and Groups) to lead in identifying courseware with horizontal impact across all DND/CF Military and Civilian, as well as joint development opportunities (ongoing); - Document clear roles and responsibilities in emerging DLN project documentation (CONOPS, SOR, Courseware Guidelines, etc.); - Leverage existing memberships (ADL, NATO, Government of Canada (GoC) working groups, Canada School of the Public Service, Committee of National Learning and Development Institutes headed by Canada School of the Public Service, KM Core Team, etc.) to identify opportunities for further building alliances, including specific courseware development projects (ongoing); - Include associated Change Management implementation costs and plans in SS(EPA) submission; and

	CRS Recommendation	OPI	OCI	Actions
				• Follow up with promulgation of departmental guidelines based on adoption of industry standards, in particular emerging from Shareable Content Object Reference Model (SCORM) working group deliberations and specifications led by Advanced Distributed Learning (ADL) Co-lab Washington, D.C. (Initial version by EPA).
7	Review CFITES and provide appropriate guidance to address the e-Learning environment. Create validation options electronically that measure the achievement of training outcomes.	DTEP	MAs	• DLN Team Leader (TL) Integrated Logistic Support/ Implementation Planning (ILS/IP) to act as a catalyst for CFITES review, in concert with DTEP 4, using the DTEP 2 Policy Working Group as a logical forum and IT&E Management Committee as an endorsement forum (ensure representation from DLPDSP to address civilian perspective); • LMP WG to survey MA reps concerning whether there is unanimous support to seek a DLN scope increase at this stage; and • DTEP to follow-up accordingly (by EPA).
8	Implement a performance measurement and a costing system to monitor return on investment, benefits and savings associated with e-Learning, as well as track both quantitative and qualitative measurement indicators. A costing system should be linked to the IT&E Costing Model.	DLN Mg't	L1s MAs	• Clear articulation of the <u>benefits</u> expected from DL and the DLN by all of the DND/CF stakeholders, along with a prioritization of benefits; • Development of metrics for the benefits and collection of quantitative data (e.g. volumes and costs) for DL initiatives undertaken up to EPA; • Where available, categorization by type of training (e.g. self-paced vs instructor-led) of DL initiatives and collection of cost and benefit information for the pre-existing form of training (e.g. classroom, self-taught) which is needed for comparative purposes;

	CRS Recommendation	OPI	OCI	Actions
				• Development of 12 or more case studies that typify the most appropriate applications of DL in the DND/CF, collection of cost-benefit (or ROI) data according to the metrics established for the DLN, and generalization of the Cost Benefit Analysis/ROI findings to potential DND/CF DL applications to provide a conservative estimate of future impacts and benefits; • Validation of external benchmarks derived from comparable initiatives (e.g. U.S. Army estimate of 8 years for positive ROI, based on 15-year plan); • Development of performance measures complete with indicators and methods for DLN steady-state related to business benefits and operational objectives (with links to existing IT&E Costing Model if feasible and practicable); and • Determination of the resources the Centre and MAs will require to collect, analyze and report on the performance measures.
9	Develop a strategy to increase user accessibility during the DLN Proof of Concept, address firewall issues and integrate the DLN with other enterprise systems. Provide sufficient IM/IT human resources with the appropriate skills and knowledge to resolve technology challenges for the e-Learning project. Create a network communications backbone that provides access to e-Learning applications via the Internet and DWAN.	ADM (IM)	ADMs: HR-Mil HR-Civ MAs	• Implement the DLN Communications strategy and plan; • Encourage all stakeholders to accelerate addition of quality courseware to the 28 courses already loaded; • Appoint a full-time Project Manager; • Complete definition of the PM and PD organization requirements; and • Develop options for meshing with broader DND IM/IT architecture, in line with DLN objectives.

INTRODUCTION

OBJECTIVES OF REVIEW

- Review the status of e-Learning development and implementation activities for military training and education;

- Research e-Learning practices and trends in other military and leading-edge civilian organizations;

- Identify opportunities and constraints in the internal environment; and

- Develop strategic recommendations.

Scope

The review examined e-Learning activities for military training and education, as part of a more comprehensive CRS Evaluation of Military IT&E. This included the Defence Learning Network initiative jointly sponsored by ADM(HR-Mil) and ADM(HR-Civ), but excluded a review of the civilian component and any civilian L1 e-Learning activities.

Definition of E-Learning

The DND/CF identifies e-Learning as a delivery mechanism for Distributed Learning (DL). DL refers to the delivery of training, education or professional development using multiple media and technologies when and where they are needed. This can range from paper-based correspondence courses to interactive online learning taken anywhere.

For purposes of this review, the definition of e-Learning[5] "*refers to training, education, coaching and information that is delivered <u>digitally</u>. E-Learning is normally delivered through a network or the Internet but it may also be delivered via Compact Disc Read Only Memory (CD-ROM). In most organizations, personal computers are used to deliver e-Learning digitally but personal digital assistants (PDAs) and other wireless devices are increasingly being used. E-Learning therefore includes multimedia computer-based training (CBT) and other forms of technology-assisted learning*".

METHODOLOGY

Approach to Data Collection

The review was undertaken by CRS as part of the Evaluation of IT&E, in partnership with International Business Machines (IBM) Business Consulting Services. Information on the internal military training and education e-Learning activities was gathered through:

- Reviewing reports and key documents such as policies, vision statements, and proposed initiatives related to e-Learning;

- Interviews with representatives from:

    o ADM(HR-Mil) – Director Training Education Policy (DTEP);

    o ADM(HR-Civ) – Director General Learning and Professional Development (DGLPD);

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[5] "The definition of e-Learning is often a source of debate." [Hall, Brandon. *E-Learning Across the Enterprise: The Benchmarking of Study of Best Practices*]. To avoid confusion, the term was defined based on the Glossary from the Defence Learning Network (DLN).

o ADM(IM) – Director Information Management Requirements (DIMR) and Director Human Resources Information Management (DHRIM);

o DLN project team;

o Chief of the Maritime Staff (CMS);

o Chief of the Land Staff (CLS);

o Chief of the Air Staff (CAS);

o Canadian Forces Medical Group (CFMG);

o Canadian Forces Provost Marshal (CFPM);

o Canadian Defence Academy (CDA); and

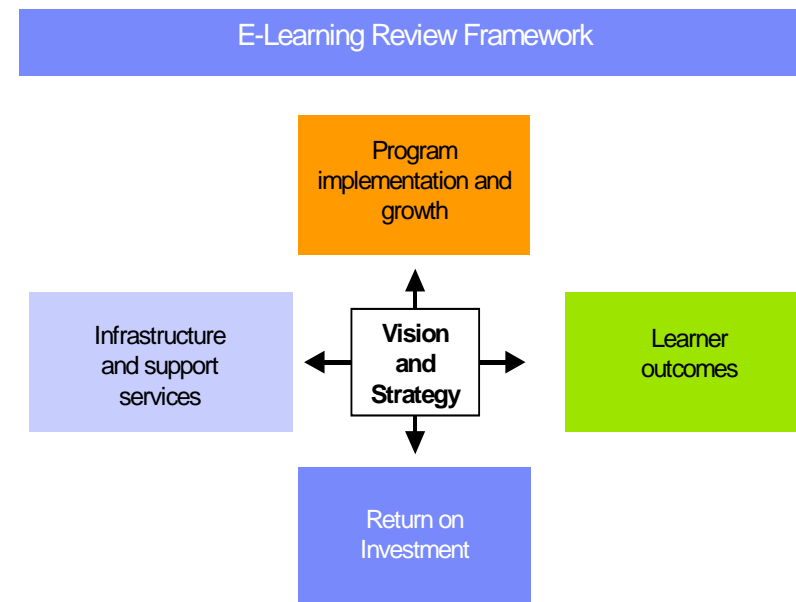o Canadian Forces Support Training Group (CFSTG).

Information on the external environment was gathered through Web research and/or telephone interviews with the following organizations:

• United Kingdom Ministry of Defence;

• Various organizations within the United States Department of Defense, referred to as the U.S. Navy, and Organizations A, B and C;

• Australian Defence Force; and

• Two private sector organizations: Cisco Systems and Central Texas College.

An analysis of the information collected from the external environment was conducted for lessons learned. Opportunities and constraints that exist in the internal environment were identified. Recommendations were then formulated to expedite implementation of a robust e-Learning program. A list of acronyms used in this report is available in Annex F.

REVIEW FRAMEWORK AND CRITERIA

The review was conducted using five perspectives[6] associated with successful e-Learning initiatives using the framework shown below and criteria that follow. However, the overarching DMS is the framework that ensures the effective and efficient delivery of the departmentally approved activities and projects. Within the overarching DMS, the Review Framework presents a scorecard to assess progress of the e-Learning initiative within the DND/CF.

E-Learning Review Framework

Program implementation and growth

Infrastructure and support services

Vision and Strategy

Learner outcomes

Return on Investment

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[6] Adapted from American Society for Training & Development, Brandon Hall, the Southern Regional Electronic Campus' Principles of Good Practice, and the Western Cooperative for Educational Telecommunications' Principles of Good Practice for Electronically Offered Academic Degree and Certificate Programs (U.S.).

Vision and strategy:

- Vision for e-Learning is clearly defined and the objectives for achieving the vision are feasible; and

- Vision is aligned with the needs of stakeholders who support it.

Program implementation and growth:

- E-Learning program is supported by robust project management and adequate budgetary resources given its scope;

- Progress is being made against the plan, as evidenced by evolving system capabilities and growing numbers of e-Learning courses and participants; and

- Stakeholders are able to set the direction of the e-Learning agenda through a well-functioning governance structure so that project(s) meet their needs on schedule.

Learner outcomes:

- Learners have information on or access to the courses they need in "one place" on the web, regardless of whether the course delivery format is instructor-led or web-based;

- Learners are participating as evidenced by head count, class registration, and class completion rates; and

- Learners are succeeding as evidenced by grades, test results, feedback from both students and instructors and validation.

Return on Investment (ROI):

- Measures of performance are defined and include both qualitative and quantitative metrics;

- Measures are tracked on a periodic basis and reported to stakeholders including the program's sponsor, program or project management, and stakeholders in the field; and

- Risks are identified and addressed, and lower than expected ROI is recognized and corrected.

Infrastructure and support services:

- E-Learning system is comprehensive and provides a full set of capabilities relative to industry standards;

- Includes services important for learner success such as help desk support and access to online libraries and required learning materials;

- E-Learning system and services are accessible by users "anytime, anywhere" over both the Internet and intranet; and

- E-Learning system is integrated or interfaced with other corporate information systems so that information does not have to be "re-keyed" across multiple systems and meaningful reports can be generated from a corporate perspective.

