ATHABASCA UNIVERSITY

PERCEPTIONS OF E-LEARNING UTILITY -

TOWARDS A CANADIAN FORCES STRATEGY

BY

RAY GOLKA

A project submitted to the

Athabasca University Governing Council in partial fulfillment

of the requirements for the degree of
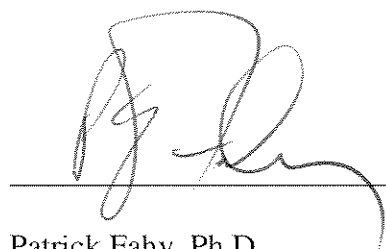
MASTER OF DISTANCE EDUCATION

Athabasca, Alberta

ATHABASCA UNIVERSITY

The undersigned certify that they have read and recommend to the Athabasca University

Governing Council for acceptance a project "PERCEPTIONS OF E-LEARNING

UTILITY – TOWARDS A CANADIAN FORCES STRATEGY" submitted by "RAY

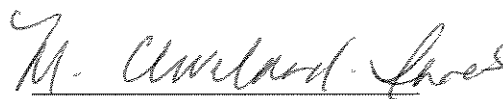GOLKA" to fulfill the requirements for the degree of MASTER OF DISTANCE

EDUCATION.

Tom Jones, Ph.D.

Committee Supervisor

Patrick Fahy, Ph.D.

Committee Member

Martha Cleveland-Innis, Ph.D.

Committee Member

Date: April, 2006

DEDICATION

This thesis is dedicated to my family, Jo-Ann, Thomas and Halina. It has, in so many ways, been an incredible few years. I thank you for sharing in this wonderful journey of exploration and providing me with so many fond memories.

ABSTRACT

This qualitative research examines the perceptions of e-learning stakeholders within the Canadian Department of Defence and makes strategy recommendations that may support e-learning adoption. A review of the literature describes the diffusion of educational technology as a slow and evolutionary process that may take twenty-five years or more to be realized in educational settings. Adoption is more successful if the technologies are easily integrated, not too complex and offer obvious advantage over existing practices. A review of distance education systems suggests a return to the basics. Large distance education systems thrive using print as the media of choice to support learning. Leading theories of distance education inform the reader of the essential requirements to support learning at a distance including the requirement for interaction and communication. The Canadian Forces (CF) are aligned with the Advanced Distributed Learning (ADL) and the Shareable Content Object Reference Model (SCORM). As one of only two ADL colabs located outside the United States, learning objects, contrary perspectives to the learning object paradigm, and notions about the SCORM standard are explored. Moreover, many complex notions embedded in the learning object concept have led some to ask where is the learning in learning objects and complex standards. Two related themes that have recently gained momentum are the convergence of knowledge management with e-learning and the rapid development of e-learning. These notions seem to support a shift from course-based learning to just-in-time and informal learning constructs. Elements of a strategic plan including the requirement for vision and leadership are examined as critical components to adoption. There is no shortage of educational technology. However, vision, leadership, and pedagogical practices have not kept pace with technological development. Hence, strategy and vision must be able to withstand the constant barrage and challenge of implementing new technologies. The

Chapter Four, "findings," provides a rich description of the challenges of implementing advanced technology applications, in the words of the candidates who were interviewed. The Chapter Five, "conclusion," provides strategic recommendations that may be considered for implementation.

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

Introduction

The Defence Learning Network (DLN) Project located at National Defence Headquarters, Ottawa, Canada, is the departmental authority responsible for facilitating and supporting e-learning on a wider scale in the Department of National Defence (DND). The DLN initiative has progressed steadily, culminating recently with a proof of concept or trial of a learning management platform (LMP) and associated courseware. However, the recent explosion of technological advancements enabling e-learning to become a powerful and complex learning tool, and increased understanding about how adults learn best at a distance, has made it difficult to know where to invest scarce resources, and which e-learning courseware types should be strategically supported.

While distance learning is not new to DND, subordinate units are pursing a myriad of e-learning approaches, including:

- Self-paced SCORM-type content (learning objects);

- Instructor-led asynchronous applications (e.g., Web-CT);

- Blended applications (with traditional paper-based); and

- Informal learning constructs.

Notwithstanding the variety of e-learning approaches, it is perceived within the Department that there is a relative dearth of e-learning courseware for deployment on the Learning Management Platform (LMP or LMS). It is clear that DND is in the earlier stages of adopting e-learning and associated technologies. McKenzie (as cited by Fahy, 2004, p. 193) indicates that organizations pass through four stages on their road to adopting a technology.

They are:

Stage 1: Survival Stage. This can include unrealistic expectations, struggle against the technology (e.g."we don't need this technology"), chaos, and outsourcing as there is no time to create and effectively manage the technology.

Stage 2: Mastery Stage. There is increased tolerance and technical competence.

Stage 3: Impact Stage. People are busy creating applications using the technology. They are less threatened by the technology. "This is just a standard procedure for how we do business."

Stage 4: Innovation Stage. Integration with current business and the restructuring of curriculum and learning activities.

To facilitate the movement of the DND to the latter stages of e-learning and associated technology adoption, research articulating strategic direction for courseware/ content choices is timely and significant. This research employs a qualitative case study design which explores perceptions and approaches to e-learning courseware by major departmental elements, including Army, Navy, Air Force, and major support units. In addition, it will explore their alignment with overall corporate direction. Finally, the research will summarize current perceptions and make recommendations for possible courseware strategies.

<center>Statement of the Problem</center>

Currently, there is no macro level departmental e-learning courseware strategy. The present strategy is based on an existing Individual Training and Education (IT&E) management framework, which essentially decentralizes courseware development to each of the Managing Authorities (MA). With a better understanding of current e-learning courseware initiatives and plans, strategic direction can be focused to support strategies that best leverage Canadian Forces (CF) resources. Centralized versus decentralized control of content decisions will be considered, as will the perceived lack of e-learning courseware.

<center>2</center>

<u>Purpose of the Study</u>

The purpose of this study is threefold. First, literature relating to the challenges and benefits of technology integration in complex learning organizations will be considered. Second, with this foundation as a point of departure key CF stakeholders or informants will be interviewed for their perception of technological integration within their respective segment of the organization with a view to barriers and supports for change. Finally, under the assumption that e-learning is a value added activity for the organization, strategy recommendations will be made in an effort to move the organization towards optimizing the benefits of technological integration in training.

<u>The Research Questions</u>

The process of inquiry shall use the following research questions as guidelines:

1. What are the perceptions of e-learning implementation within the DND?

2. What are the constraints or facilitating factors to greater adoption of e-learning courseware within the DND?

3. Is there an optimum strategy or strategies that the DND could adopt to deliver e-learning courseware for maximum effect?

<u>Limitations</u>

The Canadian military focus of the study restricts generalizations to other organizations. Moreover, the study will adopt some of the DLN's terminology.

<u>Delimitations</u>

Given the potentially extensive scope of this qualitative study, research interviews were limited to key participants in several main stakeholder units. Moreover, the study aimed to explore the perceptions of organizational leaders. As such, the direct experiences of instructors, students, and supporting personnel will not be considered**.**

Role of the Researcher

The research is characterized as "backyard research which involves studying the researcher's own organization" (Glesne & Peshkin, 1992 as cited in Creswell 2003 p. 184). As the researcher was employed in various capacities in implementing e-learning initiatives within the department and remains a member of the CF, data should be accessible. However, this type of research can be less objective. To minimize this variable multiple validity strategies will be employed including the use of member tracking strategies and the review of some departmental documentation. This will be discussed in detail in the methodology.

Significance of the Study

The research has the potential to contribute to CF policy, resulting in improved distance learning practices. It also has the potential to assist other organizations as they implement their own e-learning strategies and initiatives. Finally, it recognizes the challenges that organizations face in adopting advanced technology-based training.

Definition of Terms

The following definitions will appear frequently in this project.

ADL SCORM Initiative: "… is a collaborative effort between government, industry and academia to establish a new distributed learning environment which permits the interoperability of learning tools and course content on a global scale" (ADL website, 2004).

Canadian Forces Individual Training and Education System (CFITES): Refers to the six-phase systems approach model that is used/applied throughout the development, implementation, and maintenance of Individual Training and Education (IT&E) programs. The phases are: Analysis, Design, Development, Conduct, Evaluation, Validation, and Verification.

E-learning (electronic learning): refers to training, education, coaching and information that is delivered digitally. E-learning is normally delivered through a network or the Internet but it may also be delivered via 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 CBT (computer-based training) and other forms of technology-assisted learning (MITE, 2002, Glossary of Terms). Rosenberg (2001) indicates key characteristics of e-learning include:

- Relying on computer networking technologies making it capable of instant updating, storage/retrieval, distribution and sharing of instruction or   information;

- Delivering information to the learner via a computer that is connected to standard Internet technologies; and

- Providing learning solutions that go beyond the traditional paradigms of training. E-learning moves beyond training to include the delivery of   information and tools that improve performance and competitiveness within   the job market.

Learning Objects: "Any digital resource that can be reused to mediate training" (Wiley, 2002, p. 4).

Metadata: is frequently characterized as "data about data." It is used to identify and locate online electronic resources, particularly learning objects in a manner similar to a card catalogue system or database. Information such as subject, author, purpose and date of creation are examples of metadata search and tagging criteria. Metadata can be established by using a specific software application or, metadata editor. While metadata is not used by a Learning Management System (LMS) to run the actual courseware, the ADL encourages the minimum data requirements to enable discovery, and assure compatibility between SCORM systems.

Managing Authority: is a designated agency appointed by the Departmental Authority to manage assigned individual training and education activities (e.g., Army, Air Force and Navy are managing authorities for assigned training) (MITE, 02).

SCORM (Shared Content Objects Reference Model): assures interoperability of learning objects, important to the notion of sharing between LMS platforms. Within SCORM, learning

objects are termed SCO (sharable content objects) and must be developed in accordance with ADL specifications and guidelines. In order for SCO to be launched from an LMS, both LMS and the object must be SCORM compatible.

Technical Standards: are currently being developed to ensure that materials developed from different sources will work together. The CF conforms to a specific type of learning object technology (SCORM) and therefore employs an LMS, which is compatible with this technology.

<u>Abbreviations Commonly Used</u>

The following abbreviations appear frequently within this project:

Advanced Distributed Learning (ADL)

Canadian Forces (CF)

Canadian Forces Individual Training and Education System (CFITES)

Computer Mediated Conferencing (CMC)

Defence Learning Network (DLN)

Departmental Authority (DA)

Department of National Defence (DND)

Individual Training and Education (IT&E)

Instructional Systems Design (ISD)

Learning Management Platform (LMP)

Learning Management System (LMS)

Learning Object (LO)

Managing Authority (MA)

Rapid E-learning (REL)

Shareable Content Objects (SCOs)

Shareable Content Object Reference Model (SCORM)

Chapter II - Review of Related Literature

The introduction of new technology can be both exciting and alienating. It may create or destroy jobs, and it can both enhance the quality of our lives and seriously undermine it. It poses challenges for all aspects of our society, including the ways in which we teach and learn (Paul, 1995, p. 127).

Introduction

 This chapter reports on the literature associated with the research questions:

1. What are the perceptions of e-learning implementation within the DND?

2. What are the constraints or facilitating factors to the greater adoption of e-learning courseware within the DND? and

3. Is there an optimum strategy or strategies that the DND could adopt to deliver e-learning courseware for maximum effect?

Many military instructors have been open to using technology and other resources in an effort to enhance the learning process. This has included the range of technologies described by Bates (1995) on an ad hoc basis. However, the DLN confronts traditional paradigms of education through the introduction of innovative educational technology on a much wider scale. This is significant. Paul (1995) reminds us "Technology is not a neutral tool but a value-laden culture that must be both understood and taken into account in any attempt to apply it to change in an organization" (p. 140).

 Given a complex organizational issue involving notions of change, technology, culture and innovation, there are potentially numerous themes relating to the research questions.

However, the following perspectives are considered relevant to this study:

    a. Adoption of Innovation;

    b. Distance Education Systems;

    c. Learning Objects and Standards;

    d. Knowledge Management;

    e. Instructional Systems Design and Rapid E-learning; and

    f. E-learning Strategic Considerations.

<div align="center">Adoption of Innovation</div>

Rogers (1995) defines an innovation as an idea, practice or object that is perceived as new by the individual, and diffusion as the process by which an innovation makes its way through a social system. A single, unified diffusion theory has yet to be formulated. In the interim, four mainstream theories are commonly used to explain the adoption of innovation. They are: 1) Innovative Decision Process Theory; 2) Individual Innovativeness Theory; 3) Rate of Adoption Theory; and 4) Theory of Perceived Attributes.

Innovative Decision Process Theory

The "Innovation-Decision Process Theory" describes "the process through which an individual (or other decision-making unit) passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision" (Rogers, 1995, p. 163). The theory predicates that the decision for the adoption of educational technology passes through these five distinct stages. First, potential adopters must learn about the attributes of innovation. Second, they must be convinced of its merits. Third, they must decide to proceed with adopting the innovation. Fourth, they must decide to implement it. Finally, they must confirm that their decision to adopt was the correct decision. Once these stages have been achieved, diffusion results. The innovative decision process theory is depicted in Figure 1.

<div align="center">8</div>

Figure 1 Innovative-Decision Process Theory (Rogers, 1995).

PRIOR
CONDITIONS
1. Previous practice
2. Felt needs/problems
3. Innovativeness
4. Norms of the social
systems

COMMUNICATION CHANNELS

| I. KNOWLEDGE | II. PERSUASION | III. DECISION | IV. IMPLEMENTATION | V. CONFIRMATION |

Characteristics of the Decision-Making Unit

1. Socioeconomic characteristics
2. Personality variables
3. Communication behavior

Perceived Characteristics of the Innovation

1. Relative advantage
2. Compatibility
3. Complexity
4. Trialability
5. Observability

1. Adoption ⟶ Continued Adoption
Later Adoption
Discontinuance
2. Rejection ⟶ Continued Rejection

Individual Innovativeness Theory

 A second influential theory formulated from empirical investigations is the "Individual Innovativeness Theory." This theory explains the adoption of an innovation based on a representation of those individuals who are predisposed or opposed to adopting the innovation. Five adopter categories are described along the continuum of innovativeness. A bell-shaped curve illustrates the percentage of individuals that are willing to adopt an innovation. The first category of adopters is termed "innovators." These are the risk-takers and pioneers who lead the way. The second group or "early adopters" climb on board relatively early and help spread the word about the innovation to others. The third and fourth groups are the early majority and late majority. The innovators and early adopters convince the early majority. The late majority waits to make sure that adoption is in their best interests. The final group is the laggards and is

comprised of individuals who are highly skeptical and resist adopting the innovation until

necessary, or may not ever adopt the innovation (Rogers, 1995).

Figure 2 Adopter Categorization on the Basis of Innovativeness
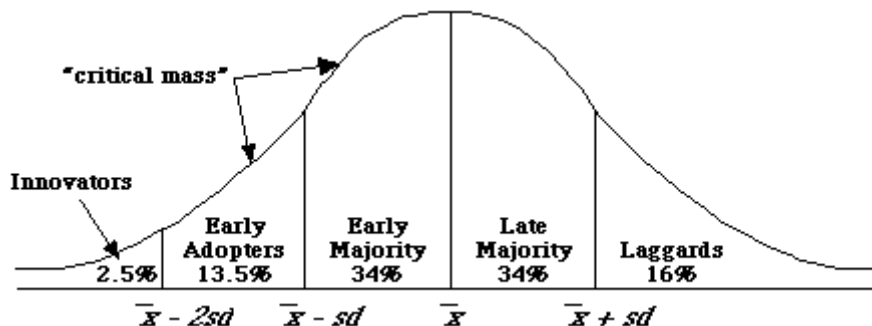
Rate of Adoption.

The third theory, "Rate of Adoption," indicates that adoption of an innovation grows

slowly and gradually in the beginning. It will have a period of rapid growth that will taper off

and become stable and owing to disillusionment, it will eventually decline. Following a period of

realistic expectations, interest in the innovation will increase. This theory would be illustrated by

an s-curve on a graph (Rogers, 1995).