NOTE: Review results are presented using the e-Learning Review Framework. All criteria were considered in the analysis. Criteria contained in the Findings and Conclusions of this report were selected on the basis of the greatest need for change.

BACKGROUND

Technology-enabled learning has been available for more than 20 years and the military has a history of exploiting the latest in training technologies to support IT&E. E-Learning has been made more relevant with the Web being able to support multimedia, interactivity, and collaborative technologies, making learning more student-centric. E-Learning also offers opportunities for highly creative instructional design, robust interactivity and more experiential learning than is possible in a classroom. Benefits of e-Learning include the following:

- Additional capacity to train at lower cost by reaching more people in a shorter amount of time;

- Cost-effectiveness in saving travel time and expenses;

- Investment leveraged over the years to large number of learners;

- Increased learning impact with engaging multimedia presentation and interactivity to reinforce understanding and application;

- Learners have just-in-time access to training anywhere and anytime, and can select their own pace of learning for some courses;

- More consistent course delivery and reduction of instructor variance; and

- Possibility of building learning communities fostering human interaction and knowledge sharing.

However, e-Learning is not a panacea. Many organizations are currently providing blended learning, which involves selecting a combination of classroom and electronic delivery methods that are most appropriate for a particular course. An e-Learning initiative must be integrated within the broader learning strategy and be cost-justified to obtain the benefits from the investment.

As determined by the CRS interviews, there is strong belief among training and education stakeholders that a higher percentage of e-Learning courses will allow them to respond effectively to key challenges in their environments, namely:

- Rising personnel attrition rates and a higher operational tempo will combine to increase demand for training for the foreseeable future. E-Learning promises to provide a high quality, lower cost strategy for enhancing training capacity; and

- Better educated new recruits and a more competitive job market combine to increase the need for effective retention strategies. E-Learning can provide improved "Quality of Life" through anytime, anywhere access.

> Defence Strategy 2020 states the need to "position Defence as an employer of choice for Canadians by expanding the knowledge and skills base of our personnel and by providing them with progressive opportunities for development, career mobility and recognition for service."

Components of a Typical e-Learning System

A typical e-Learning system, or suite, includes the following components:

- Learning Portal, which provides the initial point of contact for users for access to training, education, knowledge resources and support tools. The portal can be customized by the department and individual user;

- Learning Management System, which is the infrastructure on which e-Learning can be built and delivered. It comprises registration capabilities; management of curriculum and courses; skills and records management; student interfaces to courses; administration and interfaces with external enterprise systems;

- Learning Content Management System, which is a software application that manages the creation, storage, use and reuse of learning content. Content is often stored in granular forms referred to as learning objects;

- Virtual classroom, which is a teaching and learning environment located within a computer-mediated communication system and intended to fulfil many of the learning facilitation roles of a physical classroom; and

- Authoring tools, which is a program designed for use by a non-computer expert to create training products.

Defence Learning Network (DLN)

In response to the ideals of continuous learning, the DND/CF made a commitment in 2001 to create a single, coordinated Defence Learning Network for the Defence Team. The DLN comprises the combined ADM(HR-Mil)-sponsored Defence Distributed Learning System (DDLS) and the ADM(HR-Civ)-sponsored Learning and Career Centre Network (LCCN) projects.

The DLN concept is based on providing two key components, consisting of:

- A learning management platform, which serves as the electronic communications information technology network; and

- A network of LCCs, which are physical structures intended to provide shared learning and career advisory services.

The intent of the DLN is to establish a policy and management framework with numerous Centres of Excellence all linked by an information technology network. MAs are responsible for the assigned activities and resources allocated to military training and education. MAs are also responsible for providing courses to be delivered through the DLN.

The DLN project team initiated a PoC phase to identify the full requirements for the infrastructure to support delivery and management of e-Learning activities. The PoC is considered a

research and development project, with the purpose being to pilot the learning system. A Learning Management System provided by Sun Microsystems Inc. was formally launched in May 2003 as an 18-month test phase to validate the essential functionality required.

A Test Lab supports the PoC in evaluating implementation schemas and to test Shareable Content Object Reference Model (SCORM™) open standards, thereby allowing for reuse of e-Learning content to simplify course development. The intent is that all new course material destined for the DLN will be SCORM compliant.

IT&E is a significant activity with approximately $1.6 billion, or 15 percent of the Defence budget, being spent annually. MA's recognize the valuable contribution that e-Learning can make to provide training and education more efficiently and effectively. In interviews across the spectrum of IT&E stakeholders, it became clear that the DND/CF will probably never move entirely away from a classroom approach. Many skill topics require the human touch and classroom learning can provide face-to-face interaction that may be necessary to attain some new skills, as well as to provide military indoctrination. The appropriate solution needs to be assessed for each course to determine the combination of technology and human interaction. To remain responsive to internal and external demands, the DND/CF is making a shift towards blended learning, recognizing the benefits of e-Learning. Training technologies will continue to evolve as the external and internal environments adapt to change.

OVERALL FINDINGS AND CONCLUSIONS

VISION AND STRATEGY

Issue

The DND/CF is committed to creating and implementing a continuous learning environment for all members of the Defence Team. However, a clearly defined vision and coordinated plan has not yet been developed to guide the achievement of desired outcomes with e-Learning technology.

Maintaining a Common Vision and Strategy—CRS review team interviews and subsequent analysis indicates that each MA and the DLN project team have an independent vision for e-Learning. As stated in the DLN Project Implementation Plan, the DLN project team views e-Learning as a revolutionary capability to transform the way learning is approached within the DND/CF; the DLN vision is to support Defence Team learning "anywhere, anytime, just in time". This view is somewhat in contrast with that of the MAs. At the time of our review, MAs generally had a more traditional focus on military training and view e-Learning as a complementary delivery option for DL. MAs are in agreement that:

- The focus must be on learning outcomes and not learning technologies; technology should enable the agenda and not drive it; and

- Learning strategies must encompass a blend of approaches for learning, including face-to-face, experiential, web-based e-Learning, and other modes of delivery to meet learner outcomes.

Although MAs support the DLN as a central solution, each MA may use the DLN differently in order to meet unique organizational environment and training requirements. Consequently, MAs and the DLN team need to work closely to ensure that there is a common strategy and consistent buy-in to maintain a common vision. There are multiple e-Learning or related technology initiatives underway across MAs and each one is being conducted independently to achieve the individual visions, as summarized in Annex B.
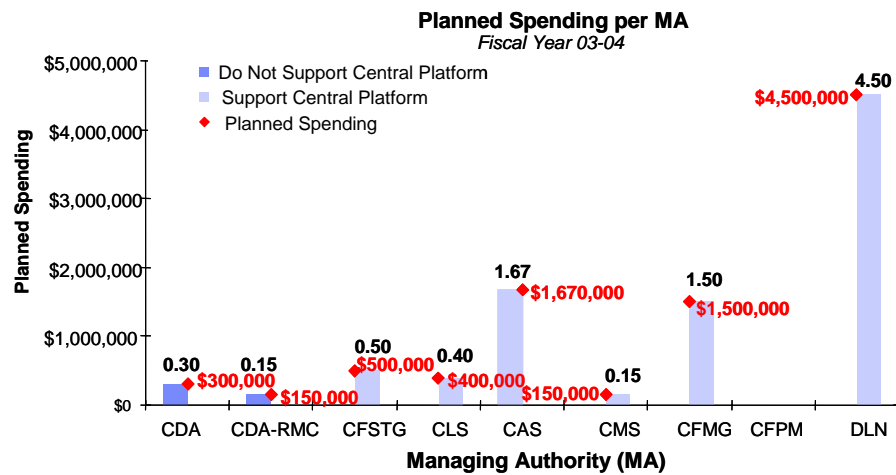
Acquisition of E-Learning Systems—In October 2003, the DLN project team hosted a meeting with representatives from each MA. Initially, the Canadian Defence Academy (CDA) did not completely support a central learning platform. The CDA supported having separate systems with a central agent to provide for integration of the various systems, but subsequently supported a central solution. The Air Force has initiated a $10-million Air Force Integrated Information and Learning Environment (AFILE) project to address unique operational needs, which will include functionality not provided by the DLN. The Air Force plans to use the LMS that will be implemented by the DLN project by exploiting and sharing DLN and Air Force resources where mutually viable. The remaining MAs were united in reconfirming their support for the DLN as a central learning platform. The ability to share courses, eliminate duplication and stop the potential proliferation of separate systems was a common theme among the other MAs.

Overall, the MAs that were supportive of one central solution want flexibility within a coordinated approach. At the same time, MAs also clearly stated their need to progress with their own initiatives in the absence of a central DND/CF solution that meets Forces-wide operational needs. However,
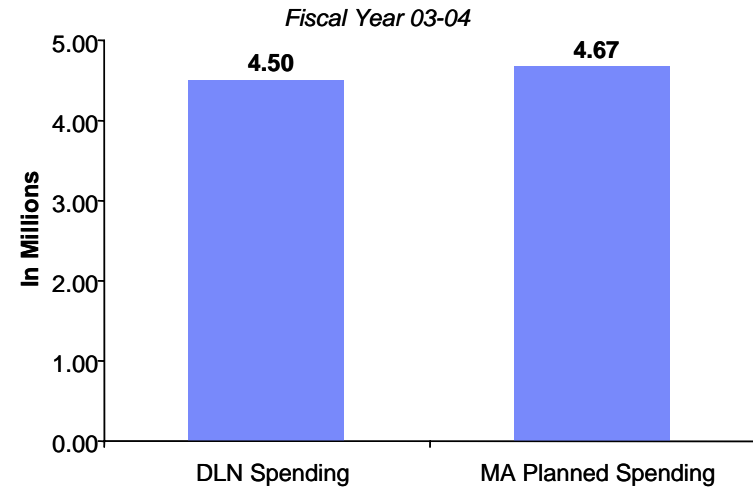
independent initiatives led to fragmentation of scarce resources. The diagram below reflects the estimated spending on e-Learning per MA for those who support a central learning platform and for those who initially did not.

The DLN technology platform was budgeted for $4.5 million for 2003-04, while MAs were planning to spend at least another $4.67 million on technology during the same period, as reflected in the following diagram[7].

Planned Spending per MA
Fiscal Year 03-04

- Do Not Support Central Platform
- Support Central Platform
- Planned Spending

Total Planned Spending by MAs Compared to DLN
Fiscal Year 03-04

Fragmented Approach to E-Learning—The DLN e-Learning PoC was originally delayed 13 months because critical software was not available on schedule. Many of the MAs have sponsored their own initiatives aimed at implementing e-Learning or related technology to meet operational needs.

Planned aggregate MA spending is more than DLN project funding, excluding the civilian component. A fragmented approach can diminish the DND/CF's ability to benefit from economies of scale and can result in duplication of effort and inefficient use of training dollars.

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[7] Planned MA expenditure may also include plans for courseware development. The Air Force cannot easily separate planned spending on e-Learning specifically from total functionality to be provided by AFILE.

Based on its analysis, the review team has assessed that a lack of central strategy and direction promotes well-intended independent parallel initiatives by MAs that do not contribute to the success of the corporate investment. However, some of these initiatives have contributed valuable lessons learned for the PoC. Development of separate e-Learning initiatives introduces the fundamental challenge of integrating diverse systems at a later date. Since the early days of Information Technology (IT), lessons learned have shown that applications and processes that have been added one at a time often result in a multitude of different systems that lack the ability to readily communicate with each other and result in a proliferation of functional "silos". Based on Gartner research, organizations have learned from early e-Learning failures that it is often not worth the time and money to integrate several vendors' e-Learning products; thus, a single provider is preferred. It does not appear that the DND/CF is benefiting from this lesson learned and if it continues down the current path, the Department is at risk of encountering costly integration challenges. The CRS team also acknowledges the challenges that arise when attempting to create central technology solutions to meet the needs of all users. Notwithstanding, it is the CRS review team's assessment that a coordinated approach to the development of an e-Learning strategy built around a shared technology platform would allow the DND/CF to rationalize training and associated overhead costs more broadly across the Department to achieve efficiencies.

Best Practices and Trends—E-Learning technology lends itself to shared technology platforms that produce economies of scale. To obtain the greatest return on investment, best-practice organizations first develop or adapt a clear, purposeful vision of e-Learning that is linked to overall organizational strategies, then support that vision with a coordinated and typically centralized technology strategy. A coordination of effort and a clear end-state brings about lower costs and normally results in less time spent to achieve target objectives.

It is important to note that all of the organizations researched for best practices have in place or are planning to build a single, centralized technology platform for e-Learning and other training administration requirements. This approach allows them to obtain the greatest benefit from their investment by spreading costs over a larger population. It also provides other benefits such as agreement upon common standards for quality, greater visibility for the project with senior leadership, and "one stop shopping" for personnel seeking training and/or educational options, whether they are instructor-led or web-enabled. Some best practice military organizations permit commands with unique needs to pursue their own separate technology platform, provided that a business case supports the request.

BEST PRACTICES AND TRENDS

U.K. Ministry of Defence (U.K. MoD) is in the process of soliciting a bid to implement a single, coherent and mandated method of delivery and management for e-Learning material across the whole of Defence. Rather than having a number of disparate e-Learning solutions, the U.K. MoD is supporting a single defence-wide capability that allows reuse of shareable e-Learning material. Extensive review concluded that a coordinated defence-wide shift towards e-Learning would reap major benefits. (a)

U.S. Navy implemented ThinQ, a Commercial Off The Shelf (COTS) system, providing a single point of access for all training commands via the web. Training commands can customize their "view" and can have their own unique "instance" of the software if it is needed.

The Naval Education and Training Command (NETC) initiated a plan to standardize and integrate the requirements, systems, and network architectures to support the Fleet, the Sailor, the Learning Centres, the schools, the training managers, and the civilian workforce. The Integrated Learning Environment (ILE) transformation strategy and architecture is NETC's capstone to that plan. Formerly independently operated enterprise programs (e.g., Navy E-Learning, E-Training Management) and multiple system interfaces (e.g., CeTARS, NTMPS, TOURS, etc.) will be managed as a single, integrated capability. (b)

Australian Defence Force (ADF) has approved funding for the implementation of an e-Learning strategy over a 4-year period to provide an e-Learning system for the Defence personnel. The tender and procurement of an integrated learning management system was completed and implementation was scheduled for November 2003. (c)

Cisco Systems is a leader in providing networking solutions for the Internet and the 2002 Award Winner for Learning Technologies in the Workplace. Cisco's strength lies in having a centralized deployment platform for all e-Learning products, and a decentralized content development platform in which the subject-matter experts create and develop the content. Cisco's learning and training and development strategy is linked directly with its corporate strategy. (d)

American Productivity & Quality Center (APQC) 2002 Consortium Learning Forum Best-Practice organizations recognized e-Learning as a way to achieve an organization's strategic vision. One hundred percent of best-practice partners responded that they have an overall learning strategy as well as a separate e-Learning strategy, and 73 percent indicated that the two strategies are integrated. (e)

Reference sources for (a) to (e) are contained in <u>Annex E</u>.

Recommendation

ADM(HR-Mil) **OCI** – ADM(IM) MAs	Develop a clear DND/CF vision and objectives for e-Learning that is part of the broader learning strategy for IT&E and that is supported by all MA senior leadership. Require that a central shared technology platform be adhered to by all MAs and L1s within the DND/CF, with the provision that a business case be developed for any unique operational needs that may justify investment in a stand-alone system.

PROGRAM IMPLEMENTATION AND GROWTH

Issue

User requirements for DLN functionality have changed due to rapid advancement in technology and rising pressures to adapt to the respective environments, yet an effective governance mechanism for adjusting e-Learning system specifications and technology strategies is lacking. As a result, there is little evidence of significant program evolution across the DND/CF.

E-Learning Successes—The DLN team has experienced resource challenges from its inception that have made it difficult to progress on schedule given the project's scope and MA expectations. DLN staff advised that the project only received a significant military funding increase from $1.7 million to $4.5 million in 2003-04. The personnel with the skill sets needed for some roles have been hard to staff and some of the 40 people on the DLN team have other secondary duties. As well, technology obstacles have delayed e-Learning progress. Despite numerous challenges, the DLN team has displayed a sound knowledge of military matters and a strong passion to commit the extensive time required for the project, resulting in the following successes:

- Launched the Learning Management System in May 2003;

- Opened six LCCs accessible by more than 8,000 military and civilian personnel;

- Operated a DLN Test Lab, which is in the process of becoming an international partner with the Advanced Distributed Learning (ADL) Group in Washington, D.C. for the development of SCORM standards for e-Learning;

- Launched the DLN Website February 2003; and

- Created Centres of Excellence for Distributed Learning and related Working Groups.

Project Delays Slowed E-Learning Progress—A project office was formed upon the creation of the DLN in 2001. Approval and L1 funding was provided to conduct a PoC aimed at evaluating a prototype design for the DLN. The intent of the PoC is to define and validate the full requirements for the infrastructure to support the DLN delivery and management of e-Learning activities. A major activity of the PoC is to test and trial the LMS to further define and validate the functionality required for the full implementation and to prepare a Statement of Requirements (SOR). The proposed schedule was to develop the SOR by 2005 and target for a complete e-Learning solution to be implemented by 2006-07, as reflected below. Project close-out is scheduled for 2009.

PoC	SOR	Procurement	Implementation	End State
2003	2004	2005	2006	2007

The DLN team adopted the PoC development strategy in 2002, using the LMS supplied by Sun Microsystems Inc. The PoC was intended to run from April 2002 to April 2004, in preparation for the Synopsis Sheet (Preliminary Project Approval) (SS (PPA)). The phased PoC project approach was formally endorsed by the SRB in February 2003, with a PoC termination scheduled in September 2004.

The review team's assessment is that the DLN project was initiated without a comprehensive project management methodology and that roles and responsibilities did not appear to be clearly understood by all. Project management was based on a dual chain of command by ADM(HR-Mil) and ADM(HR-Civ). Joint sponsorship and management offers a unique advantage, but also resulted in early operational project challenges. Owing to the complexity and magnitude of the project, milestones were not correctly defined. In addition, the LMS was delayed by 13 months due to unexpected events, such as the buy-out of the original LMS vendor.

The DLN project adopted the standard DMS approval process upon amalgamation of the joint military and civilian project. The DLN project is now following a tailored, phased approach, in accordance with the DND/CF DMS manual. In addition, during our review, a new project management structure was implemented in May 2003 with the intent to improve the reporting structure within the chain of command.

The DLN project team is in the process of completing a draft SOR, and a Joint Capability Requirement Board (JCRB) was scheduled for June 2004. A proposal was also to be presented in June to the PMB for Preliminary Project Approval to obtain ……………………………… for the DLN project over a five-year period to April 2009.

Severed under Section 21 of the AIA Advice, etc.

Current E-Learning Does Not Meet User Requirements— The DLN PoC is currently a partial solution and does not meet the stated requirements of the MAs. Since the inception of the DLN initiative, technology has continued to evolve at a rapidly increasing rate. The PoC as implemented provides support for web-based course delivery, course management, and registration; that is only a subset of the system functions that MAs say they need well before 2006-07. In contrast, MAs are seeking course-authoring capability, learner profiles, learning pathways, learner histories, course delivery, course evaluations, virtual classroom and online collaboration tools. As a result there is a gap between what is being delivered by the PoC today and what the MAs state they need now. Pressure on MAs to increase training capacity and provide new learning options has continued to grow. In response, the MAs have moved to implement other e-Learning options that they believe will meet their requirements more quickly.

At the same time, the Department is facing technology infrastructure challenges that limit how quickly the DLN project and MAs can progress. The DLN PoC has surfaced technology obstacles that prevent access for many learners to the e-Learning network.