Theory of Perceived Attributes.

The final mainstream diffusion theory "Theory of Perceived Attributes," is based on the

notion that individuals will adopt an innovation if they perceive that the innovation has the

following attributes. First, the innovation must have some relative advantage over an existing

innovation or the status quo. Second, it is important the innovation be compatible with existing

values and practices. Third, the innovation cannot be too complex. Fourth, the innovation must

have "trial ability." This means the innovation can be tested for a limited time without actually

adopting it. Fifth, the innovation must offer observable results (Rogers, 1995).

Adoption of Innovation - Application to Training and Education

Surry and Farquhar (1997) uniquely consider theories of innovation to the adoption or diffusion of instructional technology. They indicate theories relating to the adoption of innovation are relevant when teaching with technology, for three reasons. First, it is difficult to know why technological innovations such as e-learning are adopted. An understanding of diffusion theories can serve to explain, predict and account for factors that influence or impede adoption and diffusion of innovations. Second, it is helpful to understand that instructional technology is by its own nature innovation-based. Instructional materials produced because of such technological advancement need to be introduced and diffused into the educational system. Understanding the best way to present innovations for potential adoption, therefore, becomes necessary. Third, an exploration of the factors affecting diffusion may lead to a systematic model of adoption and diffusion.

Regardless of the innovation, it is important to observe that innovations in education generally take time. Fahy (2004b) suggests there is a significant time lag, twenty-five years or more, in the adoption of innovations in education and training fields. Reasons for this lag are: 1) a lack of a scientific source for producing innovations; 2) a lack of change agents in most educational environments; and 3) a lack of economic incentives to adopt innovations. Fahy (2004b) argues that it is the degree of change accompanying an innovation, rather than the technology, that is the most important consideration in planning the use of technology. He states innovations need skillful management as they can be threatening and thus resisted by members in the organization. "Poor preparation of people for change can result in resistance, slow adoption, inefficiency, stress, and, in the worst cases, failure of the adoption process" (Fahy, 2004a, p. 93).

Yates (2001) supports this view, indicating diffusion of innovations in educational technology will always be a slow, evolutionary process. It will not be a revolutionary leap. In order to ensure success, Yates suggests the user of the product should be the focus of the

11

innovation from the beginning to end. Thus, Yates appears to be suggesting that change

management must be directed at the grassroots level.

Finally, Earle (2002) examines the integration of technology in the classroom within

public education systems. He warns about the seductive force of technology, indicating

technology cannot replace human qualities such as judgment, imagination and creativity.

Technology implementation viewed as change for the sake of change is likely to result in failure.

Technology must be more than an "add on." We are reminded, once again, that computer

technology is one possibility in a range of learning media – often an expensive proposition

(citing Shale, 1988, Earle states that printed material remains the most common medium in the

educational process).

Earle (2002) states technology integration is not about the type of technology or the

amount of technology we use. Rather its essential purpose should be to promote learning and

focus on improving learning and education for students. In this regard, technology should be

pedagogically sound and permit learning experiences not otherwise possible, including deep

learning. It should support student interaction and faculty enthusiasm for teaching and learning.

It should go beyond information retrieval, and promote deeper learning of the material and

enthusiasm for its use. Finally, he is concerned that pedagogy has not kept pace with

technological innovation. Citing Dede, (Earle, 2002, p. 11), he has stressed "unless other

simultaneous innovations occur in pedagogy, curriculum, assessment, and school organization,

the time and effort expended on instructional technology produce few improvements in

educational outcomes – a result that reinforces many educators' cynicism about fads based on

magical machines."

<div align="center">Distance Education Systems</div>

The research suggests technology-based teaching, at a distance, can be just as effective as

face-to-face. The number of professional organizations that have moved away from an emphasis

on one particular mode of teaching, such as instructor led, towards the provision or accreditation of quality distance learning programs is evidence of this trend (Bates & Poole, 2003). Despite this trend, Paul (1995) states much is written about technology in distance education, but there is little evidence of significant technological breakthroughs in the literature. Bates (1995) lists five categories of educational media: human contact, text, audio, video, and computers. It is easy to lose sight of the fact that human contact and text are educational media capable of supporting learning. Frequently, these media are overlooked in an effort to use the latest technology.

In this milieu, Bates (1995) identifies a core dilemma in using technology for teaching. He signals that this medium does allow one to teach differently. However, new technologies require new approaches in order to exploit the nature of the technology. Adding to this complexity, distance education is frequently practiced within the context of a rapidly changing technology environment. A dilemma is manifested in the considerable body of knowledge of how people learn best and the equally considerable amount of knowledge about the technology to support learning.

In the CF, renewed emphasis on distance education is partly attributable to the DLN, which aims to provide training and education at a distance in order to improve the quality of life, reducing travel costs and imparting knowledge or skill at a time and place of the student's choosing. Ostensibly, training and professional development activities would be distributed to the member, with training activities managed through the departmental learning management platform.

Does a consideration of distance education shed light on the technology required to support today's learning or education at a distance? Large distance education systems have been in place in South Africa (UNISA) with 130,000 students enrolled in 1949 and in 1972, China (CCTVU) had 852,000 distance students (Keegan, 1996). There are many other examples where distance education has provided access to learning opportunities. These large numbers, certainly

13

before the Internet and the latest information communication technologies, confirms that distance education can thrive in low technology environments.

A consideration of the term "distance education" reveals numerous definitions of the term. Most definitions, however, mention the separation of the teacher and learner, use of media to prevent isolation and promote communication, and teaching and learning taking place at different times and different places. Finally, with newer technologies newer definitions include notions of the same time and different places. Keegan (1996), in his seminal work "*Foundations of Distance Education,*" defines distance education using five criteria:

1. the quasi-permanent separation of teacher and learner throughout the length of the learning process, distinguishing it from conventional face-to-face education;

2. the influence of an educational organization both in the planning and preparation of learning materials and in the provision of student support services, distinguishing it from private study and teach-yourself programs;

3. the use of technical media; print, audio, video or computer, to unite teacher and learner and carry the content of the course;

4. the provision of two-way communication so that the student may benefit from or even initiate dialogue, distinguishing it from other uses of technology in education.; and

5. the quasi-permanent absence of the learning group throughout the length of the learning process so that people are usually taught as individuals and not in groups, with the possibility of occasional meetings for both informative and socialization purposes.

Furthermore, Keegan classifies theories of distance education into three broad groups: 1) theories of independence and autonomy; 2) theory of the industrialization of teaching; 3) the theory of interaction and communication. These theories lend further insight regarding the essential nature of distance education and the technology that can support learning at a distance.

Theories of Independence.

Based largely on the work of Charles Wedemeyer and Michael Moore, learners are guided by teachers but remain largely independent of the need for teachers. In this theory, distance learners face the following obstacles to learning:

1. Maintaining interest and motivation;

2. Readiness to study (e.g., high drop-out in distance education);

3. Grasping subject matter;

4. Learning analytical thinking; and

5. Self-evaluation of one's progress.

In a similar manner, Grow (1991) developed what he calls the Staged Self-Direction Learning Model. According to Grow, the teacher's role changes as the learner progresses through four stages: 1) dependent; 2) interested; 3) involved, and 4) self-directed. Learners have degrees of freedom in initiating activities that lead to learning outcomes. The ultimate goal of the learner, however, is to become self-directed. In achieving this goal, one critical aspect is the provision of institutional support by providing a teacher or tutor to motivate and guide the student. Communication fosters this relationship.

Finally, although some points are somewhat idealistic, a system to support learner independence and self-directedness would posses the following characteristics:

1. Be capable of operation in any place by one or more students;

2. Place greater responsibility for learning on the student;

3. Free faculty to focus on educational versus custodial tasks;

4. Offer students choices in format, courses, and methodologies;

5. Use media and methods proven effective;

6. Combine media and methods to teach subject in best manner;

7. Fit courses to conform to a media program;

8. Preserve and enhance opportunities for individual differences;

9. Evaluate the student commensurate with the rate, sequence and method of study; and

10. Permit students to start, stop and learn at their own pace

(Wedemeyer, Adapted from Keeegan, 1996, p.p.61-62).

Theory of the Industrialization of Teaching.

This major theory of distance education is based largely on the work of Otto Peters (1973). Peters considers distance education fundamentally different from traditional education. Non-face-to-face teaching yields to the student taking instruction that is not fixed to a time, place or person. In this regard, distance education represents an industrialization of education. This places new responsibility on the learner in contrast to the pre-industrialized or conventional education system. Distance education is an evolution to instruction that is egalitarian, aimed at a mass audience, technology-based and free from the trappings of time or place. With this view, there is an unnatural fit with communications. Learning and teaching acts are changed relative to traditional forms of education. This results in "a slow process for a teacher to adapt to a distance education system because there will always be clashes between traditional teaching and the carefully structured procedures of a distance teaching university" (Keegan, 1996, p. 84).

Theories of Interaction and Communication.

This model of distance education emphasizes the central role of interaction and communication in distance education. Distance education is carried out by an organization that develops educational media to unite teacher and learner and provides appropriate evaluation of the learning. In doing so, two-way communication between the student and institution must be provided. John Baath, a strong advocate of two-way communication, saw communication as essential to any notion of distance education. Baath believed that communication with a tutor could lessen the effects of isolation, provide motivation, and link the learner with additional resources. Baath makes the following two important points regarding communication (which is insightful as it relates to the two predominant models within the CF: self-paced SCORM vs. Instructor led (eg., Web CT):

1. models with stricter control of learning towards fixed goals tend to imply, in distance education, a greater emphasis on teaching material than on the two-way communication between the student and tutor/institution; and

2. models with less control of learning towards fixed goals tend to make simultaneous communication between student and tutor/institution more desirable (as cited by Keegan 1996, p. 1995).

Technology can facilitate communication and interaction, providing motivation and lessening the isolating effects of studying at a distance. Garrison and Shale (1990) see interaction as paramount. "The one certainty is that the quality and effectiveness of education at a distance is directly attributable to the degree and kind of interaction between teacher and student, as well as between student and student" (as cited by Crawford, 2001). Fahy (2004a) also considers that a central role of technology is to facilitate the various types of communications essential to learning. He writes "An area where there is wide agreement that technology is of major use in distance education is in facilitating different types of communication among the three components in the learning triad: learners, tutors, and content" (p. 5). Dirr (1999) expands this list to four, in outlining the dialogic nature of learning and the types of dialogue or conversations the learner has with an instructor, other learners, instructional resources and with himself (reflection). Dirr (1999) suggests that technology should support each one of the dialogues.

To be sure, interaction and communication in distance education is important. However, Moore (1980) has observed that the amount of relative distance between the instructor and the learners is predicated largely on the degree of interaction and communication. In other words, the degree of transactional distance among elements of the learning triad is a function of the extent of the dialogue or interaction that occurs, the rigidity of the course structure, and the extent of the learner's autonomy. If a course is strictly structured, then the learner has less need to communicate with the teacher. However, this creates a heightened feeling of separation or transactional distance, which may result in feelings of isolation, anxiety and confusion. This can lead to eventual failure to complete the course satisfactorily. This represents an important research construct for distance education. However, this perception can be equally present in

17

face-to-face classes. For instance, students in introductory university courses where there are often several hundred students may never have an opportunity to communicate with their professor. Alternatively, an online course, separated geographically but connected electronically, may provide far more contact with the course instructor. This suggests that a good balance between dialogue and structure be designed into courses to enhance the effectiveness of the learning experience. "Transactional distance must be overcome by teachers, learners, and educational organizations if effective learning is to occur" (Moore & Kearsley, 1996, as cited by Chen & Willits, 1998). Moreover, both teacher and learner can control the transactional distance between them by enhancing dialogue structures in the learning situation.

While research regarding the role of communication in distance education is ongoing, Kearsley (1996) perhaps uniquely has insisted "the potential for interaction is an important design factor in distance education systems, even if most students do not take advantage of this potential" (p 89). This researcher's participation in CMC has revealed that when not a mandatory course requirement, interaction has been quite low, perhaps anecdotal evidence to support this view.

<u>Distance Education Summary</u>

A consideration of distance education and theories is insightful in revealing the central role that technology can play in supporting learning at a distance. The fact that distance education has been and continues to be practiced in low technology environments (print) suggests that technology should be employed to enhance the learning environment. One key area where technology can play an important role is in supporting interaction among the learning triad. Asynchronous technology such as CMC can support and foster the relationship required to support learning activities by reducing the isolation and transactional distance that studying at a distance embodies. Technology can also improve student access to learning materials, motivate students, and assist them in becoming self-directed learners.

18

This researcher aims to put forward strategies to improve the uptake of departmental e-learning. A consideration of distance education and associated theories represents a return to the basics in an attempt to illuminate perspectives that inform the distance learning system.

The following table summarizes the main theoretical aspects considered above:

Table 1 Distance Education Summary

Distance Education Theory	Essential Elements
Independence and Autonomy	a. Distance learners face the following obstacles to learning: 1) Maintaining interest and motivation; 2) Readiness to study (e.g., high drop-out in distance education) 3) Grasping subject matter; 4) Learning analytical thinking; and 5) Self-evaluation of one's progress. b. The ultimate goal of the learner, however, is to become self-directed.
Industrialization of Teaching	a. Places new responsibilities on learner. b. Learning and teaching acts are changed relative to traditional forms of education, resulting in "a slow process" for a teacher to adapt to a distance education system because there will always be clashes with traditional teaching.
Interaction and Communication	a. Consensus that interaction and communication is essential to any notion of distance education. b. Interaction is an important design consideration even if not highly used by students. c. Highly structured courses (e.g., self-paced) can result in increased transactional distance and feelings of isolation.

Currently, an instructional technology called "learning objects" (LTSC, 2000a) leads other candidates to position the technology of choice in the next generation of instructional design, development, and delivery, due to its potential for reusability, generativity, adaptability, and scalability
(Hodgins, Urdan & Weggen, as cited in Wiley 2000 p. 2.).

Thus far, the discussion has focused on diffusion of innovations and distance education systems. However, the CF has been a key partner in the ADL SCORM initiative and active participant in developing standards for the interoperability of learning objects. Therefore, a consideration of standards and the learning object paradigm is essential. The CF partnership in the SCORM initiative signals the organization's strategic intention, as of writing, to deliver sharable content at a distance.

While learning object technology is relatively new, the concept of sharing, using and reusing resources dedicated to learning is not. For hundreds, perhaps thousands of years, teachers have been sharing non-digital resources such as textbooks, exercises, maps and lesson plans. Enter the digital age and the notion that widely available digital learning objects, may be shared in order to mediate learning is alluring, and as Downes (2001b) has argued, given the potential economics, revolutionary. Given this potential, it is not surprising that some organizations have committed considerable resources to implement learning object technology which promises greater sharing through notions of compatibility, interoperability, and standardization.

A practical definition of the term learning object may be found in an earlier IEE standards committee definition: "any entity, digital or non digital, which can be used, reused or referenced during technology supported learning" (as cited in Friesen, 2003, p. 2). However, this definition includes books, pens and papers. Wiley (2002) limits his definition to "any digital resource that can be reused to mediate training" (p. 4). In this instance, an object is limited to a digital entity such as a computer simulation, a sound clip or an interactive element.

Definitions aside, the CF has helped pioneer the SCORM initiative and delivery of

shareable content through the establishment of the only Canadian ADL partnership lab located

within the DLN Project Office in Ottawa. The SCORM standard is an initiative started by the

Advanced Distributed Learning (ADL) initiative and supported by the United States government.

SCORM represents an amalgamation of earlier standards initiatives such as the IEEE (Institute

of Electronic and Electrical Engineers) and the AICC (Aviation Industry Computer Based

Training Committee). It has been adopted by both the US and Canadian militaries. The SCORM

assures interoperability of learning objects, important to the possibility of sharing learning

resources between LMPs (or LMS).

The CF ADL initiative is poised to support principles of the Canadian Forces Individual

Training and Education System (CFITES), and delivery of the right amount of training to the

right people at the right time. In particular, the DLN project (of which the ADL colab is a part)

will create:

> a distributed learning system that will support departmental goals of creating a
> continuous learning environment by which, or through which, standardized training and
> education programs can be delivered to all members of the Defence Team … linked by
> an electronic backbone, governed by a management framework and associated policies
> and managed by a Learning Management System (DLN, 2003, p. 14).