Interim Solution Required for Full E-Learning Solution— A further challenge to the PoC is that there will be a gap between the end of the PoC test phase in 2004 and the launch of the final LMS solution scheduled for 2007. The DLN team has begun to address this transition requirement by requesting funding for a bridging contract to allow staff to complete the PoC and SOR, and implement a suitable system for at least the next few years. An interim solution is critical for MAs and they have agreed to participate in a Working Group to examine options. However, MAs have expressed concern that an
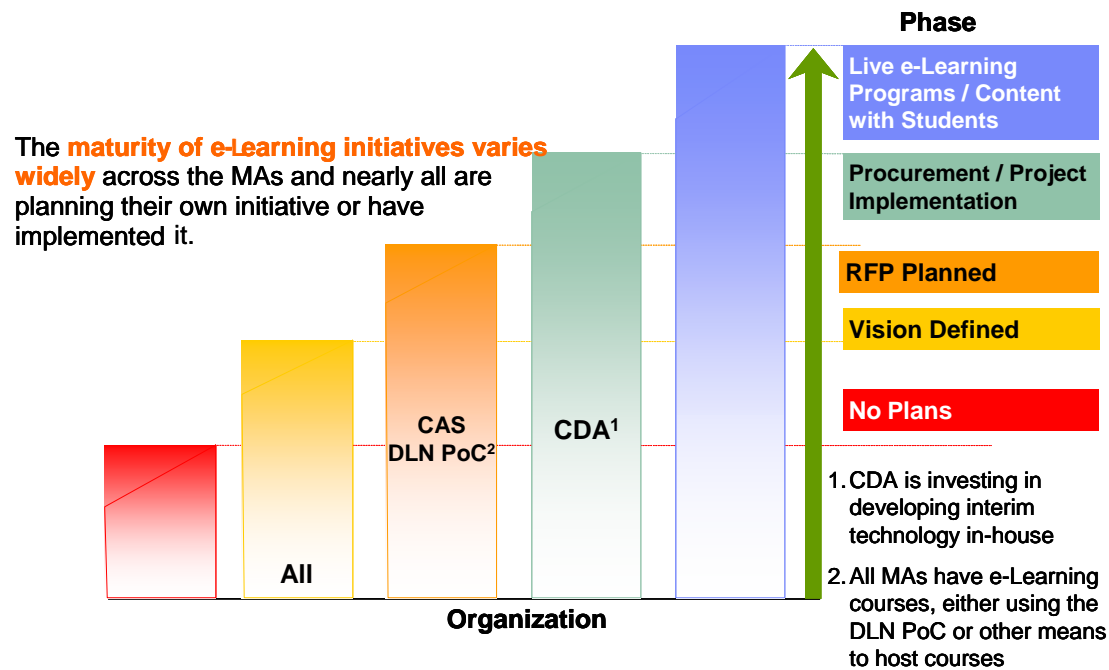
interim solution may not satisfy the collective needs and may become the end-state by default. MAs are also concerned about whether the interim solution will be able to host existing courses and allow for conversion to the end-state solution, so that money already spent on development is not wasted.

Effective Governance Mechanism is Lacking—As user requirements changed over the past years there has not been an effective governance mechanism for modifying the functional specifications of the proposed PoC approach in response to MA needs. The DLN team has a proposed governance structure for the DLN, but does not have the authority to provide governance to MAs, nor are the MAs able to hold the DLN team fully accountable for meeting their changing requirements. Decision-making responsibility for the priorities and direction of e-Learning are distributed across the DND/CF. The DND/CF governance process has not been effective to maintain a corporate-level e-Learning initiative and respond to the horizontal challenges across MAs and potentially other L1s. No single L1 has sufficient authority or a mandate to stop the acquisition of independent LMS systems. This situation contributes to the pursuit of multiple e-Learning initiatives across the DND/CF as stakeholders seek to obtain the functionality, which is needed sooner rather than later, to respond to pressures in their environments. As of the fourth SRB for the DLN project held in April 2004, the governance of the DLN was still under review. There was no definite governance structure for the DLN project at the time, other than joint sponsorship for the DLN project by ADM(HR-Mil) and ADM(HR-Civ).

The greater the investment made by the MAs in their own systems, the higher the risk that they will be reluctant to migrate to a centralized platform downstream, especially if the transition involves significant investment in reworking course content or training users. Based on lessons learned from other organizations that have implemented e-Learning systems, the independent parallel initiatives being implemented by MAs are working against the success of the DND/CF investment in e-Learning. Based on trends observed to date, a coordinated approach by MAs is required to avoid parallel initiatives that could result in duplication.

Despite the individual current initiatives and the level of ongoing and/or planned investment activity in the DND/CF, few systems are yet fully operational and supporting large numbers of students, as illustrated in the diagram on the following page.

Phase

The **maturity of e-Learning initiatives varies widely** across the MAs and nearly all are planning their own initiative or have implemented it.

CAS	
DLN PoC[2]	
CDA[1]	

All

Organization

Live e-Learning Programs / Content with Students

Procurement / Project Implementation

RFP Planned

Vision Defined

No Plans

1. CDA is investing in developing interim technology in-house

2. All MAs have e-Learning courses, either using the DLN PoC or other means to host courses

Change Management Strategy Requires Expansion—The importance of addressing the attitudinal and behavioural changes that are required to implement and sustain e-Learning in any organization cannot be underestimated. The DLN project office recognized that the potential of e-Learning will result in a corporate culture change to adopt new ways of thinking about the way training and education is developed and conducted. At the time of our review, the DLN project office had:

- Developed a change management strategy in draft form to assist the Department through the transition process that will be necessary to build buy-in for the DLN to succeed; and

- Identified change strategy targets as Communications, Communities of Practice, Costing/Funding and Accountability, Needs Analysis, and Policy and Strategy.

The review team emphasizes the need to add IM as an additional change strategy target. IM is critical to e-Learning and action for change in this area needs to be identified early in the process to address issues such as bandwidth and network compatibility. The DLN team is currently facing infrastructure obstacles that impact the ability to provide e-Learning to the Department. A comprehensive change approach will assist in eliminating organizational boundaries that can prohibit success of e-Learning.

Best Practices and Trends—The chart below compares the overall DND/CF e-Learning initiative to other militaries and organizations researched for this review. For purposes of comparison, the Department is at the stage of planning for a Request For Proposal (RFP) for the learning management system, with each MA running some e-Learning courses.

Best practice organizations place responsibility for their e-Learning programs with units that have the authority to drive change and establish decision-making processes that enable stakeholders to set or change direction on critical decisions as needed during the course of a project. This is particularly important when a technology project involves a multi-year timeline because technology evolves so rapidly.

The way in which best practice organizations handle governance for department-wide initiatives varies widely, but key characteristics include the following:

- There is a visible champion at the top who continually supports the importance of the program for the broader mission, and who assists with building buy-in across the organization and removing impediments to success; and

- In lieu of policies that "mandate" compliance with a centralized vision or approach, there is a well-defined governance and decision-making process. Governance may consist of multiple committees that involve key stakeholders from inside and outside the organizations such as a Board of Trustees, a Steering Committee, and a Project Management Team. A possible sample governance model is illustrated in Annex C.

- The **maturity of e-Learning initiatives varies widely** but those with strong champions, centralized platforms from commercial providers, and available content are furthest along

- **Australia, Organization A, and U.K. MoD** are poised to grow rapidly as infrastructure takes shape

- Organization B **lacks support at the top and has multiple LMS initiatives**

Phase

Live e-Learning Programs / Content with Students

Procurement / Project Implementation

RFP Planned

Vision Defined

No Plans / Retrenchment

DND/CF

Org B   All   Australia Org A U.K. MoD   Cisco CTC Org C U.S. Navy

Organization

Note: Organizations A, B and C are organizations within the United States Department of Defense.

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BEST PRACTICES AND TRENDS

There is evidence among the organizations researched that large-scale, learning portals can be implemented within 6 to 24 months.

Organization C program is focussed on providing access to over 20 educational institutions via one consolidated web portal. The vision was promulgated and actively supported by a head of the military organization. The initiative was stood-up in six months with enough functionality to register 10,000 soldiers, then enhanced over a 12-month period to provide services to 30,000 enlisted soldiers with a longer-term goal of supporting 80,000. The impetus behind the creation of the program was to address recruitment and retention challenges. The program is a $500-million contract awarded over five years with tuition reimbursement accounting for 90 percent of the funding. (f)

U.S. Navy launched a live, operating system in less than 24 months and has registered 300,000 users. (g)

Lessons Learned: An important lesson in decentralized implementation

Organization B was established in 2000, which merged existing activities under a centralized umbrella. One of its objectives was to establish a single organization with the authority and resources to manage advanced distributed learning programs organization-wide. Despite this intent, the initiative lacked authority from senior sponsorship, and the organization has since experienced a proliferation of individual systems, which led to fragmentation and inefficient use of resources. Despite uncoordinated pockets of success, Organization B has struggled to make progress towards the implementation of an enterprise-wide e-Learning model. The organization is developing a business case and implementation plan for advanced distributed learning, recognizing the need for a comprehensive vision and strategy for e-Learning. (h)

Reference sources for (f) to (h) are contained in <u>Annex E</u>.

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Recommendations

ADM(HR-Mil) **OCI** – MAs	Establish a well-defined governance and accountability framework for evolving the e-Learning system specifications and technology strategies. Governance should include a senior advocate for e-Learning from each MA, who will formally assist with promoting e-Learning, implementing DLN policies, finding working solutions to horizontal issues and removing impediments to success. An integrated framework will need to reflect the military and civilian differences at both the national and base/wing level.
	As part of the accountability framework, formalize a collaborative working relationship between the DLN project office and MAs to progress development of a central technology platform linked to a common vision for e-Learning that will meet the operational needs of the DND/CF and avoid duplication of effort.
	Develop a transition plan to coordinate the interim period from completion of the DLN Proof of Concept to the launch of the selected e-Learning solution. Identify roles and responsibilities and critical requirements during the period, which should include information management stakeholders in the change process.

LEARNER OUTCOMES AND RETURN ON INVESTMENT

Issue

An overarching plan with designated funding for the conversion and development of e-Learning courses has not been developed. Without a commitment to a coordinated plan, the DLN courseware will be insufficient to achieve a critical mass, and the corporate learning investment will be diminished.

Limited Electronic Courseware—A critical success factor for the PoC and the DLN is quality courseware provided by MAs. MAs have sole responsibility for carrying out training needs analysis, design and development of e-Learning courseware for the DLN. Each MA has designed a few courses and is in the process of identifying courses that might lend themselves to an e-Learning format. For example, the Navy intends to convert courses when a rigorous business case or enhanced operational capability supports the investment in course conversion. However, an overarching courseware strategy that reflects MA courseware intentions, with designated funding for the development of e-Learning courses for the centralized PoC or for most MA initiatives has not been developed. A courseware strategy needs to be created that articulates how the MAs intend to utilize the DLN to ensure that the investment is warranted.

The PoC plan was to have at least ten courses available during the roll-out for testing purposes to an available CF target population in the thousands. At the time of our review, the PoC hosted seven courses in the first six months, with just over 100 users consisting of learners and administrators. There are no more than a few dozen courses on all the MA systems

combined, even though many hundreds of courses offer potential for conversion to some extent. The PoC did trial different types of courses, and used a range of e-Learning applications.