The electronic backbone, or SCORM compliant LMS, supports the delivery of SCORM

compliant learning objects. "In essence an LMS is a high-level, strategic solution for planning,

delivering and managing all learning events within an organization, including online, virtual

classroom, and instructor lead courses" (Greenberg, 2002, p.1). The LMS acts as an electronic

backbone to support learning, administer training activities, communicate with human resource

systems and maintain learner information. An LMS can also launch and provide tools to author

objects (e.g., LCMS), and interpret instructions specifying which learning object comes next.

Moreover, many LMSs support asynchronous computer conferencing, which immediately adds

interactivity to courses delivered at a distance.

In order for a learning object to be launched from an LMS, both LMS and the object must be SCORM compatible. Therefore, there is a requirement that learning objects or SCOs be developed in accordance with ADL specifications and guidelines.

Learning objects have the potential to be reused or repurposed in order to support economies by sharing. In principle, it will be possible to assemble a collection of objects and reuse them to facilitate intended learning outcomes to differing target populations. It is precisely because learning objects can be reused, repurposed for different learning audiences and shared, that expensive developmental costs can be reduced considerably. Downes (2001b) in particular argues that sharing learning objects will result in "relentless" economics. He states "it makes no financial sense to spend millions of dollars producing multiple versions of similar learning objects when single versions of the same object could be shared a much lower cost per institution" (p. 2). He contends that there will be sharing because those that share will have a competitive advantage over those who do not. Sharing similar objects, however modest, reduces the costs per unit significantly. Downes (2001b) questions the need for thousands of similar courseware iterations such as "Hamlet" or the "sine wave." Downes (2001b) argues that the system will need to change and artificial barriers that hinder sharing will need to be removed. The premise is that sharing will naturally evolve between organizations (e.g., military organizations) where similar subject matter and opportunities exist.

In addition to sharing, learning objects designed as self-contained instructional units permit varying degrees of choice and individualized control. This sharply contrasts with group-based approaches where the group progresses ensemble. Fletcher (1992) has argued in favour of an individualized design, stating "computer-oriented approaches can provide individualization of pace, content, sequence and style. These approaches have been widely reviewed and found to be effective" (p. 10). The latest version of SCORM permits dynamic [adaptive] sequencing or "the addition of learning content sequencing capabilities" (ADL, 2004). This means that learner

performance and achievement will ultimately dictate the lesson sequence, enabling learners to proceed at a sequence and pace commensurate with their individual learning ability.

It is also evident that learning objects can cater to individual learning styles by including elements such as text, audio, quizzes, graphics video, simulations and/or combinations. It would be up to the design team to determine which elements would be included. At a basic level, immediate feedback could be achieved through quizzes and exercises. This can increase interest, maintain motivation and confirm intended learning outcomes. A course developed as a series of learning objects would permit the individual to decide the specific objects or content, essential to job performance. This would work well where acquisition of new knowledge or skill, such as the assignment of a new task, necessitated a training intervention but not a whole course. In essence, a learning object paradigm would also work well to support an organizations knowledge management strategy.

<center>Critique of the Learning Object Paradigm</center>

Despite widespread support and funding by industry academia, military circles and regional and international consortia (Friesen, 2003), the learning object paradigm has come under criticism. Criticism begins with the definition of a learning object. No one seems to know constitutes a learning object. Friesen (2003) suggests that problems begin with the attempts to define the term "learning object." Polysani (2003) echoes a similar refrain, arguing that a commonly accepted definition will be needed in order to take advantage of the attributes offered by this technology. He writes "It is evident that learning objects (LO) are the most meaningful and effective way of creating content for e-learning. Unfortunately, the current definitions and practices of LO are confusing and arbitrary" (p. 2).

The variety of definitions surrounding the learning object concept paves the way for the development of different types of objects. As an example, an examination of a popular peer-reviewed learning object repository MERLOT (www.merlot.org) reveals numerous LO. Many,

<center>23</center>

however, are little more than digitized papers, obviously lacking in terms of basic ISD. This raises the question "where is the learning in these objects?" To be sure, these are learning resources. In this regard, Mills (2004) distinguishes between LO and information objects: "If the intent is to inform, then it is an information object. If the intent is to facilitate learning, then it is learning object" (p.1). In a similar vein, Polsani (2003) suggests LO should possess two fundamental attributes, a learning intention and the ability for reuse in multiple contexts.

Hamel and Ryan Jones (2001) portray LO as more instructional in nature and certainly larger than a single web page or graphic. They write "It is helpful to think of a LO as a unit of stand-alone instruction. The content of a LO should be similar in scope and nature to the content of a typical "lesson" so as to create instruction, not merely information and it should be based upon a single learning object" (p. 1). Hamel and Ryan-Jones (2002) promote five principles of LO design to assure instructional content is designed and tagged for modularity and reuse: 1) LO must be units of instruction that stand-alone; 2) LO should follow a standard instructional format; 3) LO should be relatively small; 4) a sequence of LO must have a context; 5) LO must be tagged and managed.

While it is important to distinguish between learning or information objects, it is equally important to consider the premise of reuse or sharing which appears to be driving the LO movement. This is particularly true if significant development cost (e.g., outsourcing) is involved. Return on investment becomes vital. While smaller informational objects (a video clip) represent a greater tendency to be shared, a LO that increases in size or granularity becomes more difficult to share. Sound ISD demands that the target population be considered. Krauss (2004) contends "designing for a global audience leads to different decisions about granularity and sequencing of learning objects and takes the instructional designer away from the initial goal – meeting the needs of their learners" (p.12).

Merrill (2002) seems to support this view in his reminder that there are fundamental principles for instructional design. Learning from a given instructional program will be facilitated in direct proportion to the explicit implementation of first principles. One of the first rules of instructional design is consideration of the specific target audience. The better the audience is defined, including needs, pre-requisite knowledge and skill, the more likely the instruction will meet intended learning outcomes.

Larger LO intended for a specific learning audience, a module at the Performance or Enabling Objective level may prove difficult to share without some, even significant, modification. For instance, a LO oriented towards a particular target audience (e.g., military lawyers) may not be suitable for another target audience (military police), as it violates fundamental instructional design principles. If objects were initially outsourced, modification likely involves additional costs and development activity potentially creating barriers (e.g., proprietary development tools, funding, time) to reuse. If the LO was created in a proprietary tool, it is likely that any modification will require the same tool for repurposing purposes. In a large organization such as the CF can a singular tool or tools be identified and be made available?

Moreover, Friesen, (2003) questions the pedagogical neutrality of standards, such as SCORM, which is not aligned with any particular pedagogy. Rather, he proposes standards are being implemented to address systemic shortcomings, including issues of interoperability, portability and reusability, at the expense of pedagogy. He questions whether standards that are pedagogically neutral can also be relevant. Friesen (2003) also questions the "juxtaposition of narrow technical standards and specialized concepts with the general and varied dimensions of learning" (p. 1). Friesen (2003) argues the placement of the words "learning" and "object" is incongruous at best, juxtaposing a specific technological paradigm with roots in object-oriented programming with something as vague and ill structured as learning. Friesen (2003) suggests for

this innovation to be successful it must possess characteristics favourable to the adoption of an innovation (e.g., e-mail). Furthermore, the advantages of LO must be readily apparent for teachers and practitioners if they are to be accepted and adopted over existing practices.

Complex technical aspects of the LO paradigm are evident in: 1) the requirement for the object to be constructed in accordance with established standards; and 2) that the object be meta tagged in accordance with ADL guidelines (for SCORM objects). While metadata is not used by an LMS to run the actual courseware, the ADL encourages the minimum data requirements to enable discovery within an LMS/ LMP, and assure compatibility between SCORM systems. Metadata, frequently characterized as "data about data," is used to identify and locate online electronic resources, particularly LO in a manner similar to a card catalogue system or database. Information such as subject, author, purpose and date of creation are examples of metadata search and tagging criteria. Metadata can be established by using a specific software application or metadata editor.

Clark (1998) suggests that one of the challenges of LO is how to define and tag them. Clark identifies five types of information objects including: 1) facts; 2) concepts; 3) processes; 4) procedures; and 5) principles. These too must be metadata tagged to assure discoverability, at least if they are to be placed in a repository. However, meta tagging of granular items (animations, text) for retrieval has significant workload implications. Clark (2002) has estimated that metadata tagging can increase development costs by 25%. Whereas, MacLaren (2004) has stated: "metadata descriptors are now so developed that, in some cases, it is more time consuming to input the metadata than to actually construct the learning object itself" (p. 66). Furthermore, this substantial effort is directed to assuring technical compatibility. The effort does nothing to assure that objects are pedagogically sound, nor does it assure that the resource will have a lower cost per unit because of sharing.

<u>In-house Development of Learning or Information Objects</u>

Sharing of reusable learning resources is one way to achieve economies and produce cost savings. Questions such as sharing – with whom and to what extent - would need careful consideration to ensure an appropriate return on investment, if any. A second way to achieve economies may be to design LO in-house with commercially available software or templates. Dirr (1999) states "perhaps one of the most important forces driving the development to distance and virtual learning is the spirit of entrepreneurship that is in the hearts of many of the leaders in the field." (p. 29). Whereas, Firdyiwek contends "the proliferation of integrated courseware tools is a fairly recent phenomena" (1999, p. 29).

Newer generation software applications are certainly much less complex than earlier generation CBT authoring systems. The in-house development of LO appears to be reaching the point where organizations may be able to achieve a return on investment on LO, almost immediately, particularly where SMEs have access to instructional design and technical support. For instance, Cisco Systems (www.cisco.com) employs a template-based software, which requires that their LO contain content, practice and assessment items.

Moreover, the researcher tested a template-based software application, *Ready Go* (www.readygo.com). The *Ready Go* software required no knowledge of LO or the SCORM standard. An accompanying online tutorial enabled the user to start developing content almost immediately. The learning curve and degree of difficulty to use the software was considered on par with the popular Microsoft presentation software *Power Point*. The development costs were limited to the purchase of the software (<1000.00 CDN). The *Ready Go* software had pedagogy built-in, promoting a behaviorist approach to developing instruction. The trial resulted in SCORM compliant LO compatible with CF basic instructional techniques course (Introduction, Stages with confirmation/feedback and a summative evaluation). Objects contained video, feedback, interaction, graphics, quizzes and summative assessment instruments.

Bates identifies two approaches to developing content: 1) project management (with a

team of experts); and 2) a lone ranger model. The *Ready Go* trial falls into the latter category.

Bates (2003) acknowledges this approach is gaining momentum and cautions that there are both

advantages and disadvantages. While not a comprehensive list, the advantages include: 1) getting

members to understand and use technology in support of teaching; and 2) avoiding making long

term decisions about which technology to support. Disadvantages include: 1) the amateurish

application of design and production; and 2) the fact that trials do not always end in a final

product. He offers a number of ways to strengthen this approach including: technical support to

developers, workshops, and show and tell sessions where developers can communicate results of

their efforts.

<div align="center">Learning Objects to Support Knowledge Management</div>

> The scenarios are familiar and endless. For example: there's a new policy and training is required so that everyone knows all the ramifications of the new way of doing business. The Navy just received a new piece of kit and training is required so that all the sailors know how to work it. The newest member of the staff is tasked with developing and offering management renewal workshops and all managers are expected to attend. (MITE, Vol 2 p. 4)

Training is the most frequent request by management for the resolution of a performance

problem (MITE, 2002). One possible solution may be the rapid development and provision of the

correct information. Flexible accessibility of the right information, through the departmental

LMP, would free up personnel to learn at a time of their choosing.

In fact, this may be more efficient than taking a full course. Rosenberg (2001) writes:

> Access to information is as essential for learning as instruction … in many cases we don't have to go through the time, expense, and rigor of formal training; we may be far better off simply providing accurate, well-designed, and easy-to access information… If we apply what we know about how to create information that people can use and rely on, we are working in an area that is known as knowledge management (pp. 63-64).

Moreover, Wagner (2002) argues the Internet and associated inexpensive technologies

positions the capacity for digital content in the hands of employees. She discusses how

enterprises can leverage content assets to support knowledge management, performance improvement and learning. This depends largely upon identifying e-learning and knowledge assets that will be leveraged in support of the organization's mission. The probability of implementing a successful e-learning initiative greatly increases as the organization determines which enterprise needs require management. A content audit will indicate five types of electronic resources most organizations possess. This includes: 1) raw media such as photos, audio or video files; 2) Information Objects (facts, processes, procedures or references); 3) LO (collection of reusable shareable content objects or stand alone learning object); 4) Learning Components (lessons or courses consisting of series of learning objects); and 5) Learning Environments (learning components wrapped with communication tools). The relationship of these assets is depicted in the figure below. Of interest is the relationship between e-learning and knowledge management.

Figure 3 Learnativity Content Model

A Content Model for Designing Learning Objects
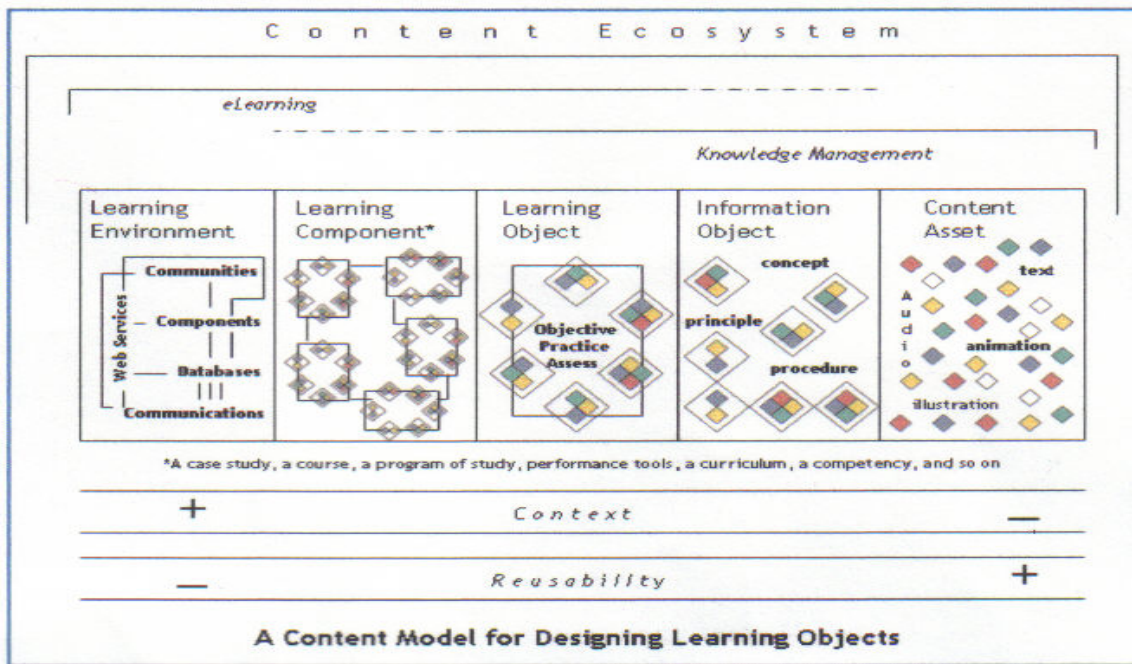
Bersin and Associates, an e-learning consulting firm (www.bersin.com), similarly indicate different problems justify different e-learning solutions. Citing issues of cost and time they argue that formal training is not always the solution. They maintain e-learning application tools (e.g., *Macromedia Breeze* or *Ready Go*) may be used in-house by staff to develop and transmit lower categories of information. Bersin identifies the following four categories of e-learning:

Table 2 Bersin E-learning Categories

Category	Example	Learner Activity	Tracking
Broadcast new Information	New Policy	Read	None
Important Knowledge Transfer	New policy	Read	Who took this?
Developing New Skills	Harassment Training	Read, listen, answer some Questions	Did they really learn? What score did they get?
Creating certified competencies	Certified expert	Read, listen, try new skills	Did they pass? Are they certified?