Some examples of successful applications of courseware to date include:

- The Army Transition Command and Staff Course, combining traditional classroom instruction with on-line work;

- The Naval Environment Training Program (NETP), an instructor-led e-Learning program; and

- The Air Maintenance Policy Level 2 course, currently in production, planned to be a self-paced on-line scenario-based e-Learning approach with an after course performance support strategy.

Lack of Funds and Development Expertise—The DLN project does not make provision for courseware development funding. These funds are expected to be identified and secured through the L1 business planning process. The review team found that MAs have not committed funds to support courses for the DLN. Also, most MAs lack people with expertise to develop courses suitable for electronic delivery, and do not have resources available to provide subject matter expertise to guide external courseware development. The DLN project office has issued courseware guidelines, but has discovered that there is a general lack of knowledge of e-Learning development principles. With the exception of the courses developed by the Canadian Forces Training and Development Centre (CFTDC), which has an intended role[8] as the Centre of

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[8] DLN PoC Project Implementation Plan V0.4 26 Mar 03.

Excellence for national course development, many of the e-Learning courses are not sufficiently advanced to enable learner "interaction". Many of the courses available electronically use traditional learning methodologies and are considered "page turners" where learners simply read the material. MAs want to retain these courses in the absence of time and resources to improve them and to build web-interactivity. Although the quality of some courses can be improved, the current e-Learning courses are contributing to reduce the heavy demand on instructor time created by the high operational tempo.

The traditional CF training approach relies on members with subject matter expertise to deliver training. Given the emphasis of the instructor selection criteria on subject matter expertise, instructors may have limited skills in adult learning in some cases. This results in more lead time required to prepare staff to deliver e-Learning courses.

Technology Challenges Impact Courseware Delivery—A stated goal for most MAs is to be able to share components of course content with each other and to obtain relevant course content from external organizations. E-Learning technology provides the ability to share content, by separating traditional courses into meaningful electronic learning components, or units of instruction. These learning components can be used by others to build customized courses quickly, reduce development costs and maintain quality control over courseware.

> The bottom line is that good courseware is the cornerstone of a successful e-Learning program.
>
> Source: Based on Gartner Research 2003

The DLN Test Lab is experiencing many challenges with the technology that will support courseware development, and is working on overcoming the outstanding issues during the PoC. The DLN PoC does not provide course-authoring tools, but has proposed a Courseware Working Group in an attempt to avoid duplication and maximize sharing of development opportunities.

An additional challenge is to overcome the departmental technology infrastructure obstacles that are currently limiting learner access to e-Learning. Maintaining and providing quality courseware by MAs is dependent on the availability of supporting technology for learning.

Policy Guidance is Needed—The Canadian Forces Individual Training and Education System (CFITES) provides guidance on military training and education, but it does not address specifically the e-Learning environment, and guidance may be needed. The CFITES validation process, which is conducted to verify that graduates are prepared to perform operational tasks and goals as intended, is not uniformly executed for all training activities, regardless of the method of delivery. If e-Learning is not regularly validated, changes will not be made to increase training effectiveness and less than satisfactory outcomes may go undetected.

Performance Measurement is Lacking—Performance measures for monitoring return on investment associated with e-Learning are not defined and MAs do not have costing systems that easily allow for the collection of data needed to evaluate the cost/benefit of their activities. The Air Force has identified that performance improvement will be a prime objective of e-Learning interventions planned for development.

The driving force behind the business case for e-Learning, or DL, has generally been the need to shorten the length of training time to achieve the operational readiness of personnel. The SRB for the DLN project held in April 2004 endorsed the Options Analysis Report (OAR), but options were not costed. Development of the DLN has not been based on a commitment to achieve cost savings nor to meet a specific ROI target for the DND/CF. The DLN intends to develop an action plan to address this.

Although return on investment is not tracked, MAs have identified the high-level outcomes they seek, as follows:

- Improved Quality of Life for personnel with less time away from home and family;

- Reduced instructor-led training time;

- Cost-savings over face-to-face instruction;

- Improved access to learning options and resources; and

- More learning options and sharing among communities of interest.

Severed under Section 21 of the AIA Advice, etc.

The proposed investment ………………….. is significant. For an investment of this magnitude, it is critical to have key performance measures and establish targets for the benefits and cost savings to determine if the intended outcomes are being achieved.

Need to Expand E-Learning Courseware—The development of quality courses was identified by the DLN project office as having medium risk in the Capability Initiatives Database. The DLN project office is dependent on MAs for authoring courseware, but MAs may not have an incentive to develop courses for the PoC as they have invested in and host courses on their own systems. With current limited MA funding allocated to course development, it is highly likely that the PoC will not obtain sufficient numbers of courses to test. The DLN team's ability to meet MA timelines and operational needs will determine if MAs will utilize the DLN, or feel compelled to continue to pursue their independent initiatives.

There is risk that the PoC approach may not achieve its intended success because there are few e-Learning courses up and running and few learners have been engaged during the test phase. The approach of working in isolation to develop courseware can result in duplicating expertise and development effort. The power of technology provides an opportunity to break down the traditional "silo" approach of working separately, and begin working jointly where appropriate, to deliver IT&E. All three Environments and all MAs can share, or re-use, components of content, where appropriate, to support learning for one Defence Team. For example, e-Learning can be an efficient learning technology to adjust for future changes that will impact IT&E, such as the Military Occupational Structure Analysis, Redesign & Tailoring (MOSART) project. Full MA participation is critical for success of the PoC and ultimate success of the DLN.

If a coordinated courseware strategy is not developed with full MA participation, the implementation of e-Learning and the corporate learning investment may not realize the potential benefits. Without established performance measures and targets, the DND/CF will not be able to determine if cost savings are realized. The PoC is continuing into the Definition Phase and will provide the opportunity for additional data collection and analysis from the interim LMS solution.

Best Practices and Trends—The most successful organizations that have applied e-Learning are those with the highest usage rates. They have focused first on providing users with a large range of learning options and stress the importance of courseware development. They have put a sizable number of e-Learning courses online, either acquired from third parties or through custom development, and they have made the technology readily accessible to learners and "easy" to support or administer centrally. They are not focused first on technology. These organizations include the U.S. Navy, Cisco, and Central Texas College, as reflected on the following page.

There is variation among all of the organizations researched in the area of return on investment, an area of challenge for most organizations that were researched. The U.K. Ministry of Defence has established concrete measures by identifying a target to convert appropriate training to e-Learning.

BEST PRACTICES AND TRENDS

Best-practice organizations offer lessons learned on course development

Organization A implemented a distributed learning system. Lessons learned: courses generally take longer to field and develop than originally envisioned. (i)

U.S. Navy recognized that content development is the biggest challenge and a major component of program success. U.S. Navy determined that blended learning resulted in optimal learning and that a solution that fully supported that requirement with little to no additional work was key. Another critical consideration for best practice course development was the ability to reuse content – in other courses and in other delivery formats (such as user guides, instructor presentations, on PDAs, etc.) while minimizing maintenance. (j)

Cisco Systems identified that a major barrier is coming up with the upfront resources to develop and implement e-Learning tools, training modules, and content. (k)

Central Texas College (CTC) is one of the largest providers of web-enabled education to the U.S. Army, Navy and Marines. CTC focuses on pragmatic technology strategies and learner outcomes. They put "delivery" first and make course availability the number one priority. They recognized that the biggest challenge is not the scalability of technology, but the availability of content and instructors who know how to use the technology to really teach. (l)

Performance Targets and Return on Investment

U.K. Ministry of Defence proposed a target to convert 80 percent of appropriate training courses to include a minimum of 25 percent e-Learning within five years. (m)

Cisco Systems has achieved a 40 to 60 percent cost savings through the increased use of e-Learning applications by way of more efficient, convenient and effective knowledge transfer. (n)

Organization C has demonstrated a 14 percent annual increases in re-enlistment activity. (o)

Reference sources for (i) to (o) are contained in <u>Annex E</u>.

Recommendations

Severed under Section 21 of the AIA Advice, etc.	**ADM(HR-Mil)** **OCI** – MAs	Develop a coordinated courseware strategy and implementation plan to provide an inventory of all courses that need conversion or development to support the proposed ……………….. investment. Obtain full MA commitment to identify course priorities and content needs that can be addressed collectively or independently to justify the corporate learning investment. Provide MAs with effective course authoring tools to support more rapid courseware development. Build alliances with partners within the DND/CF and externally to leverage resources for course development, realize economies of scale and eliminate duplication of effort. Review CFITES and provide appropriate guidance to address the e-Learning environment. Create validation options electronically that measure the achievement of training outcomes. Implement a performance measurement and a costing system to monitor return on investment, benefits and savings associated with e-Learning, as well as track both quantitative and qualitative measurement indicators. A costing system should be linked to the IT&E Costing Model.

INFRASTRUCTURE AND SUPPORT SERVICES

Issue

The IM infrastructure that supports the DLN PoC is not accessible to the large majority of users because of security and firewall issues, nor is it integrated with other corporate systems at this time. These challenges impede progress of e-Learning within the DND/CF.

E-Learning is not Widely Accessible—The intent of the DLN is to provide access to learning for all employees/members within the DND/CF[9]. The DLN team has overcome many infrastructure issues, but significant challenges remain that threaten success of the departmental initiative. Infrastructure can be a "show stopper" for the DLN as access is currently not available to many learners.

The DLN PoC had planned to use the General Purpose Network (GPNet) to provide access to e-Learning. The GPNet is a network used by government agencies, but only a minority (just over 2000) of the DND/CF employees/members have access to this network based on a defined business need. Most CF bases cannot access GPNet, making access to e-Learning extremely limited in the Department.

Access to the DLN e-Learning is provided through the Internet. Members can access the Internet from the DWAN while at work. However, e-Learning is not an approved application for the DWAN due to limited bandwidth and the firewall that prohibits access to interactive learning applications. Only the most basic courses consisting of simple images and text can be accessed from a work station.

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[9] DLN Project Charter: Project Mandate.

Learners who cannot access the GPNet can engage in e-Learning using a personal home computer if they have a web browser and connection to the Internet. MAs have indicated that the number of members who have access to home computers varies significantly. For example, CFSTG has stated that 40 percent of their target population may not have access to computers.

The DLN team intended to loan laptops to learners who do not have a personal computer or Internet connection. However, in August 2003, the GPNet dial-up was discontinued for security and control reasons. As a result, the only way for learners to participate in e-Learning is to connect to the DLN from home, or have office access to the GPNet.

The current infrastructure cannot support the departmental vision for learning "anywhere, anytime, just-in-time". Limited testing using the DLN during operational deployment is planned, but access will not be available to ships and operational theatres. Satellite connections are costly, so e-Learning will be limited in operational theatres. The DLN team is replicating the DWAN environment in the test lab with the intent of demonstrating successful running of courses, but research will take time. ADM(IM) representatives are currently working with the DLN team to find solutions to the many infrastructure barriers, and progress is slow.

Integration Between Corporate Systems is Lacking—The DLN initiative also requires the transfer of student and course completion information between the LMS and the DND/CF Human Resource Management System (HRMS). Due to ADM(IM) security concerns, no interface between the two systems will be allowed during the PoC phase. The LMS will keep historical data, but the data will need to be manually keyed from the DLN LMS to HRMS (PeopleSoft application).

Next-generation e-Learning infrastructures will no longer be confined within the firewalls of an organization. Instead, they will bridge Application Service Providers (ASPs) to provide LMS services, hosting facilities, content suppliers, partners, and customers. The era of integration and interoperability has only just begun.

Source: American Society for Training & Development

Governance Structure Has Not Been Determined—Project management and governance for e-Learning in the steady state have not yet been determined. …………………………… …………………………………………………………………….. …………………………………………………………………….. …………………………………………………………………….. ……………….. In addition, ongoing funding will be required to support the vision for the DLN. The DLN initiative is proving to be a large and complex project with several major components, consisting of:

- Human Resources (Mil and Civ): learning, policy, and the training and education framework;

- Infrastructure and Environment (IE): construction or renovation for the LCCs;

- Information Management (IM/IT): providing the electronic backbone and ongoing maintenance to support e-Learning in the Department; and

- Science and Technology for research and development needed; and other components such as Materiel, and Policy.

Technology Support is not Sufficient – The technology component is significant and the IM Group support of this project is critical to the success of continuous learning in the DND/CF. The information management infrastructure must be in place in order to advance e-Learning. Under DMC sponsorship, the IM Strategic Review (IMSR) resulted in the principal decision to make the full transition to an enterprise model and move away from a multiple-systems approach. The DLN is intended to be a departmental system and the need for ongoing technical support will be an enterprise requirement.

The DLN team is working on the requirements analysis during the PoC and has briefed the Information Management Requirements Committee (IMRC) on one occasion. However, ongoing IM involvement in the development of the DLN is essential to ensure that corporate visibility is maintained for the technology requirements. Roles and responsibilities need to be formalized to ensure that business requirements drive learning and that technology provides the support needed to realize the vision for continuous learning in the DND/CF.

The DLN project office Risk Assessment contained in the SS(ID) rendered the project to be low to medium risk, and identified that the technological risks were not yet fully understood. There is a realization now that the technology component is significant and is a critical success factor for e-Learning.

There is a risk that MAs will continue to develop their own systems until a more mature system is available in 2006-07 and the firewall issues are addressed. With the numerous infrastructure challenges facing the DLN team and the magnitude of the project, the initiative is also at risk of not meeting the implementation timeline. As a consequence, the DND/CF may have to spend more money and time downstream on corrective measures than it would today to

realize the benefits of a strategic rationalized department-wide approach. The challenges facing military e-Learning initiatives identifies the need to share lessons learned between the DLN team and all MAs, as well as working closely with the ADM(IM) to successfully implement a departmental e-Learning network.

Best Practices and Trends—Research from Gartner 2003 highlights that e-Learning is moving to open standards and sharing of information. Open standards support technical specifications that will facilitate online learning activities, such as locating and using educational content from an external organization, tracking learner progress, reporting learner performance, and exchanging student records between administrative systems.

However, for most militaries, overcoming firewalls and providing secure networks is an ongoing challenge. The infrastructure issues will require collaborative working relationships with IM groups and business users to find solutions for continuous learning to be widely available throughout the Department. A Comparison of Current Status for E-Learning of the organizations researched for this review is provided in Annex D.

Key Insights on Implementation Challenges

APQC 2002 Consortium Learning Forum Best Practice Report identified:

- Relationships with other organizational units, such as IT, HR, etc., across the functions are critical. Working closely with these groups helps reduce errors and redundancies and integrates e-Learning into the corporate culture much faster than going it alone.

- Forge a strong partnership with IT staff from beginning to end.

- Don't let the technology cloud the fact that learning drives business results.

- Assessments of available internal and external technologies are crucial. Understanding what hardware and software the organization's infrastructure will support requires an internal assessment.

- A supportive learning environment is critical. All the tools and resources in the world won't help if employees are not given the human and technological support needed to be successful.

- Implementation always takes longer than planned. Continue to educate the organization about e-Learning from senior management to general employees to facilitate the adoption process. (p)

Reference source for (p) is contained in <u>Annex E</u>.

Recommendation

ADM(HR-Mil) **OCI** – ADM(HR-Civ) and ADM(IM)	Develop a strategy to increase user accessibility during the DLN Proof of Concept, address firewall issues and integrate the DLN with other enterprise systems. Provide sufficient IM/IT human resources with the appropriate skills and knowledge to resolve technology challenges for the e-Learning project. Create a network communications backbone that provides access to e-Learning applications via the Internet and DWAN.

ANNEX A—SUMMARY OF RECOMMENDATIONS

Recommendations are in the order as presented in this report[10].	**OPI** ADM (HR-Mil)	**OCI** ADM (HR-Civ)	**OCI** MAs	**OCI** ADM (IM)
1. Develop a clear DND/CF vision and objectives for e-Learning that is part of the broader learning strategy for IT&E and that is supported by all MA senior leadership. Require that a central shared technology platform be adhered to by all MAs and L1s within the DND/CF, with the provision that a business case be developed for any unique operational needs that may justify investment in a stand-alone system.	●		●	●
2. Establish a well-defined governance and accountability framework for evolving the e-Learning system specifications and technology strategies. Governance should include a senior advocate for e-Learning from each MA, who will formally assist with promoting e-Learning, implementing DLN policies, finding working solutions to horizontal issues and removing impediments to success. An integrated framework will need to reflect the military and civilian differences at both the national and base/wing level.	●		●	
3. As part of the accountability framework, formalize a collaborative working relationship between the DLN project office and MAs to progress development of a central technology platform linked to a common vision for e-Learning that will meet the operational needs of the DND/CF and avoid duplication of effort.	●		●	
4. Develop a transition plan to coordinate the interim period from completion of the DLN Proof of Concept to the launch of the selected e-Learning solution. Identify roles and responsibilities and critical requirements during the period, which should include information management stakeholders in the change process.	●		●	

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[10] Recommendations that affect the DLN will need to be coordinated with ADM(HR-Civ).

ANNEX A

Recommendations are in the order as presented in this report[11].		OPI ADM (HR-Mil)	OCI ADM (HR-Civ)	OCI MAs	OCI ADM (IM)
5.	Develop a coordinated courseware strategy and implementation plan to provide an inventory of all courses that need conversion or development to support the proposed ………..……… investment. Obtain full MA commitment to identify course priorities and content needs that can be addressed collectively or independently to justify the corporate learning investment. Provide MAs with effective course authoring tools to support more rapid courseware development.	●		●	
6.	Build alliances with partners within the DND/CF and externally to leverage resources for course development, realize economies of scale and eliminate duplication of effort.	●		●	
7.	Review CFITES and provide appropriate guidance to address the e-Learning environment. Create validation options electronically that measure the achievement of training outcomes.	●			
8.	Implement a performance measurement and a costing system to monitor return on investment, benefits and savings associated with e-Learning, as well as track both quantitative and qualitative measurement indicators. A costing system should be linked to the IT&E Costing Model.	●			
9.	Develop a strategy to increase user accessibility during the DLN Proof of Concept, address firewall issues and integrate the DLN with other enterprise systems. Provide sufficient IM/IT human resources with the appropriate skills and knowledge to resolve technology challenges for the e-Learning project. Create a network communications backbone that provides access to e-Learning applications via the Internet and DWAN.	●	●		●

(Left margin, beside row 5: Severed under Section 21 of the AIA Advice, etc.)

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[11] Recommendations that affect the DLN will need to be coordinated with ADM(HR-Civ).

ANNEX B—SUMMARY OF E-LEARNING INITIATIVES

MA	DLN Support	Infrastructure and Plans	Estimated Spending on E-Learning Technology FY 2003-04
CDA	Support "federated system of systems approach" with a central agent to integrate separate systems. Do not support central DLN.	Using WebCT[12] and a few web-enabled courses including the Intermediate Leadership Qualification (ILQ). Developing interim technology tools to track learner pathways, histories, and profiles.	Developing technology using in-house staff, so an accurate expenditure cannot be determined. Two or more FTEs may be devoted to effort. Assume $300,000 for full costs.
CDA-RMC	Level 3 reporting to CDA.	Using WebCT and a few web-enabled courses.	WebCT licensing costs, hosting costs, and staff time associated with software maintenance and course development. Assume …..…….. for licensing fees and full labour costs.
CFSTG	Support the DLN Project as a central DND/CF solution.	Using WebCT for five developed courses, six in development, and plans for 19 online courses in the short-term. Focus is on mandated training and intent is to integrate DL in course design.	WebCT license, staff labour devoted to developing content and supporting systems. Assume ……..….. for full labour costs.
CLS	Support the DLN Project as a central DND/CF solution.	Used ………... but it did not work for the Army. Purchased an LMS for Staff College. Committed to DL with a small, in-house e-Learning capability supported by four people. Developed four courses, with two requiring change. Developed Army DL policy and reviewed Qualification Standards to identify DL course components. Plans to develop eight courses with the intent of using DLN.	Budget of ……..… per year for e-Learning infrastructure and course development.

Severed under Section 20(1)(c)(d) of the AIA Third Party Information

Severed under Section 20(1)(c)(d) of the AIA Third Party Information

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[12] WebCT, Theorix, Lotus Learning Space (IBM), KMSS and Axia are e-Learning solution providers.