Alternatively, Clark and Mayer (2003) identify two types of e-learning: inform and perform content. Lessons that are designed to provide awareness or information (e.g., a new policy or process) would fall into the inform category. Lessons to build specific skills (e.g., labeling hazardous waste and using software) are examples of perform type e-learning content. E-learning may contain both types of learning.

The following table highlights Clark and Mayer's (2003) e-learning categories:

Table 3 Clark and Mayer E-learning Categories

Goal	Definition	Examples
Inform	Lessons that communicate information	Company History New Product Features
Perform - Procedure	Lessons that build procedural skills (also called near transfer)	How to log on How to complete an expense report
Perform – Principle	Lessons that Build principle based skills (also called for transfer)	How to close a sale How to design a Web page

Finally, the British Army in their "Army E-learning Guidelines" (2005) considers that the focus should not be the technology to support learning or the "e" in e-learning. Rather the "e" could stand for "enabling empowering, engaging or as is most often used electronic" (p. 3). In this view, learning is identified as a complex activity to acquire new information from multiple sources, including instructors, books, and/or students and colleagues. The problem is that a formal learning environment is not always available, and thus e-learning offers a good solution.

Uniquely, the British Army identifies several levels of e-learning:

Table 4 British Army E-learning Categories

Level 0	e-learning assets to support courses (e.g., animations, pc based assessment).
Level 1	courseware is built as multiple SCORM conformant SCOs via Intranet/Internet and tracked by an LMS
Level 2	courseware is built as multiple SCORM conformant SCOs via Intranet/Internet and tracked by an LMS
Level 3	courseware is built as multiple conformant SCOs and fully integrated with peer to peer collaboration (CMC, email)

(adapted from Army E-learning, 2005)

The significance of the aforementioned is the notion of thinking outside the traditional course. In this regard, e-learning assets could be developed and made accessible through an LMS to support both formal and informal learning constructs, performance support initiatives, and knowledge management.

Instructional Systems Design (ISD) and Rapid E-learning

Instructional Systems Design.

> The traditional training approach that relies on detailed job analysis and on static, monolithic courses no longer meets the performance requirements of modern organizations. This approach is too slow, generalized and expensive. At the same time, technology that delivers knowledge and skills widely via intranets and the Internet opens new channels of information distribution.
> (Clark, 1998, p. 60)

Since the late sixties, the CF has employed an ISD model termed the CFITES. It is insightful to review "instructional design" in an attempt to understand the role it may have in adopting e-learning technologies. Especially as Siemans (2002, p. 1) describes e-learning as "the marriage of technology and education and the instructional designer's greatest role is that of bridging concepts between the two worlds."

Smith and Ragan (1999) define "Instructional Design" (ID or ISD) as "the systematic and reflective process of translating principles of learning and instruction into plans for instructional materials, activities, information resources and evaluation" (p.2). Morrison, Ross and Kemp (2004) state that four fundamental components are addressed in most ISD models. These components includes the identification of: 1) learners; 2) objectives, 3) methods, and 4) evaluation. Regardless of the definition used, ISD supports the notion that instruction developed in accordance with appropriate learning theories will ultimately result in better learning.

There are literally dozens of ISD models including the Dick and Carey Model, Braden's Linear Model of ISD, and Gagné's Learning Events. The CF corresponds closely to the popular Analysis, Design, Development, Implementation, Evaluation (ADDIE) model. The CFITES recognizes six phases of instructional design. The main phases or processes of the CFITES are summarized in the table below.

- Table 5 CFITES Quality Control System

CFITES Phase	Processes	Output
ANALYZE	Review needs assessment findings Analyze tasks for training Specify performance objectives	Qualification Standard
DESIGN	Define learner characteristics Perform instructional analysis Develop assessment plan Develop assessment instruments Identify/cost instructional strategy Specify course/lesson guidance	Course Content Lesson Guidance Documentation
DEVELOP	Procure/develop materials Conduct trials and revise Prepare staff Record development costs	Instructional Materials
CONDUCT	Deliver instruction Monitor Learning	Qualified graduates

EVALUATE	Evaluate learner achievement	Confirmation of learning/
	Evaluate content and delivery	Identification of problem
	Evaluate costs	areas
	Revise as necessary	
VALIDATE	Scope and plan	Confirmation of efficiency
	Collect/analyze data	and effectiveness or
	Submit report and recommendations	recommendations for improvement

From an instructional designer perspective, any model could be followed to develop an efficient and effective learning environment. However, depending on the course content, one model may be more effective than another (e.g., a math course versus soft skill courses versus e-learning).

The dominant e-learning design on the web today supporting asynchronous learning is "programmed instruction/tutorials" or "traditional CBT" (Earle, 2002). In this model, the content is chopped into manageable chucks that the trainee may work though at his/her own pace. Often questions are interspersed and there may be immediate feedback. Earle (2002) posits that this model is consistent with basic learning theory. However "the content is mostly text and is frequently criticized as boring and puerile" (p. 11). Earle (2002) argues other models that could enrich the learning experience (e.g., case studies, projects or simulations) are rarely employed, due to high development costs and scalability issues.

In e-learning, with students widely dispersed, where there is potential for the effects of transactional distance and isolation, quality becomes an important consideration. Rosenberg (2001) reminds us that multimedia can improve the quality of instruction, by adding richness and interactivity to a training program. However, he also reminds us "all the multimedia learning in the world can't fix an inherently bad learning design, in fact it may make it worse" (p. 56). He cautions that it may be better to have great instruction without multimedia rather than great multimedia without solid instructional design. In this regard, Rosenberg (2001) cautions us on

the rush to convert content to CBT. He recalls the following lessons learned from this experience, including the gratuitous use of "shovel ware" and talking heads":

1. Content that wasn't any good (e.g. page turner/ generic nature of the program);

2. Learning that wasn't authentic (e.g., situations, problems or questions must be real);

3. Form over substance (i.e., "technolust", great looking but ignores solid ISD);

4. One size doesn't fit all (i.e., design should allow learning flexibility);

5. Technology as a barrier (i.e., incompatibility between platforms, outsourcing);

6. Uselessness after the first use (e.g., the technology did not support knowledge management and the ability for find needed information after training session);

7. Learning wasn't reinforced;

8. No support for the CBT (i.e., post development, outdated);

9. It went against the culture (e.g., classroom tradition);

10. Boring (e.g., pages and pages of text); and

11. "Shovelware" (e.g., classroom training transferred to the web platform without taking advantage of the innovation).
(Adapted from Rosenberg, 2001, pp. 42-48)

Writing just over ten years ago Paul (1995) states the "significant technology that established the Open University in the United Kingdom and so many of its imitators around the world was not characterized by innovative use of high tech, but through a systematic approach to learning" (p.132). Similarly, Wagner (as cited in Earle, 2002, p. 10) posits that "the educational technology that can make the biggest difference to schools and students is not the hardware, but the process of designing effective instruction" which appropriately incorporates computer technology and other media.

Essentially, e-learning must be designed in accordance with sound instructional principles, including the selection of the most appropriate media and opportunities for interaction and feedback. The student in an e-learning environment does not have the same advantage as a

student undergoing traditional instruction. Hence, appealing e-learning that efficiently and

effectively meets learning outcomes enhances e-learning's reputation. More specifically,

Siemens (2002, p. 1) suggests e-learning can benefit from ISD in the following manner:

1. "Distance learning courses are likely to fail if they are delivered as if they were traditional courses." (Smith, 1996);

2. "Pedagogy must drive the choice of instructional technology, not the other way around." (Chizmar & Walbert, 1999);

3. Compared with a human instructor, technology is less adaptive. Once a plan of integration is implemented, it is less likely to change based on the student's reactions. This is why instructional design plays an important role in bridging pedagogy and technology. Subject content has to be well organized and strategies for teaching via a chosen medium have to be well-thought-out. Instructional design can help educators making the best use of technology, therefore guaranteeing successful integration.

4. Provides consistency between various courses developed by various instructors/designers. The general look and process of content exploration is standardized.

5. In a classroom, an instructor can adjust "on the fly"...if, during the design process, a concept was not communicated clearly, a classroom instructor can clarify. However, online this type of adjustment is usually not possible. The design process must anticipate and meet potential concerns/ambiguities or put another way, ID tries to do online what the instructor does in a classroom;

6. ID focuses on the most effective way to present content;

7. ID begins with the learner and the learner experience;

8. The quality of the course is ensured through ID, covering all phases of good development;

9. ID gives structure to the student's process of working through course material;

10. Appropriate use of technology: "With e-learning and blended learning proving to be no more effective than traditional classroom methods, why are so few training professionals recognizing this simple fact? Technology, no matter how advanced, cannot compensate for its misapplication. Here's why instructional design is, and always has been,the key to unlocking the true potential of available learning technologies;

11. Accelerate development. A current concern about e-learning is the development time. ID can speed up development time; and

12. Creates a transparent process. It is much easier to track and utilize the experiences of development teams (a knowledge management issue).

<u>Rapid E-learning.</u>

It is clear that the design of instruction, based on principles of how to best facilitate learning, is essential to producing a quality-learning environment. Traditionally ISD has involved a team effort including subject matter experts (SME), instructional designers (ID), web developers, and project managers. Alternatively, this activity may be outsourced, involving contracting mechanisms through established call up procedures.

However, despite obvious benefits, one criticism of employing ISD in the information age where time to market is critical is that it takes too long. Archibald (2005) reports traditional courseware development timelines are measured in terms of months. Bersin and Associates (2004) confirm this view. Their research also indicates that 72 percent of all training challenges are time critical, with the top challenge being the time to develop a course. Moreover, they report that time is also required to integrate the courseware onto an LMS, in addition to content development. This process can take weeks. In the case of the DLN (for the Proof of Concept trial), an additional eight weeks was required to complete the latter step.

Given time criticality, rapid e-learning (REL) is a concept that is gaining momentum. Archibald (2005) cites a Larstan Business Report, indicating 85 percent of Fortune 500 companies plan to expand the role of e-learning and that REL will make a significant contribution to the training initiatives in their companies. Given that outsourcing can cost between $10,000 to $50,000 USD per hour of e-learning, the focus on REL is not surprising. Bersin & Associates (2004) report that REL recently grew 80 percent and it will continue to grow 40 to 50 percent (compounded annually), over the next two years.

Typically, REL initiatives have limited budgets, extreme deadlines, and short shelf lives. Bersin analysts (2005) define REL as web-based training programs that can be created in weeks with programs authored by subject matter experts. Mayberry (2004) confirms this view, adding

37

that quality should not be sacrificed during the process. He states, rapid development is "the development of online learning using the shortest possible schedule without sacrificing quality. In short, the goal of RD [rapid development] is to develop online learning better, faster and cheaper" (p. 1).

REL is well suited for training material that has a critical deadline or changes frequently. It is typically developed through commercially available software tools such as *Macromedia Breeze™*, *Articulate™* or *ReadyGo™*. Some features of these software programs include assessment and tracking tools, and standards such as SCORM compliant. REL ensures that editing and updating of content can be done quickly and easily. "It is most useful for low to mid-range levels of e-learning complexity in which knowledge and comprehension are key" (Archibald, 2005).

REL employs development processes that dramatically decrease development time, changing traditional design and development roles. As such, Mayberry (2004) argues in favour of a charter document to guide the rapid e-learning project. The document would serve to blend aspects of the instructional design process with project management principles. The following are elements of a charter document:

  a. scope, which identifies the project deliverables (i.e., what's in and out);

  b. time, which can be identified using a high-level project schedule; and

  c. resources, which refers to your project team and materials.

  (Mayberry, 2004)

Bersin (2004) questions if the practice of SMEs developing content will result in rapid "junk." However, in practice it is reported that instructional designers still play a critical role building templates, guidelines and editing content to ensure that it is effective and consistent.

Archibald (2005) also acknowledges that there are considerable tradeoffs in having SMEs develop content using REL tools unless the SME is trained in ISD. Three possible solutions to

this problem are: 1) having the SME work directly with the instructional designer; 2) having the

SME design the content with ISD oversight; or 3) using a template-based software (e.g., *Ready*

Go™) which guides the SME through the design. The latter approach is reportedly being used by

many organizations. This is deemed a better option than not having content developed.

<center>E-learning Strategic Considerations</center>

> Many school districts have no technology plan at all. They buy when they can and figure
> out what to do with it after it arrives. This is the Helter-Skelter model (McKenzie, 1993
> p. 6).

At lower levels of the organization, there may be strategic questions concerning the

decision to move to web based instruction. As a precursor to web based instruction, Owston

(1997) asks three questions: 1) Does it increase learning access?; 2) Can it improve learning?;

and 3) Can improved access and improved learning be achieved without additional costs?

Accessibility permits students to study independently, on-line, at their own location, and

communicate with the instructor, submit assignments, and receive course guides electronically.

Owston (1997) states that learning improvement is largely dependent on the effective

exploitation of the medium in the teaching-learning situation. Finally, Owston suggests, in order

to be cost effective, that development efforts be directed to those courses with the greatest

enrolments.

Similarly, Bates (1997) cites four main reasons for using technology for education and

training: 1) to improve access; 2) to improve quality; 3) to reduce costs; and 4) to improve cost-

effectiveness. He indicates that these reasons can contradict each other. For example, the

professor who wants the world to access ideas and research, but he/she does not devote a similar

passion to improving the quality of material. Bates (1995) cites the two most important criteria,

in choosing educational technologies, are cost and accessibility.

<center>39</center>

The foregoing principally illustrates strategic elements or questions that may be asked at lower levels of the organization when implementing technology to support learning. However, Rosenberg writes "with so many stakeholders and business variables in the mix, a more strategic approach is necessary to ensure that e-learning has the best possible chance to succeed" (2001, p.32). Bates (2000) supports this view, suggesting a strategic plan can work well, particularly in a hierarchical organization such as the military. In this regard, lower plans should mesh with higher-level strategic direction. In essence, a strategic plan should offer some hope of managing chaotic and uncertain events and changing technology from the top down. It can help managers select information and technology systems most likely to deliver on technology goals after today's technology is replaced by tomorrow's.

There is consensus that a strategic plan starts with a shared vision for the use of technology for the entire organization (Bates, 2000; Rosenberg, 2001; Fahy, 2001). The shared vision "provides a benchmark against which to assess different strategies and actions regarding the development of teaching with technology-based teaching" (Bates, 2000, p.45). The shared vision gives the entire organization a sense of the successful e-learning state. The vision statement is not about how many online courses are available or the specific technology that will be in place. Rather, the desired situation or state should be considered, with input from stakeholders, so that learning and development efforts may be concentrated.

Bates's (2000) model plan would also include the following elements: 1) a vision; 2) clearly identifiable goals (or deliverables) requiring action over a three to five year time-frame; 3) financial resources; 4) enrollments; 5) new trends; 6) organizational SWOT (assessment of strengths, weaknesses, opportunities and threats); and 7) interdisciplinary developments. Lower-level strategic plans should mesh with the larger departmental plan.

Rosenberg (2001) describes an e-learning strategy as a "line in the sand", meaning it indicates the destination of the e-learning initiative. According to Rosenberg (2001), a strategy or

plan includes three important variables: 1) an analysis of the current situation as it pertains to the ability to launch and sustain e-learning; 2) a description of the desired state, including a vision for what the organization will look like two and five years forward; and 3) a gap or force field analysis which can lead to the identification of disparities between the current and desired state. The force field analysis could be applied to specific gaps such as " the perception that there is a dearth of e-learning courseware."

A force field analysis can be used to close gap statements; it can also be used to leverage facilitating points to make progress. Based on the work of Kurt Lewin, a force field analysis is a relatively simple decision-making model, which can introduce an element of scientific experimentation resulting in better decisions (Swinton, 2005). Not only is it a useful technique for looking at all the forces for and against a decision, the technique weighs pros and cons of a perceived gap. In this regard, a perceived gap can be viewed as a struggle between resistant (forces that impede change or the desired end state) and driving forces (forces that favour the change). The technique enables the formulation of strategies to reduce the impact of the opposing forces and strengthen the supporting forces. It allows one to look more closely at strategy issues (Rosenberg, 2001). Much like strategic elements, such as vision, mission and SWOT assessment, it may be one of the constituent elements in an overall e-learning strategy.