ANNEX B

MA	DLN Support	Infrastructure and Plans	Estimated Spending on E-Learning Technology FY 2003-04	
CAS	Committed to Air Force Blended E-Learning Project. Support central LMS where it will complement CAS.	Planning to undertake large-scale initiative based on Human Performance Technology, that will include training, performance and blended learning. The initiative includes courses. Will use CFITES, but portal knowledge management is crucial. Plan to use DLN LCCs and participate with at least one course.	$10 million planned for fiscal years 2003-04 to 2005-06. Have gone to SRB to identify funding. Fiscal year 2003-04 planned funding was $1, 670,000.	
CMS	Support the DLN Project as a central DND/CF solution.	Using Lotus LearningSpace LMS to deliver operationally required training. Three courses are part PoC activity. Plan to deliver some training on the DLN and online examinations, with greatest emphasis on training management functionality and self-development opportunities while sailors are at sea.	Lotus LearningSpace used. KMSS licence and operation. Assume ………... per year.	Severed under Section 20(1)(c)(d) of the AIA Third Party Information
CFMG	Support the DLN Project as a central DND/CF solution.	Planning to embark on a Learning Portal initiative to maintain clinical skills. Have access to Axia website for exploration. DLN project office is sponsoring Needs Analysis for the initiative. Critical to reach people who are deployed and to manage content for competency maintenance.	To be determined, but around …………. hoped for.	
CFPM	Support the DLN Project as a central DND/CF solution.	Developed security course for DLN for military and civilian learners. Assessed in-house courses will range from 30-70 percent for DL portions on the DLN.	Leveraging DLN.	Severed under Section 20(1)(c)(d) of the AIA Third Party Information
DLN	Support the DLN Project as a central DND/CF solution.	Launched Sun Enterprise Learning Platform for the PoC, long-term strategy to be determined during PoC.	………....... for technology platform component. Excludes ADM(HR-Civ) funding.	
Total Planned Cost for Fiscal Year 2003-04			**$4.5 million for DLN and $4.67 for Combined MAs**	

ANNEX C—POSSIBLE SAMPLE GOVERNANCE MODEL FOR E-LEARNING

The possible sample governance model provides activities, work steps, procedures, outputs and the activity owner for "at-a-glance" comprehension. The possible governance model would be useful for managing e-Learning within the DND/CF to optimize processes and systems across functions or departmental boundaries rather than within silos.

Possible Sample Governance Model

	Strategic Planning			Tactical Planning			Project Planning		
Work Steps	Scan Environment	Adjust Vision	Generate Project Ideas	Conduct Assessments	Make Decisions	Plan for Implementation	Manage Projects	Review Performance
Procedures	Internal • Stakeholders • Strategic Plans • Risks • Inspiration • Performance External • Peers • Technology • Regulations	• Validate Perceptions • Build Consensus • Obtain Buy-In	• Brainstorm Projects • Define Scope	Analyse • Requirements • Resources • Options • Risks • Build vs. Buy Prioritize • Costs/Benefits • Urgency • Importance	• Approve Priorities • Approve Resources • Consider Standards	• Develop Plans • Identify Deadlines • Identify Milestones • Budget Resources	• Redesign Processes • Implement Systems • Monthly Reports • Quarterly Reports • Corrective Actions	Review • Qualitative Assessment • Quantitative Assessment
				Review Performance				
Outputs	Issues & Trends	High Level Ideas	Proposals	Recommendations	Decisions	Project Plans	Implementation	Feedback
Owner								

Source: IBM

ANNEX D—COMPARISON OF CURRENT STATUS FOR E-LEARNING

United Kingdom – Ministry of Defence (MoD)			
Objectives/Driving Need	**Program Features & Status**	**Team Size & Program Cost**	**Outcomes/Lessons Learned**
• The *Modernising Defence Training Review*[13] concluded that there is a need to exploit new information technologies to support education and training. • The *Review* indicated that e-Learning could provide better support to deployed operations, particularly refresher and more responsive training, to enhance operational effectiveness and provide greater opportunities for career development.	• Program is in the initial stage of development. The *Review* proposed to adopt a progressive strategy for defence-wide e-Learning, including the Reserves. • Initiated the Defence e-Learning Delivery and Management Capability (DELDMC) Project[14]. The aim of the DELDMC is to create a single, coherent and mandated method of delivery and management for e-Learning material across the whole of Defence. • The intention is to support all MoD personnel and reservists. This may be expanded in the longer term to include dependants and veterans. • The U.K. MoD has approximately 218,000 service personnel and 107,000 civilian employees.	• An E-Learning Team has been created for the delivery of e-Learning across Defence. They work in conjunction with the Directorate General Training & Education (DGTE) who is the primary customer. The team is currently involved in the provision of the DELDMC.	• In order to secure the benefits of a defence-wide strategy, a new Director General central Training and Education Organization is proposed. The role of DGTE will be to set overall policy, share best practices and drive through the strategy, demonstrating ownership and building confidence in e-Learning from senior management level down.

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[13] Information has been obtained from Modernising Defence Training Review, Volume 2, Supporting essays.

[14] Information on the Delivery and Management Capability (DELDMC) Project has been obtained from the Ministry of Defence, Defence Logistics Organisation.

ANNEX D

Canada – Department of National Defence (DND/CF)			
Objectives/Driving Need	**Program Features & Status**	**Team Size & Program Cost**	**Outcomes/Lessons Learned**
• There is a need to increase capacity for training across the Canadian Forces to cope with demographic trends, as well as a need to improve access to training and education in order to maintain skill levels and retain personnel.	• Effort has been under way for about six years. • Eight MAs responsible for training, many school houses, multiple e-Learning systems and points of web-based access. There are multiple visions and strategies within commands. The Defence Learning Network (DLN) Project, a central initiative, is currently in the Proof of Concept Phase. • DLN team is developing the PoC in partnership with Sun Microsystems. Other MAs using systems such as Theorix and WebCT. DLN team is planning to issue an RFP once requirements are finalized. • Among the MAs, very few web-enabled courses exist. Within the next year, the DLN team plans to have ten courses available. Currently, there are multiple access points for training programs and even more under development. Information, content, and services are distributed across multiple MAs and sites. • In terms of size, DND includes 60,000 Regular, 20,000 Reserve, and 19,377 Civilian personnel. Initially, the DLN is expected to support upwards of 10,000 personnel but there are very few users at this time.	• DLN is centrally funded and includes a change management group. Each of the eight MAs participates in the DLN project via a Working Group, which meets on an ad hoc basis. • The DLN spending on technology is expected to be approximately $4.5M in the current budget cycle. The total spent across the MAs cannot be determined with accuracy, but was estimated to be at least $4.67M for fiscal year 2003-04.	• Need for a strong sponsor and shared vision. Absence of either contributes to the existence of multiple, uncoordinated e-Learning initiatives across the MAs, and has resulted in stove-piped decision-making and training operations and slow progress of DLN implementation. • Establish priorities and funding for the development of e-Learning content. This is a critical success factor for user adoption. There is not much web-enabled content available and responsibility for developing it resides with the MAs, all of whom have competing priorities. As a result, user adoption lags expectations.

ANNEX D

Australia – Australian Defence Force (ADF)[15]			
Objectives/Driving Need	**Program Features & Status**	**Team Size & Program Cost**	**Outcomes/Lessons Learned**
• The e-Learning system is intended to provide military and civilian staff, particularly those in regional and rural areas, with greater and more flexible access to training and development opportunities.	• Program is in the initial stage of development. • Currently implementing an LMS and LCMS, using ThinQ[16]. • Also providing a virtual library via the Internet to provide access to Defence personnel and their families. • ADF has approximately 51,000 full time and 21,000 reserve members. The e-Learning strategy, to be implemented in phases over the next four years, will provide e-Learning access to more than 91,000 users across the Navy, Army and Air Force, as well as the 11 Defence civilian groups, making it one of the biggest e-Learning system implementations in Australia.	• Size of implementation team cannot be determined at this time because in early stage of development. • $3.0M (Australian funds) was allocated to provide an LMS and LCMS for the e-Learning strategy.	• The Federal Government recognizes the strong link between support services for personnel and Defence capability. • Providing all Defence personnel with access to the latest technology and education opportunities directly contributes to Defence capability.

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[15] All information has been obtained from the website www.defence.gov.au.

[16] ThinQ is an e-Learning solution provider.

ANNEX D

United States Navy – Integrated Learning Environment (ILE)			
Objectives/Driving Need	**Program Features & Status**	**Team Size & Program Cost**	**Outcomes/Lessons Learned**
• 2001 report entitled *"Executive Review of Naval Training"* (ERNT) summarized deficiencies in current organization, processes and systems. • As a result, goals set to improve sailor performance and retention, and the efficiency of training while maintaining or improving effectiveness. • The ILE strategy brings together the program management, functional, and technical integration of processes, products, and people involved in capturing, organizing, designing, validating, and deploying instructional and technical content to the users in the right format and place at the time of need.	• Program Office was established in April 2001, and LMS was deployed (rolled out) within 24 months. • The vision was to stand up an enterprise solution for the entire Navy, but individual training commands are free to customize the solution to meet their unique requirements if they can demonstrate sufficient justification. • Access is intended to be any place, anywhere, any time via a Web interface and they are piloting deployment on ships. • ThinQ was selected for the LMS after a false start; Outstart was selected for the Learning Content Management System (LCMS). Customization to the LMS was minimized and legacy systems are still used to register students for residential courses. The LMS is not used to manage the accession process. • The LMS is deployed regionally and there are more than 2,000 e-courses; they are still working to develop course content and view this activity as a high priority. • The LCMS is currently integrated with the LMS to enable dynamic delivery of "My Course" to the sailor. • The U.S. Navy is comprised of 55,791 active duty officers, 322,135 active duty enlisted, 152,209 reserves and as of April 30, 2003, there were 184,114 Navy Department Civilian employees.	• The Government Project Management Office was initially staffed by 10 FTEs, but this was not sufficient to manage scope on deadline. They currently have 20 FTEs. • The Annual budget is approximately $11.9M (CDN) for the ThinQ LMS, system maintenance, testers, and content from SkillSoft, etc.	• Return on investment (ROI) measures are identified and include shortened in-residence requirements, expanded education and training opportunities, ability to accommodate changing demographics, availability of proficiency training Navy-wide, and TAD/TDY cost savings. • Lessons Learned: Used an evaluation process to select the most suitable COTS LMS and LCMS products. Developed a plan for full enterprise implementation. • The LCMS, OutStart, is used as the central repository for content management. This will simplify the management and quality control of content created by numerous third-party content developers. • Still need centralized standards for content development and recommend making content development a high and "funded" priority.