Strategy clearly plays a vital role in the successful and widespread adoption of e-learning. It is equally clear that technology will continue to change. A strategic plan offers the organization hope for coordinating activities to meet the articulated vision for teaching with technology. Within the CF, overall training policy direction rests with the Director, Training and Education Policy (DTEP). While policy is centrally developed, with input from the Managing Authorities (MA) (e.g., IT&E Management Committee), the implementation of training and education activities is delegated to the MA (DAOD, 2003; MITE, Vol 1, 1997). It is at the managing authority level that implementation of training and education activities occur.

Consequently, it is at this level that an effective strategy can address issues of technology. However, the departmental authority also requires an overarching departmental strategy, ensuring that it meshes with lower level strategies proposed by the MA.

<u>Literature Review Summary</u>

The following table summarizes the literature review and some of the themes explored:

- Table 6 Summary of Review of Literature

Adoption of Innovation	Diffusion of technology innovations is a slow and evolutionary process taking up to twenty-five years.
	The degree of change is an important consideration in adopting technology.
	Innovative Decision Process theory posits there are five stages in deciding to adopt educational technology including: 1) knowledge of an innovation; 2) forming an attitude toward the innovation; 3) a decision to adopt or reject; 4) implementation of the new idea; 5) confirmation the decision was correct.
	Individual Innovativeness theory suggests there are five general adopter categories ranging from early adopters to laggards. Rate of Adoption theory suggests innovation will have a period of rapid growth that will taper off and become stable and owing to disillusionment.
	Theory of Perceived Attributes suggests that successful innovation should involve a trial period and offer a relative advantage over the status quo.
Distance Education Systems	There are many large distance educations thriving in low technology environments.
	Print remains most common media despite enthusiasm for technology.
	Theories of Independence and Autonomy point to the changing role of students and instructors.
	The distance education system should promote learner independence, self-directedness and autonomy.
	Industrialization of Teaching theory suggests there is an unnatural fit of teaching at a distance. There will be clashes between traditional teaching and the distance education

system resulting in "slow uptake" of this form of teaching.

Theories of Interaction and Communication suggest:
1) models with strict control towards fixed goals require greater emphasis on quality teaching materials; and
2) models with less control make communications such as CMC more desirable.

There is wide agreement that technology is essential in facilitating different types of communication to support learning.

The degree of transactional distance between and among learners and teachers is related to the extent of the dialogue or interaction.

Learning Objects and Standards	LO have the potential to be reused or repurposed to support economies by sharing.
	Sharing of objects and the "relentless" economies that result is a prime driver of the LO paradigm.
	Computer-oriented approaches can provide individualization of pace, content, sequence and style.
	Definitions and practices of LO are confusing/ arbitrary. A LO can be a small information object or a stand-alone instructional module.
	Adherence to sound ISD may limit the ability to share objects without significant redesign.
	A complex aspect of LO is evident in technical aspects, such as meta tagging for discovery.
	In-house development of LO is possible with current templates and tools.
Instructional Design	A systematic process for designing and developing quality instructional materials
	Educational technology that can make a significant difference to quality learning is ISD vs. hardware/ software.
	Pedagogy should drive the choice of instructional technology and media decisions.
	Distance learning courses are likely to fail if they are delivered as if they were traditional courses.

	Quality is important.
	Rapid ISD is a growing trend utilizing newer tools and templates for SMEs to quickly develop e-content.
	Rapid e-learning adheres to ISD principles, but offers a quick product in short time.
Knowledge Management	There is evidence of convergence of e-learning and knowledge management.
	LO paradigm would work well to support an organization knowledge management.
	Various e-learning and knowledge management assets will need management framework ranging from information type assets to training assets that produce competencies.
E-Learning Strategic Considerations	Strategy plays a vital role in the Adoption of E-learning.
	There is no shortage of technology, however there is a shortage of vision and leadership
	Important elements of a strategy are: vision, clearly identifiable goals (or deliverables) requiring action over a three to five year time-frame; financial resources enrollments; trends, organizational SWOT and/or force field analysis

Chapter III - Methodology

Introduction

The researcher was interested in exploring e-learning implementation at the Canadian Forces (CF). The CF has a system in place to implement training in the most efficient and effective manner (CFITES). However, anecdotal evidence, including DLN News Letter (March, 2005), suggested e-learning within the department was experiencing a slower than expected adoption. Accordingly, the study was designed to obtain key training managers' perspectives on e-learning courseware and strategies to answer the following questions:

1. What are the perceptions of e-learning implementation within the DND?

2. What are the constraints or facilitating factors affecting greater adoption of e-learning courseware within the DND? and

3. Is there an optimum strategy the DND could adopt to deliver e-learning courseware for maximum effect?

The research is characterized as "backyard research," which involves studying the researcher's own organization (Glesne & Peshkin, 1992 as cited in Creswell, 2003, p. 184). The research has the potential to contribute to CF policy resulting in improved distance learning practices. It also has the potential to assist other organizations as they implement their own e-learning strategies and initiatives. Finally, it recognizes the challenges that organizations face in adopting advanced technology training.

The intent of this chapter is to provide a description of the research methodology including: 1) participants/participant organizations; 2) instruments; 3) design; and 4) procedures.

Participants

A total of eight participated in this study. Qualitative researchers tend to use non

probability or non random samples (Neuman, 2003, p. 211). Hence, sampling was purposeful

with interviewees meeting particular criteria. Participants are experts in their fields and

primarily senior officers. Their participation helped assure that relevant e-learning stakeholder

organizations were represented. In particular, four of the seven CF managing authorities were

represented, as was the departmental authority (DA) and the civilian component. The following

table is intended to outline personnel and the respective organization represented in the study:

- Table 7 List of Research Participants

Organization/Number of Candidates/ Location	Candidate Profile(s)
Director Training Education Policy (DTEP) / Defence Learning Network (DLN) (3 Subjects – Ottawa, ON)	Subject A: A Major responsible for LMS implementation, Help Desk Operations and adoption of industry standards. Subject B: A Captain responsible for courseware guidelines and courseware advisory services. Subject C: A civilian consultant responsible for managing DLN project requirements.
Navy (1- Ottawa)	A Lieutenant Commander, working in the Chief of Maritime Staff/ Directorate of Maritime Training and Education (DMTE) as senior staff officer for training development.
Army(1- Kingston)	A Major working in the Chief of Land Staff/ Directorate of Army Training (DAT) as senior staff officer training development.
Air Force (1-Ottawa)	A Major working with the Chief of Air Staff, as senior staff officer for the DLN and Air Force Integrated Information and Learning Environment (AFIILE).
Canadian Defence Academy Headquarters (1 - Ottawa)	A Major working with the Canadian Defence Academy as staff officer for "learning programs development."

| Assistant Deputy Minister Human Resources Civilian/ Director General Learning and Professional Development (DGLPD) (1- Ottawa) | The concept of Military MAs has no equivalent in the civilian world. A civilian learning and development representative from the DGLPD brings a civilian presence to the e-learning study. |

Participant Organizations Represented

Three participants represented the DLN project office in Ottawa. This larger number was essential to fully appreciate and understand the corporate view of e-learning implementation. The DLN (http://www.forces.gc.ca/hr/dln-rad/engraph/home_e.asp) is a joint civilian/ military initiative designed to foster a continuous learning environment "anywhere, anytime and just-in-time" for civilian and uniformed personnel. "The DLN project office is made up of a team of individuals who are training and education specialists, technology and business analysts, developers, and other members with particular areas of expertise" (DLN website, 2005). Hence, the three candidates expressed views from the departmental authority (DA):

The DA is the central or departmental staff responsible for all aspects of professional development in the CF, including individual training and education. The DA issues IT&E policy and guidance to the Managing Authorities, and through a permanent staff and committee structure exercises authority and provides the requisite oversight on IT&E matters for the CF (DAOD 5031).

One candidate represented the civilian component, or DGLPD. The four remaining candidates represented four of the seven MAs:

> The DA appoints MAs to manage assigned IT&E activities and the resources allocated for IT&E. MAs are responsible for implementing or arranging for the implementation of basic, advanced and specialty training for their unique occupations, and IT&E related to the environmental portions of the general specifications. The MA is responsible to request and provide resources to meet IT&E responsibilities (DAOD 5031).

MAs included in the study included one candidate from each of the following operational elements: Army, Navy, and Air Force. The operational role of these organizations is generally

understood. Therefore, these organizations will not be described further. However, candidates were also interviewed from the following two, lesser known, supporting MAs: 1) Canadian Defence Academy; and 2) DGLPD (civilian component).

The Canadian Defence Academy (CDA) (http://www.cda-acd.forces.gc.ca/index/engraph/about/about_e.aspis) is an MA comprising of a headquarters, located in Kingston, Ontario, and a number of geographically dispersed educational institutions. Most notably the formation serves as headquarters for the Royal Military College (RMC) of Canada (Kingston), the Canadian Forces College (Toronto), the Canadian Forces Language School (Gatineau), and Campus Fort St-Jean (St-Jean-sur-Richelieu). Campus Fort St-Jean includes the Non-Commissioned Member Professional Development Centre and the Canadian Forces Management Development School. The CDA is also responsible for managing and delivering "Officer Professional Military Education" (OPME) through the Division of Continuing Studies of RMC. The OPME represents a series of six distance education courses (some with undergraduate equivalency), which is the required professional development for CF officers (http://www.opme.forces.gc.ca/engraph/timetable/desc/course_e.asp).

Civilians comprise a large component of the Defence Team. However, there is no official civilian MA. Accordingly, a member from DGLPD (Ottawa, ON) was interviewed, who essentially assumes the MA role. This relatively new organization is charged with advancing Treasury Board goals, such as helping DND become a learning organization and developing learning plans for all civilian employees. Previously, a Director of learning and a small staff of five completed this role. The organization now comprises approximately 40 people.

Instruments

Based on a review of literature, questions were developed (Appendix B). To ensure questions relevancy/clarity, they were submitted to the project supervisor and a colleague for review. Based on feedback, questions were modified or deleted.

Data were collected from following sources:

1.   interviews (face to face and in two instances by phone) and

2.   departmental documentation (e.g., plans and policies were requested of the
     interviewee at the time of the interview. Four candidates brought e-mail messages,
     strategy documents/plans to their interview).

Design

A qualitative research design was selected as it lends itself to interpretive inquiry of an
exploratory nature. Moreover, the relatively small sample size and the exploratory nature of the
study lends itself to a qualitative methodolgy. "The idea behind qualitiative research is to
purposefully select participants or sites (or doucuments or visual material) that will best help the
researcher understand the problem and the research questions" (Creswell, 2003, p. 185). Data
were collected during June 2005.

Procedures

Contact with Subjects.

Four of the study participants were informed that an e-mail message requesting their
participation would be forthcoming. The request was discussed informally with the potential
participants at a Canadian Forces Seminar, May 2005. Subsequently, more formal contact was
made with these subjects and the Air Force representative via e-mail message requesting their
participation approximately one week prior to the interview. The e-mail message was worded as
follows:

```
I've had the opportunity to touch base with all of you (with the
exception of Maj XXXY) regarding a study I am conducting regarding the
DLN and specifically an exploration of courseware issues (yes, suspect
another study).  The study is finally at a point where qualitative data
collection (interviews) may commence. Accordingly, attached is a formal
invitation letter soliciting your participation. You may confirm
participation (or decline) via a return e-mail. I would send out a list
of open-ended questions in advance for those who agree to participate
(and confirm an acceptable interview time). In closing, thank you very
much for considering this request.
```

Without exception, all five (5) candidates willingly responded within days of the formal e-mail message request. Once confirmation was received, questions were e-mailed to the subjects. During the course of interviews, addional referrals were made by participants for representatives from the following organizations: CDA, DGLPD (civilian MA), and the Army MA representative. The same formal e-mail message solicitation procedure was used. The remaining candidates eagerly agreed to participate in the study, bringing the total number of subjects to eight (8).

Interview Process.

All candidates permitted taping of the interview. Six (6) participants were interviewed at their place of employment. Two (2) candidates, located in Kingston, ON, were interviewed by telephone. These candidates permitted the interview to be recorded using speaker phone/ tape recorder. In all instances, participants were provided with questions (Appendix B) at least one week in advance. This facilitated an opportunity to reflect and consider their e-learning experiences and responses. Interviews ranged in duration from 40 – 70 minutes. The interview consisted of: 1) an introduction, orienting the subject to the research being conducted; 2) a body, consisting of previously e-mailed questions; and 3) an interview summary where subjects were free to add additional information.

Interviews were generally conducted consistent with the questions listed at Annex B. However, the questioning process was somewhat dynamic as the inquirer gained a greater appreciation of what should be asked (Creswell, 2003). Moreover, the nature of the interview frequently led to areas of exploration not previously considered.

Subjects were aware that they could terminate the interview at any time or pass a question. This did not occur. Subsequent to the interview, subjects were provided with the interviewer's contact information in the event that any relevant information could be forwarded. Within several days of the interview, candidates were provided an electronic copy of their

responses for review and feedback. However, none of the candidates proposed further changes to the e-mailed interview transcript.

<u>Data Analysis.</u>

"Researchers rarely know the specifics of data analysis when they begin a project … in order to code the data it helps to have "tacit knowledge or in-depth background knowledge" (Neuman, 2003, p. 440). For example: to code rock music one must know a lot about rock music and musicians. Therefore, a review of related literature precludes data collection/analysis.

Data analysis was completed using qualitative procedures outlined by Creswell (2003, pp. 191-195). The "Atlas.ti" qualitative software program (version 4.2) was used to analyze the data. Initially, the software program and accompanying electronic manual proved unwieldy and difficult to use. Fortunately, the researcher found an excellent online resource: (http://erel.tamu.edu/video/atlasf2.html). This rich resource (a learning object?)contained audio and simulated media elements, easing the learning curve required. A screen capture of the Atlas software with data loaded is provided at Appendix C.

Precisely 80 double-spaced pages of raw data were generated from the interviews. The recommendation to use a qualitative analysis software program saved invaluable time at the "back end," easily making up for time spent at the "front end" learning the software. The *Atlas*™ software was found to be a powerful, relatively easy to use tool to assist with qualitative data analysis. It permitted the researcher to easily change code categories, add or delete codes, and consider code grouping or families of related codes. Basic data output procedures such as frequency and distribution were straightforward. To summarize, the following data analysis techniques were employed:

a. Interviews were recorded and transcribed;

b. Data were read and reread to gain a general sense;

51

c. Relevant e-learning "strategy" codes, guided by the research questions, permitting higher-level thinking were inserted into the data in order to interpret data using the "open coding" feature of the *Atlas*™ software. Subsequent passes through the data permitted codes to be refined and/or renamed and permitted relationships to be discovered amongst related groups of code families;

d. Finally, the researcher looked for patterns or relationships early in the research project, and as such analysis naturally extended across all stages of the research (Neuman, 2003).

Strategies for Validating Findings.

Creswell (2003) has identified a number of strategies for validating the accuracy of the findings. At the onset, it is paramount to reiterate that this researcher is part of the organization under study. Hence, it was important to establish and recognize this potential bias at the onset, with the goal of reporting openly and honestly. A second strategy to validate findings was to employ "member tracking strategies," whereby the final report/narrative descriptions was forwarded to members to review for accuracy. Finally, at a most basic level a triangulation of data occurred. Data emanated from multiple, well placed participants and sources, including departmental websites, and policies.

Compilation and Publication of Results.

"Compared to quantitative research, it is more difficult to write a report on qualitative social research. It has fewer rules and less structure" (Neuman, 2003, p. 477). Nevertheless, it was intended that the study would incorporate a descriptive and analytical exposition of collected data in Chapter IV –Results. In addition, a peer debriefing was conducted, before the publication of results to "enhance the accuracy of the account" … and ensure that the "account will resonate with people other than the researcher" (Creswell, 2003, p. 196).

CHAPTER IV - RESULTS

A summary of qualitative results is presented here. An open coding strategy was employed to permit the data to drive coding categories. Coding was refined with subsequent readings. Participant responses were ultimately coded into 8 categories and 29 subcategories.

- Table 8 Coding Categories

Coding Category	Sub Category	Frequency	n
E-Learning	-Exploring Potential	26	7
	-Unrealistic Expectations	4	4
	-Not Much Content	8	5
Value Perception	-Positive	4	4
	-Negative	5	2
	-Split	2	2
	-Concerned About Quality	19	8
Access	-As Primary Reason	15	8
Constraints	-Complexity of IT/e-learn	20	7
	-Complexity SCORM	9	3
	-Limited E-learning talent	8	5
	-School Cultures/traditions	18	7
	-Better Coordination	7	4
Facilitating Factors	-Funding	6	5
	-In-house Development	18	7
	-Miscellaneous	11	6
Policies	-Supports Decentralized	7	5
	- More DL guidance	10	4

Strategies	-Use JIT/ KM/ PS	18	6
	-Use Outsourcing	9	5
	-Use CMC	4	4
	-Use CoP	8	3
	-Use COE	5	3
	-Use Simulation	5	4
	-Use SCORM for high value content	4	3
	-Use SCORM	2	2
Courseware Sharing	-Supports in Theory	13	8
	-In Practice is Difficult	13	6
	-Practical Example of	1	1

E-learning

Exploring E-learning Potential.

The study asked participants to share their perceptions of e-learning implementation. Given a CF trial of an enterprise-wide e-learning solution concluded approximately one year ago, it is perhaps not surprising that twenty-six instances were recording for the "Exploring Potential" category. This category recorded the highest frequency of responses, with responses distributed among seven of the eight participants. This high result firmly indicates CF organizations are exploring e-learning technologies and strategies for potential adoption.

> We have several e-learning initiatives. We are just testing the water to develop strategies in terms of capability within the limits of security measures that are in place. We have a number of schools that are actively exploring these issues (P1).

> … we're going though a little bit of a revolution. Whether we call it a transformation or revolution it is significant. All of a sudden training technology has become an important way ahead …The other thing is we do have a long history of CBT and training technology. We were starting to get pretty good and now we've gone into this new way ahead, Internet based and using LMPs. Folks are frustrated and now we have to scrap everything and go with this way ahead. Often it doesn't make sense (P3).

> DL has not really taken off. There are a lot of reasons. First, we are very early in this process … they are going through some growing pains (P4).

We are experimenting right now. What if we outsource? What if we do build it in-house? We are testing content out. We will be testing the interim LMS. Now we have content we put on it. I hope that we will know what will work by 2008 (P5).

An in-house LMS was built just for those courses – called e-course ADM FIN CS who is responsible for financial matters built it. There was duplication of the course so that it could also be placed on the DWAN. It was SCORM compliant for the LMS. It was non-SCORM for the DWAN in-house LMS (P5).

We did a trial on a product called MERLIN, from the Northern Alberta Institute of Technology. It was used it to standardize in-house development among faculty. Unfortunately, it was difficult to use, it was not intuitive and you had to work with it for a while before you became comfortable with it. Additionally there was no instruction manual with it. We decided against using it (P6).

We are all learning and there is a lot of stuff that is fire and forget (P7).

Unrealistic Expectations.

The military is a top down organization with a clearly identified chain of command.

Operational effectiveness often requires decisive leadership that can make the right things

happen at the right time. Within training and education circles, there is frequent pressure to take

an operational perspective to designing, developing and delivering training activities. However,

four of the eight subjects cautioned against overly optimistic expectations regarding e-learning

adoption.

It is risky in terms of our expectations in terms of how fast the take up rates for e-learning will be. Quite frankly I think we are a little too optimistic, which is probably characteristic of an organization like the military (P3).

In the meantime, we are creating all these learning objects for use in the classroom that could just as easily be used for distance education. We are building towards this however; it may take some time for the training establishments to put content online (P4).

The Proof of Concept just finished about a year ago. The University of Alberta, took the view in their e-learning implementation that this was something that was going to take time. It has been successful … there is the view that this is a learning process that will evolve with time – it's a slow process (P7).

<u>Lack of E-Content.</u>

In a similar manner, five of the eight participants expressed that there was little e-learning content available. This view appears consistent with other related code categories "exploring e-learning potential" and "unrealistic expectations." It also correlates with anecdotal evidence regarding a perceived lack of content.

> We have one module that is delivered web-based instructor led. Other than that, there is not a whole lot that is web based (P2).

> In a general sense the e-learning take up rate is kinda slow. There is still very much the perception that e-learning is very much part of a niche application... We have hundreds of courses but we do not have many SCORM courses. What we've done is bought SCORM content off NET G and SKILL Soft. When you parse out the modules and translate into French – it seems like 30 or 40 courses. However, the reality is we do not have a lot of SCORM courses (P3).

> Right now we don't have a lot of stuff we are delivering on-line … we felt that the first things that get converted are easy things – page-turners that are not very good. People tend to do this because it is easy and because it is the most common. This is what classroom training is all about. When we move forward with EL [e-learning] initiatives – instructors will look at the complex support mechanism in the classrooms we hope they will look at what they have in the classroom and recognize that it can be ported to the web at a distance. When it takes off it will be because we have matured the classroom training aid such that they are not just a page-turner or death by power point. It will interactive. That's where we need to go to DL [distance learning] going (P4).

> We do not have a lot of content ... we can have the greatest courseware on the platform but if no one goes to the platform that is what happened with SUN. We've got 140 students maybe more because one student will take more than one course. I think it is a low return on investment (P5).

> Usage is very low ... painfully slow progress (P8).

<u>E-learning Quality.</u>

With a frequency of nineteen (19) and distribution across all subjects "concerned with quality" indicates that the quality of e-learning courseware is a primary concern. E-learning distributed through an LMP offers the opportunity to engage learners in a media rich learning environment. However, much of the online content was described as "page-turning," which does not produce the type of results possible or desired from an online learning. Two respondents

suggested they must compromise quality for content. One respondent cited security as a

compromising factor to developing quality online material, whereas another respondent indicated

that their organization acknowledges this issue and they are taking concrete action to rectify it.

> I do not think courseware is there. We need the ease and ability to have interactive courseware – technically it's not there. It's very low level. I haven't seen really good courseware ... people do not like basic page-turners (P2).

> We should take advantage of that and not produce a bunch of low-level information transfer courses. E- learning is a huge field and there are a lot of different courseware applications that could work ... With respect to quality that is important but not as high a priority ... If you start stepping over people to make sure the quality is there we will never get this going. Certainly in the early going, we're in line with the ADL SCORM initiative. Again, even with the F2F offerings there is work to be done (P3).

> I think we are still in page-turner type e-learning with some drag and drop, pretest/posttest ... Because of it [security] we can't use video clips and technology that enrich learning. We are then limited to page-turner type content (P5).

> One of the graduate schools in the States shared some of the more technical and complex media that can be developed. That's the type of media and e-learning that we want to create ... we do not presently have the highest quality products. We hope to conduct an evaluation of our existing courseware. Identify the current gap between the existing quality and the desired quality and work towards it (P6).

> It is hard to associate the courseware with something that is good ... We are not trying to decrease quality however; we are just trying to put this out (P7).

> Should be setting some targets, like US Army for the number of offerings. Start small, quick successes, set some realistic acceptance criteria: the quality will come (P8).

Value Perception

Value perception could be defined as the worth or importance of e-learning within an

organization. Participants freely expressed their perception of value from one of three main

perspectives: 1) CF leadership; 2) the operator or learner; or 3) their own view. Value perception

could be influenced by the perceived quality of e-content. However, despite concerns expressed

over quality of courseware, four candidates stated there was a perception of positive value for e-

learning within the organization. One of these candidates indicated that operational tempo and

service issues detracted from e-learning. Notwithstanding, this candidate did see the value

despite the e-learning equation not being as high within the member organization. Of the four

remaining candidates, two were split on the issue, stating it depended on the view taken. For

example, higher levels of the chain of command have a positive perspective and lower levels of

the organization have a negative view. Finally, two candidates clearly felt e-learning had not yet

lived up to its potential.

Value perception was also interpreted as a driving force for e-learning (although not

expressed as such in the table above). The overall results indicate that higher levels of the chain

of command (versus lower levels) are more apt to have a positive view of e-learning.

> Leadership does see the value of what we are doing. They have bought into the concept at least in near term. The perception that e-learning is going to achieve some tangible goals are driving factors (P4).

> The value perception for e-learning is dependent upon who you ask. If you ask you get the corporate ivory tower perspective and wanting this to happen. You also get, at the worker level … well, people are not banging down our doors for content. There are courses we have built and there as been very little throughput (P5).

> In my opinion the value perception of e-learning is not very high. Operators don't see what is being offered as high value … In general, the e-learning out there is not sophisticated … PIP [programmed instructional package] type stuff. It seems like a paper-based model has been ported it to the web. It's a good first step but there needs to be value in it…Operators like to see something that shows value. How is this directly helping me to do my job. I find the courseware that we have currently are "fluff." There is no real hard value being demonstrated (P7).

> Way behind industry leaders and US. There is a narrow perception of what is possible

> (formal vs. informal learning) (P8).

<div align="center">Access</div>

Access as the Primary Reason for Using Technology.

Bates (1997) has suggested four primary reasons for using technology: 1) to improve

access to education and training; 2) to improve the quality of the learning; 3) to reduce the costs

of education; or 4) to improve the cost-effectiveness of education. Participants were unanimous

in viewing access as an important reason for using educational technology. However access

<div align="center">58</div>

meant many different things to many different people. Typically access was considered as

students being able to reach the content.

> …access is a little different in DND, it is based on the civilian component to the project. Civilians have had a long history of non-access to PD and training which is opposite for the uniformed component. The civilians wanted to increase their access to opportunities and the saw e- learning as a part of the equation (P3).

> Access is huge …We built a policy for the orientation program because we have a classroom course for that. We just built this year an online course a briefing for managers within a standalone module that can be taken as one of the thirteen modules. It used to be in the classroom but managers were not coming to it. They were too busy to go to a 2hr classroom portion. So we decided it was a good candidate – its got good information, a manager could complete the course from their desk in an hour. We put that one on line (P5).

However, for the DLN trial or Proof of Concept (POC) it was not possible to access

content over the departmental intranet (or Defence Wide Area Network (DWAN). This limited

access to courseware via the Internet or a government provided network (GP Net), and prevented

students from accessing courseware from their workplace desktop. The POC was never intended

to test this functionally as this issue is complex and cuts across requirements for information

management and security. In the interim, project personnel are working with responsible offices

to resolve this issue. No one seemed to neglect the value of these efforts. One candidate indicated

members in their organization were not likely to take e-courses on their own time. Hence an

Internet option was incidental. Whereas another candidate felt that this decision severely limited

the full testing of courseware options:

> The IM group or security people forced the DLN into a limited range. For instance, we were not allowed to do stuff across the firewall. We could use the GP Net. We were not allowed to experiment with what a server on the outside should like and how it should be configured so that we could gain access through the firewall. We did not have that opportunity. We experimented with what we had (P1).

Access was also considered to be an important feature to support knowledge management

after the qualification was completed.

The primary reason for using technology is access. Not just to education and training but to knowledge. Performance support and knowledge management. Procedures for repairing Aircraft, for instance. You might learn this in School but you have not seen it for years (P1).

Some considered access from the perspective of the instructor and that he/she be able to access instructional material.

I do not care where it is stored as long as it is accessible by the instructor to change courseware (P2).

Why send content to Ottawa in order to run SCORM compliant content in the classroom when it can be done successfully at the local level (P4).

Access was also considered from the perspective of having appropriate quantities of hardware and software for learners.

Some have one computer for entire shop and a standalone at that. Some do not even have DWAN accounts. They are still getting notices for things on paper – the bulletin board. We have a lot of work to do. We do not have the policies or infrastructure in place to support this (P5).

Access was considered from the perspective of the learner.

People accessing course have encountered so many barriers with registration or creating their account for the LMS, for instance. Unless it is something they absolutely have to take, they are going to give up because there are so many barriers along the way – it's not clearly described, people don't know where to click (P5).

Finally, one participant commented on gaining access to accredited programs as an important part of their strategy.

By offering some of our courses, we could for instance offer a certificate in military arts and sciences. That is what we are working on. By doing that we can gain access to accredited programs, for NCMs for instance (P6).

<div align="center">Constraints</div>

Complex Technology.

One of the overarching research questions guiding this study was a consideration of constraints and facilitating factors in an attempt to understand some of the dynamics at work in the change process. There were numerous constraints identified in moving to an e-learning

environment ranging from IT (information technology) and technical complexities of the

SCORM standard to a school-based culture.

The number and types of constraints tend to multiply in an e-learning environment. Seven

candidates identified IT as a constraint (frequency of mentions = 20). Respondents discussed the

limitations of networks, standards, security, and firewall issues. Respondents also discussed the

need to gain access through the three domains: Internet; Intranet and GP Net (the dedicated

portion of the internet for DND). However, IT constraints were also encountered in terms of: 1)

the different interpretation of IT policies across the MA; 2) the restrictive IT policy limiting

software trials; and 3) the fact that IT systems are unable to communicate with each other.

> IT world is a constraint in terms of what they are prepared to let us do. It is also a
> fragmented structure because each wing has its own Wing ISO. Those folks between
> wings do not do things the same way. Not every wing has the same technology in terms
> of bandwidth or technology. They each have their own view about what is secure or not
> secure (P1).

> IM [information management] is a restrictive framework. You cannot go out and get open
> source software. You cannot keep up with the leading edge because it is so restrictive.
> Since I got into my job, I've been trying to get "knowledge webform" on the DWAN.
> Two years later … I've bought the software and we've done our trials. It's still not on the
> system ... If we could run some localized stuff and not have to worry about the whole
> system. The Internet was designed for that and we have made it so restrictive (P2).

> Tracking right now is also big issue. We have attestation pages at the end of our e-
> learning courses. Mangers must complete them certifying that the training was
> completed. This is necessary until tracking information can go from the LMS to our
> HRMS. I am working on that with the DRIM and CDA folks with which fields we need.
> We do not want to have to manually input this into the HRMS. We have about 300
> training coordinators that do this manually right now. This too is an e-learning barrier
> (P5).

SCORM as a Constraint.

Four candidates suggested that SCORM did not figure prominently in their e-learning

efforts and seemed to suggest that e-learning could take place outside of the requirement to

SCORM e-learning content. Three candidates firmly expressed that the SCORM was not well

understood or poorly implemented.

SCORM is a bit of a mystery. Its strength from my understanding of it will be in the sharing of courseware ... sixty odd Meta tags for each object is a lot of inputting to do ...That will be a sore point because of the amount of meta tagging that has to be done. This is complicated because we need a nomenclature and a taxonomy that is going to be standard … so that repositories are functional and not loaded with junk worded in different ways (P1).

In a utopian world, the SCORM sounds great but practically I think it creates such a level of complexity and the benefit I've not yet seen. I don't know if anyone has taken a SCORM object and reused it ... The question still has to be asked who is going to be reusing repurposing this. SCORM introduces barriers of technological complexity and the practical implementation (P2).

I am a little concerned that we are not implementing it properly. I don't think that it is well understood and typically a lot of the courseware we're spending more time and effort – money and resources to insist on some courseware becoming SCORM conformant but, we're picking courseware where there is little or no chance of reusing it ... It may have a short shelf life so we are not worried about durability and right now we don't have a repository up so you can check the metadata. Therefore, you are putting in metadata in that is never going to get used. We picked bad examples of courses that we insisted on using SCORM against and they didn't pay off so you can't show the users the return on investment (P3).

A Lack of E-learning Talent.

In this complex environment, five respondents indicated that a constraint was an absence

of e-learning talent.

We just do not have enough courseware advisory people with the expertise at a national level to match them up with all the requests for assistance (P3).

There are a few people who see themselves, as developers are quite adept at using tools but not necessarily applying strategies and sound ISD. On the other hand, you have people who are good at design but fuzzy on the tools. There are pockets of knowledge but not across the board. Gagetown is an example where they are streaming ahead. They have some high levels of knowledge in CTC but only in one cell (P6).

We have TDOs [training development officers] with ISD background and they are not necessarily well-allocated or dedicated to one activity. We bring them in as needed. That is a problem. The expertise is there but in terms of management that has been a problem (P7).