ANNEX D

United States Navy – Integrated Learning Environment (ILE) (cont'd)			
Objectives/Driving Need	**Program Features & Status**	**Team Size & Program Cost**	**Outcomes/Lessons Learned**
• Employ the Navy Knowledge Online (NKO) as a portal, ILE will provide access to a Technical Data Repository (TDR), the Learning Content Management System (LCMS), OutStart, the Learning Management System (LMS), ThinQ, and the Navy's Data Warehouse (NTMPS). • The "right user" is a well informed Sailor, Reservist, civilian, dependant, or retiree who has all the required information at their fingertips to access the appropriate content for their objectives and use it in "just-in-time" or "just-for-me" fashion to perform their job, continue to develop in their career continuum, or improve their skills.	• They currently have 189,000 students registered in the LMS. • The ILE contains three major components: Learning Management, Content Development and Management, and Intelligent Delivery Systems. • Content is the most critical component of the ILE. The "right content" is tied to readiness, validated as meeting requirements, and directly linked to authoritative sources with processes in place to ensure updates are quickly realized across the entire system from source material to learning content. • The 2001 Quadrennial Defense Review and Sea Power 21 recognize that transformation of training is a key enabler to achieving the operational goals and mission of Department of Defense (DOD). Defense Planning Guidance mandates a strategic plan for transformation to ensure that networked training capabilities are designed into operational systems and requirements and that distributed learning technologies are applied to training and job performance. The Integrated Learning Environment is Navy's Training and Education (T&E) response to those requirements and will be a key component of Sea Warrior.		

ANNEX D

Central Texas College (CTC)			
Objectives/Driving Need	**Program Features & Status**	**Team Size & Program Cost**	**Outcomes / Lessons Learned**
• CTC's need is to provide access to education for military students.	• CTC's online portal provides worldwide access to college courses and degrees via the web. It currently has in excess of 30,000 enrollments and generates significant revenue for the college. A majority of the students are enlisted military personnel, and systems and services are tailored to their needs. • CTC's aim is to provide access any place, anywhere, any time via a web accessible interface. The strategy at CTC is to keep things simple from a technical perspective and they focus on outcomes (user adoption and success rates). • CTC offers five distance learning delivery systems, which include self-paced, CD-ROM, offline access, standard and hybrid. • Both e-Learning programs are supported by single, integrated learning platforms. CTC utilizes Prometheus[17] as their LMS. CTC was migrating to Blackboard effective summer 2004.	• The Distance Learning team at CTC includes a Director and eight FTEs. However, their model is somewhat decentralized with the e-Learning students being supported by departments campus-wide. CTC's annual amount expenditure on e-Learning operations is approximately $3.2M (CDN) per year for software and people.	• At CTC, ROI is not formally tracked but revenues and expenses are monitored and measurable. CTC is one of the largest education providers to the military and the top school in terms of enrollments in eArmyU due to high quality service levels and acceptance among soldiers. • Lessons Learned: Pay attention to the needs of the target audience (in this case the military learner); keep things simple; and do things quickly to gain the benefits. • CTC found that too much complexity in e-Learning technology can create barriers for their students so they keep their focus on simple interfaces and learner-centric objectives. As a result, they are guided to adopt strategies that are easy to implement and low-cost. Their focus on outcomes has resulted in significant growth.

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[17] Prometheus is an e-Learning solution provider.

ANNEX D

Cisco Systems[18] (Cisco)			
Objectives/Driving Need	**Program Features & Status**	**Team Size & Program Cost**	**Outcomes/Lessons Learned**
• Cisco embraces and supports an environment in which employees learn and develop their workplace skills and talents in order to remain competitive and up-to-date on the latest technologies and thinking.	• Cisco employs its own e-Learning solutions to employees and partners around the world, on an "anytime, anywhere" basis. • Cisco offers its employees a range of learning and development options that include skill development in business, marketing, technical and engineering, product knowledge and basic industry. • The Cisco Field E-Learning Connection is a unified delivery framework that delivers training activities and communications to its sales force quickly. It is a single, on-line point of entry that plans, tracks, develops, and measures the company's sales force skills and knowledge. • The global site links tens of thousands of searchable Web-based learning aids and job-specific learning paths with corresponding individual histories and access to on-line assessment tools and certification exams.	• The size of the implementation team at Cisco is unknown. • Cisco's Internet Learning Solutions Group is responsible for the training of the global sales force and support staff, 30,000 channel partners, and thousands of customers on product lines, new technologies and Internet business practices.	• Cisco has achieved a 40 to 60 percent cost savings through the increased use of e-Learning applications by way of more efficient, convenient, and effective knowledge transfer to those who need it, when they need it.

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[18] Learning Technologies in the Workplace Award Winner 2002: Cisco Systems Canada Co. Case Study 2002 (Ottawa: The Conference Board of Canada, 2002).

ANNEX E—SOURCES FOR BEST PRACTICES AND TRENDS

(a) United Kingdom Ministry of Defence website, Defence E-Learning Delivery and Management Capability (DELDMC) project, DELDMC policy, DELDMC System Requirement Document V2.2, Ministry of Defence, Modernising Defence Training, Report of the Defence Training Review, (pages 31 to 33).

(b) United States Navy, with permission.

(c) Australian Defence Force, Media Release: *12 May 2003 Defence Learning Goes Online*.

(d) Learning Technologies in the Workplace Award Winner 2002: Cisco Systems Canada Co. Case Study 2002 (Ottawa: The Conference Board of Canada, 2002). With permission.

(e) APQC Best-Practice Report, Planning, Implementing, and Evaluating E-Learning Initiatives, (page 15), with permission.

(f) United States Department of Defense Organization C.

(g) United States Navy, with permission.

(h) United States Department of Defense Organization B.

(i) United States Department of Defense Organization A.

(j) United States Navy, with permission.

(k) Learning Technologies in the Workplace Award Winner 2002: Cisco Systems Canada Co. Case Study 2002 (Ottawa: The Conference Board of Canada, 2002). With permission.

(l) Central Texas College, with permission.

(m) United Kingdom Ministry of Defence, Modernising Defence Training: Report of the Defence Training Review, Volume 2, Supporting Essays, (page 53).

(n) Learning Technologies in the Workplace Award Winner 2002: Cisco Systems Canada Co. Case Study 2002 (Ottawa: The Conference Board of Canada, 2002). With permission.

(o) United States Department of Defense Organization C.

(p) APQC Best-Practice Report, Planning, Implementing, and Evaluating E-Learning Initiatives, (pages 48, 61, 93), with permission.

ANNEX F—SUMMARY OF ACRONYMS

ADF	Australian Defence Force		CFITES	Canadian Forces Individual Training and Education System
ADL	Advanced Distributed Learning		CFMG	Canadian Forces Medical Group
ADM(HR-Civ)	Assistant Deputy Minister (Human Resources-Civilian)		CFPM	Canadian Forces Provost Marshal
ADM(HR-Mil)	Assistant Deputy Minister (Human Resources-Military)		CFSTG	Canadian Forces Support and Training Group
ADM(IM)	Assistant Deputy Minister (Information Management)		CFTDC	Canadian Forces Training and Development Centre
ADM(S&T)	Assistant Deputy Minister (Science & Technology)		CLS	Chief of the Land Staff
AFILE	Air Force Integrated Information and Learning Environment		CMS	Chief of the Maritime Staff
			CoE	Centre of Excellence
AG	Advisory Group		Comd	Command
APQC	American Productivity & Quality Center		CONOPS	Concept of Operations
ASP	Application Service Provider		COTS	Commercial Off The Shelf
C/W	Courseware		CRS	Chief Review Services
CAS	Chief of the Air Staff		CTC	Central Texas College
CBT	Computer Based Training		DA	Departmental Authority
CDA	Canadian Defence Academy		DC	District of Columbia
CDN	Canadian		DDLS	Defence Distributed Learning System
CD-ROM	Compact Disc Read Only Memory		DGLPD	Director General Learning and Professional Development
CeTARS	Corporate enterprise Training Activity Resource System		DGTE	Director General Training and Education
CF	Canadian Forces		DHRIM	Director Human Resource Information Management

DIMR	Director Information Management Requirements	ILQ	Intermediate Leadership Qualification
DL	Distributed Learning	IM	Information Management
DLN	Defence Learning Network	IMRC	Information Management Requirements Committee
DLPDSP	Director Learning and Professional Development Strategies and Policies	IMSR	Information Management Strategic Review
DMC	Defence Management Committee	IT	Information Technology
DMS	Defence Management System	IT&E	Individual Training and Education
DND/CF	Department of National Defence/Canadian Forces	JCRB	Joint Capability Requirement Board
		KM	Knowledge Management
DOD	Department of Defense	KMSS	Kongsberg Maritime Ship Systems
DTEP	Director Training Education Policy	L1	Level One (reports to either DM or CDS)
DWAN	Defence Wide Area Network	LCC	Learning and Career Centre
EPA	Effective Project Approval	LCCN	Learning and Career Centre Network
ERNT	Executive Review of Naval Training	LCMS	Learning Content Management System
FTE	Full-time Equivalent	LMP	Learning Management Platform
GoC	Government of Canada	LMS	Learning Management System
GPNet	General Purpose Network	M	Million
HR	Human Resources	MA	Managing Authority
HRMS	Human Resources Management System	MOSART	Military Occupational Structure Analysis, Redesign & Tailoring
IBM	International Business Machines	MOU	Memorandum of Understanding
ILE	Integrated Learning Environment	NATO	North Atlantic Treaty Organisation
ILS/IP	Integrated Logistic Support/Implementation Planning	NETC	Naval Education and Training Command

NETP	Naval Environment Training Program		ROI	Return on investment
NKO	Navy Knowledge Online		SCORM	Shareable Content Object Reference Model
NTMPS	Navy Training Management & Planning System		SME	Subject-matter Expert
OAR	Options Analysis Report		SOR	Statement of Requirements
OCI	Office of Collateral Interest		SRB	Senior Review Board
OPI	Office of Primary Interest		SS (EPA)	Synopsis Sheet (Effective Project Approval)
PC	Personal Computer		SS (ID)	Synopsis Sheet (Identification)
PD	Project Director		SS (PPA)	Synopsis Sheet (Preliminary Project Approval)
PDA	Personal Digital Assistant		TAD/TDY	Temporary Duty
PIP	Project Implementation Plan		TB	Treasury Board
PoC	Proof of Concept		TDR	Training Data Repository
PM	Project Manager		T&E	Training and Education
PMB	Program Management Board		TL	Team Leader
PMP	Project Management Plan		U.K. MoD	United Kingdom Ministry of Defence
PSEL	Personnel Selection		U.S.	United States
RFP	Request for Proposal		WebCT	Web Course Tools
RMC	Royal Military College		WG	Working Group