<u>Course-based Culture.</u>

The military has a strong culture of classroom training. Training organizations are established, staffed and funded to carry out training and education activities. There is no pressing need to change the status quo for most training establishments, particularly to adjust to the dual notions of technology-based training, at a distance. Consequently, and not surprisingly, seven subjects (frequency 18) cited a course-based culture as a constraining factor.

> At the school, there is less of an inclination to innovate, to modularize and to do e-learning because we have them in-house … There is a lot of potential there to modularize and provide just in time training. That is going to cut across our CFITES mentality for qualification codes (P1).

> People are using the old school house paradigm. People need to be made aware of the powers of the Internet and then they need to be helped in coming up with alternate pedagogies for training. To get over the negative factors we need to show them what the benefits are. Thus far the awareness and willingness are low. There is fear of the unknown (P2).

> There is also the perception that e-learning at work is not look like work, or it is not real work but, they feel guilty. Training is also used as a reward system; obviously not the goal of training but it represents a treat for people. If you take that away, you remove an incentive. That is part of the culture (P5).

> School cultures have resisted DL because it is foreign and we have not done a good job of promoting DL. That is a responsibility of management and we need to be part of that change process (P6).

> The instructors in the schools are the older NCMs. This is what works. There is a feeling that any thing beyond PIPs [Programmed Instructional Packages] is not doable (P7).

<u>Decentralized Content/ E-learning Coordination.</u>

The CF is a large and complex organization. There are numerous training establishments delivering thousands of courses. Coordination of e-learning activities are decentralized to seven MAs. Subjects believed that the MA is in the best position to manage and direct e-learning requirements for his/her particular element and that a decentralized structure worked well.

> The guys who should be deciding what's required are those at the coal face. So I think that policy is still sound (P3).

Notwithstanding, four subjects felt e-learning efforts were not well coordinated. For instance, it was observed that the proliferation of technology in the CF has not necessarily been consistent and that some MAs have done a better job of securing technology and funding. Moreover, subjects at the DA level, while supportive of the decentralized approach, most visibly expressed concerns that this strategy had not resulted in as much content as had been expected.

> We are trying to encourage as best we can. All we can do is encourage. The MAs have their own ideas as to where they want to go (P7).

> We are relying on them coming up with content. In three years, we still have minimal content. Strategy is build it and they will come and it is risky (P3).

<div align="center">Facilitating Factors/Strategies</div>

In-house Development.

Many Managing Authorities are developing their own e-learning content in-house reflecting the high frequency (eighteen) and wide distribution (seven) for this category. Developing content in-house as opposed to hiring a firm to develop custom content can have many benefits. For one, content can be quickly developed or modified as products, services and procedures change. As well, most often knowledge experts can reside within the organization. Also, the cost of creating content in-house can be much lower than outsourcing. There can be pitfalls to in-house development of content including: frequent staff turnovers and low quality content. However, in-house development activities and the accompanying "entrepreneurial spirit" were considered a facilitating factor for e-learning.

> I have one of my personnel doing research on templates and on adopting templates for us. If there is one thing that will be useful to the development community is that we have to standardize the process (P6).

> This was not a view shared by all participants, particularly by the three subjects at the DA

level, where reservations to this strategy were noted.

> It is quite scary, the tools haven't really caught up with this new way ahead. In the old days of CBT, you had to be a programmer then tools became easier and we got back into

the in-house development game. Tools are becoming available but should SMEs develop content? SMEs are only there a few years and they're gone back to operations. Therefore, my sense is no, at least for uniformed folks ... (P3).

There is still too much focus on in-house development, it did not work for CBT (P8).

Notwithstanding, one of the MAs had plans to double the number of in-house development staff from twenty to forty in the near future.

In fact, there has been additional funds allotted and they are planning to double their staff though contract positions. They are maturing the process where they identify projects and fund them (P4).

Funding.

Access to software and hardware funding was predicted to be a constraint. Surprisingly, however, most candidates did not consider it to be a barrier.

Funding is not necessarily an issue. We have this project and we have 15M approved for the next 5 yrs (P1).

In another instance, funds were available but expertise was not.

People are coming to us with money but they need the expertise (P3).

Finally, the expenditure of funds was cited as being difficult, in three instances, owing to the Defence management system.

Miscellaneous Facilitating Factors.

A number of miscellaneous facilitating factors were identified. However, no significant themes were noted. Some interesting observations included:

The live virtual classroom seems to provide an easier switch to those traditional face-to-face instructors compared to the asynchronous environment. It seems to be an easier switch because the technology supports what they were doing in a traditional classroom. This way they are still answering questions, organizing syndicate work and once they get over the use of the technology, they can still use their same ISD/ strategy. This would seem to allow a faster e-learning uptake, as instructors do not have to change their paradigm (P3).

First clarification of the Army definition of e-learning. There is a CFITES definition, however, our interpretation includes electronic aids used in the classroom or elsewhere

and not necessarily distributed. When we talk about e-learning we are talking about advanced training aids and animations. This is where a lot of the work is going on right now within the Army (P4).

Many changes occurring in PS. There's a new PS employment act. We've had the same act for 33 years. As of November it is going to change the way that human resources are completed. It will be a major cultural change for the PS. There is going to be a huge amount of information needing to be disseminated to a huge amount of people. I think technology (communications/learning) will be the only way to reach so many people in a short time.

Another area may be the notion that you can create strategic alliances or partnerships with other schools or organizations and gain access for instance to community colleges or universities (P6).

Finally, two subjects expressed the view that a facilitating factor for e-learning uptake

was the "Internet Generation" and their appetite for e-learning opportunities.

If we look at demographics the up and coming workforce are taking courses on line such as video conferencing. Some universities demand that each student has a laptop. We have a small percentage that wants e-learning and this will drive it (P5).

In terms of where we will be in a few years, looking forward, it's a generational thing. Look at the ages of the people that are trying to move this forward. They are older. The privates and lieutenants coming in. They are going to be the leaders and they grew up with technology (P7).

Support just-in-time training or KM.

A budding theme identified in the literature suggests a move away from the notion of

monolithic courses to learning opportunities that are provided just-in-time and support

knowledge management or performance support activities. Candidates tended to confuse the

terminology, blurring distinctions between these categories. Regardless of what it is termed, the

requirement to support informal learning was clearly stated.

Primary reason for using technology is access. Not just to education and training but to knowledge. Performance support and knowledge management. Procedures for repairing Aircraft, for instance. You might learn this in School but you have not seen it for years (P1).

In conclusion, I think what we think of, as courseware is too specific. Thinking in terms of a course scares people ... After training people still need, to learn stuff and give back to the people that are still in training. There's also the knowledge management aspect to that (P2).

Another reason is to support performance support: just in time, modularized training that one could access at desktop. The future in my mind is the link to knowledge management and performance support (P3).

Just in time learning – you need when a situation comes up what to do. For instance, "Duty to Accommodate" is an area where you don't need to know information unless a situation arises. In this era we shouldn't expect that everyone know every thing but they should know how to get the information (P5).

E-learning in general makes a lot of sense. I do not even think we've scratched the surface where e-learning could go. We are looking at e-learning in conjunction with knowledge management. This is a wider expanse. We are looking at having information available for our personnel to access for instance, after they have completed a course ... The notion that learning is a scheduled event as opposed to a process is a fallacy. We need to focus more on the learner requiring long term learning support. The fact is skill atrophy renders the qualification redundant after a short period of time (P6).

Outsource Development.

A good strategy for organizations with minimal e-learning or high-end content requirements may be to outsource the development of content. Five candidates expressed this was a valid strategy to complement in-house development efforts or it would be the sole method for developing content, as long as vendors could provide high quality and reliable service.

Contracting out remains the vehicle of choice for more robust courses (P3).

The direction we are taking is to outsource all development … we just can't keep our e-learning developers long and management has decided not to invest the huge amounts to keep skill current, particularly due to high turn over rate. The preferred choice is outsourcing (P5).

It is the DLNs advice that outsourcing is preferred. At least rather than establish a position (P7).

Use CMC.

Computer conferencing (CMC) includes the ability to send and receive text asynchronously via the Internet/Intranet. It may also include the use of discussion boards, and e-mail message for private communication. Four subjects signaled that CMC figured prominently into their strategic plans. The Officer Professional Military Education and NET PO (Naval

Environmental) courses were cited as good examples of higher learning utililzing this technology for interaction and communication.

Use Centers of Excellence.

A center of excellence (COE) provides a focal point or concentration of expertise and knowledge on a certain topic. The DLN project is in the process of establishing centers of excellence at various levels of the organization. Enabling access for personnel interested in a topic area or domain. For instance, there is the CF COE at the DLN project and the naval COE at the Canadian Forces Fleet School Quebec. Three candidates indicated that this remains valid.

> The ability to reach out to support the office worker, communities of practice and lessons learned data bases; then you don't have to spend your time sitting on a formal course (P3).

Use Communities of Practice (CoP).

Groups of people who come together to share and learn from one another in either a face-to-face or virtual environment are examples of communities of practice. Communities usually have a central core comprising a relatively small number of voluntary participants, and are held together by a common interest in a body of knowledge and a need to share problems, personal experiences, and best practices. Three candidates expressed this was a valid strategy to pursue.

> I see a need, perhaps, for communities of practice. This could be an extension of just in time training or knowledge. As you extend outwards to your network of experts. It fits the paradigm of a just in time philosophy accessing not only assets but also individuals and communities (P1).

> There are ways we can do it [e- learning] in the Navy to show the advantages – the communication power of the web. Which is for me the real benefit of e-learning - the ability to participate in discussion groups and be able to provide people with the most up-to-date information and yet do it at a very low cost (P2)?

Use Simulation.

Four subjects felt simulation figured into their current or future plans.

> The long-range strategy is to get a 3D model of the whole Air Craft working systems simulated and then from that body of knowledge we can then develop courseware for engineers, maintainers, aircrew, life cycle material managers can use the same thing ...

We are also using a lot more simulation. There seems to be a trend towards simulation (P1).

A good example of simulations is the Navy PTT [part task trainer]. The LMP tracks and manages the students. But the students very much work locally with the simulator. In other words, we're not trying to pump content through the LMP. The application is on the hard drive. The LMP tracks how long the students are on the system and the exams they take. That is a way ahead that is particularly attractive – where content is on a DVD or hard drive and using the network to track and manage (P3).

Use SCORM for high value assets.

Three candidates felt that SCORM would be employed for learning assets of high value where there would be a desire to repurpose or share content.

SCORM will help us if we have content assets of high value, 3D models, simulations, and we want to repurpose or reuse them in different ways. Then we want to be able to Meta tag them in a way that we can quickly retrieve and launch them. We expect to use SCORM in those instances ... There is a desire to repurpose or reuse expensive objects.

Sharing Content

The SCORM standard assures that objects are interoperable and shareable. Sharing of content, one of the prime drivers supporting the work on technical standards was supported, at least in theory, by seven candidates.

If we could obtain courseware from our Allies or service provides such as "Smart Force" that would make a huge difference. I think increasingly there will be products available off the shelf that could be useful to use. Then we may see a synergy as people see more courses and take more courses. They will get a better sense and appreciation of e-learning as courseware gets better and it takes off exponentially (P3).

The potential for sharing is huge. The federal government is guilty of a lot of duplicating. Almost every department uses the same course (P5).

However, only one candidate mentioned a practical example of sharing. Whereas six candidates expressed the view that sharing learning content was currently non-existent and the practical reality of sharing SCORM learning content would either be difficult or unlikely to occur in the near term.

We have 650 courses out there, what is common amongst these courses. This is a simple question to ask. It is very difficult to answer ... At 403 squadron, we went into the school and did commonality mapping between five courses run at the school. We learned that

the terminology used and statements are dissimilar. Some will use the term: maintain the "whatever" radar. Someone else will say "repair" and another will say "upkeep it" (P1).

SCORM I'm a little less convinced about. You need large scale to make that work ... In reality, you cannot separate content from context ... The question still has to be asked who is going to be reusing repurposing this. SCORM introduces barriers of technological complexity and practical implementation … In a utopian world the SCORM sounds great but practically I think it creates such a level of complexity and the benefit I've not yet seen. I don't know if anyone has taken a SCORM object and reused it (P2).

Everybody talks about sharing SCORM content. We have trouble seeing how that is going to fit in without creating more work. We are not adverse to this idea. However it is just not a top priority. Other things are more important ... a course-authoring tool which was developed in Gagetown which can make content SCORM compliant. They are not converting objects to SCORM, they haven't seen the true benefit of doing that right now …with meta tagging there has always been the problem of naming conventions – which hasn't been sorted out yet. There is lots of work still to be done there before we jump in the pool headfirst (P4).

A technology that shows promise, in a perfect world is the SCORM because we found for instance, there were six harassment courses. If we had SCORM there could be more "shareability." However, having discussed this with the MAs just last week we should be able to bring this into a central place and reuse it. They said that is not likely to happen. The stove pipes are going to stay … Sharing may make more sense in an academic world which is more of sharing world unlike the military (P7).

<u>Policies</u>

Finally, four candidates believed that current e-learning guidelines did not provide

sufficient guidance on the topic of DL.

CFITES is a good thing it is a little inadequate for e-learning requirements. The guidance that is required at the design and development stages, it is available, just not embedded into the CFITES manuals. Storyboarding, design documents, project management around e- learning teams – we just don't address these issues in the CFITES (P1).

I think we need a great deal more IT&E guidance in terms of DL production. Is there a centralized policy for courseware quality, for performance management and performance indicators? Is there a centralized policy for evaluation of DL instruction in terms of student reaction? Is there a policy for the DL development process and how is it similar/different from the current CFITES process? This type of guidance does not exist formally, it may exist informally in bits and pieces. I have not yet seen a formal policy. Personally, it should not be policies from the DLN. They should be DTEP volumes. DL and technology-based learning is not going away. It is going to become the norm. We need to emphasize in this in the 9050 series (P6).

DTEP is looking at providing another volume to CFITES for e-learning. At least there would be something to go back to in order to reference. I think there is value in having something in place (P7).

CHAPTER V - CONCLUSION AND RECOMMENDATIONS

Introduction

This study commenced by stating that organizations pass through four stages on their road to adopting new technologies such as e-learning. These stages merit reiteration.

Stage 1: Survival Stage. This can include unrealistic expectations, struggle against the technology (e.g."we don't need this technology"), chaos, and outsourcing as there is no time to create and effectively manage the technology.

Stage 2: Mastery Stage. In this stage there is increased tolerance and technical competence.

Stage 3: Impact Stage. People are busy creating applications using the technology. They are less threatened by the technology. "This is just a standard procedure for how we do business."

Stage 4: Innovation Stage. Integration with current business and the restructuring of curriculum and learning activities.

McKenzie (as cited by Fahy, 2004, p. 193)

In comparison with Chapter IV results, it appears the CF are in the early stages of adopting e-learning and associated technologies. The coding category "exploring e-learning potential" incurred the highest frequency of responses (26), which was widely distributed among six of the eight study participants. Subjects reported struggles with technology, such as duplicating courseware to run on the LMP and the departmental Intranet. Five candidates reported content shortages or "unrealistic expectations" regarding the quantity of courseware that could be launched during the proof of concept or trial of the enterprise-wide e-learning solution. Concerns were expressed over the quality of courseware being developed and launched from the LMP. Experimental activities with in-house development tools and outsourcing were initiated in order to firm up e-learning strategy choices. There were also some indications of increased tolerance and mastery using residentially developed authoring tools to develop e-learning content. Finally, the proof of concept was a trial of an enterprise wide e-learning solution.

Notwithstanding the challenges, this trial demonstrated the viability of such a model to support distributed CF learning activities.

<div align="center">Responses to the Research Questions</div>

Three research questions were formulated to guide this study:

1. What are the perceptions of e-learning implementation within the DND?

2. What are the constraints or facilitating factors affecting greater adoption of e-learning courseware within the DND? and

3. Is there an optimum strategy the DND could adopt to deliver e-learning courseware for maximum effect?

Wide ranging responses to the research questions are contained in the Chapter IV results. This section will attempt to narrow the main responses or conclusions to the research questions.

<u>What are perceptions of e-learning implementation within the DND.</u>

Figure 4 illustrates that four of eight study participants expressed a positive value perception of e-learning, with qualitative data suggesting favourable impressions of e-learning at mid to higher levels of the organization.

Figure 4 MA Value Perception Regarding E-learning

Coding Category	Sub Category	Frequency	n
Value Perception	-Positive • -Negative - Split	4 5 2	4 2 2

While two of eight study participants were split in their response (depending on the perspective, the learner or the manager), only two candidates expressed a negative perception regarding e-learning. These latter, less positive sentiments appear to have been driven by the perceived poor quality of e-learning courseware that was being deployed.

However, candidates were unanimous that increasing access to content is a prime organizational reason for e-learning, improving the quality of life for CF members anywhere, anytime and just-in-time. This notion, coupled with the positive value perception of e-learning, was interpreted as a positive driving force for the adoption of e-learning within the organization. With the CF trial of an enterprise wide e-learning solution having concluded recently, many CF units continue to explore e-learning technologies and strategies for potential adoption. This result suggests continued support for such initiatives.

While e-learning initiatives and experimental activities were relatively well received, technology purchases (LMP, courseware) can lead to the creation of idealistic expectations about the technology. Half of the study participants reported that there were unrealistic content expectations and content shortages. This perception aligns with Rosenberg's (2005) consideration that the investment and maintenance of huge infrastructures can be problematic. In other words, should an organization decide to buy an LMS, there may be a need for courses to fill the LMS and authoring tools to build courses, etc. However, if they decide later that they need a community of practice, they can't do it because their LMS doesn't support it. Accordingly, strategic planning, the thrust of one of the recommendations below, is paramount.

Finally, Figure 5 indicates that quality of e-learning content was a prime concern of study participants.

Figure 5 Participant Value Perception of E-learning Quality

Coding Category	Sub Category	Frequency	n
Value Perception	-Concerned About Quality	19	8

One respondent indicated that the MA was taking measures to close the perceived deficit between the current quality of online offerings and management expectations for quality courseware. There was also mention that the CFITES lacked specific guidance for developing

quality online learning materials. The literature suggests that other organizations have struggled with the quality of online content. Content that is boring and page turning in nature is not likely to support widespread adoption.

What are constraints or facilitating factors to the greater adoption of e-learning courseware within the DND.

Figure 6 is a force field analysis depicting the driving and restraining forces for e-learning adoption.

Figure 6 Force Field Analysis

Driving Forces for E-learning (pro's)	Weight	Restraining Forces for E-learning (con's)	Weight
Value Perception (improved, just-in-time)	5	Resistance Passivity/ School Cultures	5
Improved Access	4	Complexity IT/ E-learning	4
Adequate Funding	4	Complexity of SCORM	4
Entrepreneurial Spirit (e.g., in-house development)	4	Lack of Appropriate Content	3
		Better Coordination	2
Compatibility with social or organizational trends	3	Limited E-learning Talent	2
		•	
Total	20	Total	20

A Likert Scale (1-5) was used to approximate the relative merit of each of the forces identified in Figure 6. Both driving and restraining forces were gleaned from the Chapter IV results. While the relative strength of the forces are estimates, the result indicates that driving and restraining forces are equal. While coincidental, if this is the case, this suggests equilibrium or status quo with respect to e-learning adoption levels.

A top-facilitating factor was considered the positive value perception of e-learning in the organization. A top restraining force, working against e-learning uptake is the resistance or passivity owing to a strong culture of classroom training. Military training establishments are established, staffed and funded to carry out training and education activities. Training or

education by distance education currently constitutes approximately 1.4% (2005, DLN Business Case) of the overall training and education equation. Frequently, there is no pressing incentive (financial or otherwise) to change the status quo from a predominately classroom-based environment to online. The online environment demands that training establishment staff adjust to the dual notions of technology-based training, at a distance. Consequently, and perhaps not surprisingly, seven subjects (frequency 18) cited a course-based culture as a constraining factor. <u>Is there an optimum strategy the DND could adopt to deliver e-learning courseware for maximum effect.</u>

Given the diversity of CF units and requirements, it is complicated to single out optimal strategies the DND could support to deliver e-learning courseware for maximum effect. Moreover, this study concludes with ten recommendations, which are, in essence, strategy recommendations. Furthermore, the review of literature attempted to uncover possible strategy considerations early in the research process. It included a consideration of adoption of innovation/diffusion theory, which may serve to mitigate expectations that e-learning will take hold (exponentially) early in the implementation process. The sound application of ISD principles remains an optimum "technology" to assure an efficient and effective learning environment. In fact, given the increased complexity of the online environment, perhaps the application of ISD and principles of how adults learn best is needed more than ever.

Overall, a simple yet effective strategy could be to focus on leveraging the most basic elements of the electronic backbone or, LMP system, including the opportunity to provide motivation and opportunities for interaction and feedback through communication features inherent in the LMS. This could be accomplished in conjunction with print-based offerings. The strategy could include firm policy direction to provide maximum support to both facilitators and autonomous learners.

A strategy could be invoked which leverages in-house development of lower level learning objects in support of both classroom-based training and knowledge management/performance support once skill has faded. Coupled with rapid e-learning, the in-house development of learning objects could be an optimum strategy to increase e-learning content and reduce course length (given that some course content, just in case learning content, is stored as LO's in the repository to be accessed at the time of need by the learner and not necessarily while the member is on course).

Given the Chapter IV results, the sharing of learning objects, a prime driver for the SCORM initiative, a useful concept, will likely remain largely misunderstood in the next 3-5 years. Hence, it may be beneficial to place greater emphasis on working in a SCORM environment. After all, if the Departmental LMS is SCORM conformant, courseware content strategies – using CMC, inserting PDFs, study guides and some self-pacing content/LOs - need not be SCORM. These content items must be able to work effectively with the SCORM conformant LMS. Only when the business case supports the development of SCORM content should this additional step be taken.

Finally, at the MA level many strategic plans were already developed. However, a basic corporate-wide strategy should be developed and implemented as soon as possible, which includes traditional elements such as vision, mission, environmental scan, objectives/goals, strategies, SWOT assessment (Strength, Weaknesses, Opportunities, Threats) and monitoring (Bates, 2000, Rosenberg, 2001). The strategy should be compared with subordinate level strategies to ensure unity of direction.

To conclude, qualitative exploratory studies do not readily lend themselves to overarching recommendations. In this regard, further quantitative studies or DLN data may serve to confirm or reject some of notions above or, for the matter, the recommendations below.

Moreover, the following recommendations represent change. However, in considering organizational change in any context, civilian or military, the complexities of not only communicating such change but in implementing it are vast and have been well documented. There is frequently strong inertia to maintain the status quo. As stated, the data suggests a prime constraint to e-learning adoption is the tradition of "school-house cultures" (Frequency=18, n=7). Organizational change in the civilian sector has a decisive advangate as it is frequently predicated on the ability to gain profits. This does not exist within the military. Futhermore as Chisholm (2002) has stated that the size and complexity of military structures make change difficult under any circumstances. Chisholm considers that change is amplified when the desired action is a departure from history and training. Military organizations being hierarchical in nature do not generally respond as well to change as flatter more centrally controlled structures.

However, as we proceed into the Information Age, the Chief of Defence staff has embarked on a vision of CF transformation. "Transformation focuses on people, technology, ways of conducting operations and ways of thinking" (CF Transformation, 2006). This environment calls for professional, highly trained armed forces capable of using new technologies. Technology will play an important role as the CDS transformation web site explains "The CF has embraced these new technologies, and we will continue to invest in training and equipping Regular and Reserve personnel to ensure they remain amongst the most highly trained, technologically adept soldiers, sailors, air force personnel in the world" (CF transformation, 2006).

Accordingly, ten recommendations, flowing from the three research questions, have emerged. It is hoped they will be useful in the formulation of strategic direction and transformation process.

<p style="text-align:center;"><u>Recommendations Related to Research Question One</u></p>

<u>Leverage positive value perception associated with e-learning</u>**.**

The research data listed at Figure 4 (p. 72) indicate a positive value perception associated with e-learning. Qualitative notions considered the improvement of the quality of life of service members and increased efficiency and effectiveness of training as being positive reasons for deploying e-learning. This corresponds to the academic and professional literature which promises many benefits to be derived from e-learning systems, including "increased effectiveness," "just-in time-training," and "improved access" to learning materials. These notions have certainly helped drive the e-learning equation within the DND. Moreover, access to previously denied learning opportunities was cited as the prime driver for e-learning within the department (eight candidates found access to be the most important reason: n=15).

Given the positive value association and strong support for e-learning, it would be beneficial to invest in quality e-learning content. This would help leverage the positive value perception associated with e-learning and help establish the case for additional e-content.

<u>Expect e-learning uptake or diffusion to take time.</u>

Despite a positive value perception of e-learning, the results depicted in Figure 7 suggest that CF units and organizations appear to be grappling with the impact of technology on their respective units and the benefits of associated potential technologies.

Figure 7 Participant Analysis of E-Learning

Coding Category	Sub Category	Frequency	n
E-Learning	-Exploring Potential -Unrealistic Expectations -Not Much Content	26 4 8	7 4 5

Accordingly, this recommendation recognizes the challenges associated with implementing technology-based training at a distance. Training and development professionals have been struggling with complex technology platforms, inconsistent support and skill, and e-learning content shortages. The literature suggests this is characteristic of learning organizations whether they are academic, military or corporate entities. In addition, technological advances in learning and related disciplines such as e-business and e-commerce are continuously being achieved in relatively short periods of time.

In sharp contrast to these rapid technological advances, considerable time is required to design and create well-developed educational programs. Educational research is unable to keep pace with advances in learning technology. In other words, technology frequently outpaces the ability of designers to assimilate the impact that technology will have on the efficient and effective delivery of educational programs and services.

In this milieu, it is practical to guard against idealistic expectations, particularly in large and complex organizations such as the CF. There are ingrained habits and hurdles that must be negotiated. Moreover, with a time lag, or evolutionary process of twenty-five years or more cited in the literature, it would appear sage to keep expectations grounded. Paul (1995) has stated that today's new instructional technology will eventually be taken for granted, just like telephones and bank machines. The ubiquity of the Internet is a recent phenomenon. As one research candidate stated, no one could have imagined the uses from education, to banking, to sales, and so forth.

It is equally important to reiterate that instructional technology, which by its own nature is innovation-based, needs to be introduced and diffused into the educational system. Understanding the best way to present innovations for potential adoption will help ease the process and ground expectations. For instance, the "theory of perceived attributes" tells us that individuals will adopt an innovation if they perceive that the innovation has: 1) relative

advantage over an existing innovation or the status quo; 2) is compatible with existing values and practices; 3) is not too complex; 4) has a trial period; and 5) offers observable results.

DLN project research and the results of tests or trials of new technologies should be widely disseminated in favour of those e-learning innovations deemed most likely to result in widespread diffusion. Regardless, for those technologies that are diffused, it is important to recall that diffusion is more likely to measured in years versus months. Leading theories of the diffusion or adoption of technology inform us that this is, in fact, the norm.

Quality Content is Important.

The data indicates that all candidates were concerned about the present quality of e-learning content (Frequency=19, n=8). The provision of quality learning materials in the online environment appears to take on greater meaning. Instructors are unable to "step up" and compensate for poor design or inadequate content. Content must motivate and engage students. Meeting instructional needs of students with quality learning materials and experiences is the raison d'etre of distance education. Crossman (2004) states "if there's anything that will cause a program to fail, it's not making the investment in content …Recycled PowerPoint slides or classroom materials converted to HTML do not constitute high-quality e-learning content." Content must be entertaining, captivating and sufficiently interactive. It must motivate students to pay attention to it. Basic, page-turning text is not likely to accomplish this, nor is it likely to enhance e-learning's reputation. In fact, it makes little sense in going to the time and expense of producing low quality e-learning products that could be developed and distributed more efficiently. Print remains a most popular media choice in distance education systems for obvious reasons.

Furthermore, a review of distance education theories suggests that study at a distance can be an isolating individual activity. This corresponds to a recent Campaign for Learning study, which revealed that 57% of respondents claimed the e-learning experience to be "frustrating,

lonely, and stressful" (Van Liew, 2005). This result does not suggest an easy undertaking on the part of most learners. This is particularly true when specific time may not be set aside to engage in a learning activity or when learning opportunities are not available or supported at the work place. Other things can get in the way or become more important. This requires that learners be autonomous, motivated and self-disciplined. Quality content would seem to play a significant role in motivating students to commit to studies.

However, quality, a relatively easy concept to understand, is more elusive when put into practice. Within the Canadian Forces, quality appears to be embodied in the phases of the CFITES model and the application of systems approach over the "life-cycle of the IT&E program" (MITE, vol 1, p. 3). Training and education activities developed systematically are apt to be quality products.

Alternatively, Bradberry (1991, as cited in Patsula, 2001) takes a learner-centric approach to quality stating "the fundamental criterion of quality must be value to the learner." Hence, it is the learner perception which matters most. After all, education is one of the few events where the consumer also does the work. Quality can take on many dimensions in distance education systems, including quality learner support and feedback mechanisms. Most certainly there will be a requirement for appropriate levels of interactivity and feedback. In particular, self-paced SCORM-compliant content will require high levels of interactivity to compensate for the isolating effects or transactional distance inherent in distant studies. However, quality must be present in all aspects of the design to ensure the effective and efficient attainment of learning outcomes.

One possible resource, which could lead to the production of quality learning objects is a review instrument. Proposed by researchers, Nesbit, Belfer and Vargo (2002) and termed a "convergent participation model," the researchers suggest that the properties of learning objects, including global standards, granularity, and reusability, have unique implications for evaluation.

81

An evaluation team involving stakeholders in the learning process completes a two-cycle review of the learning object. The first cycle is completed asynchronously. In the second cycle, a moderator leads a discussion on points of greatest divergence among participants. The strength of the model is that it is brings together stakeholders in the learning process, focusing attention on areas of agreement and dissent among evaluators. The model also helps to educate members on the desirable qualities of learning objects, influences design practices, and encourages community-building. While researchers call for additional study of the model, it aims to inject quality and promote a greater understanding of learning objects. Adoption of such a model may prove beneficial to increasing the likelihood of quality e-learning content.

<div align="center">Recommendation Related to Research Question Two</div>

Minimize E-learning Constraints.

Figure 6 (force field analysis data, p.74), indicates the driving and restraining forces impacting upon e-learning adoption within the CF. Based upon Lewin's (1951) force field analysis theory, the table illustrates the dynamics at work in the change process. Driving forces facilitate movement from a present level of organizational performance to a desired level. Restraining forces act to hinder this movement. The results of the force field analysis, which was based on the gathered data, suggests equilibrium with respect to e-learning uptake.

Earle (2002) questions whether restraining forces should be decreased or the driving forces increased to facilitate the integration of educational technology in the classroom. He concludes that increasing driving forces ultimately creates tension and return to the status quo. Accordingly, focusing energy on the reduction of the constraining factors (such as classroom-based culture) is deemed a more productive way to help integrate e-learning.

Specific strategies could include a focus on the design and development of quality learning materials, or other strategy recommendations cited below may serve to lessen the identified restraining forces. For instance, employing an e-learning strategy incorporating the use

of small e-learning procedures, and integrating these into the regular classroom may reduce

resistance of school cultures. This represents the Canadian Army's current strategy. In this

regard, knowledge assets could also be placed on the LMP to be accessed after the qualification

is gained to support KM (just-in-time or refresher training).

The list of restraining and driving forces identified in this study should be re-considered

relative to further research, expertise, or DLN project evaluation reports. However, e-learning

adoption will be increased by a sustained focus on decreasing identified restraining forces. This

is the focus of recommendation three.

<u>Recommendations Related to Research Question Three</u>

<u>Support an umbrella of several E-learning Requirements.</u>

Participants recommended a number of diverse strategy recommendations in Chapter 4.

The data are depicted in Figure 8.

Figure 8: Participant Strategy Recommendations

Strategy	Frequency	n
-Use JIT/ KM/ PS	18	6
-Use Outsourcing	9	5
-Use CMC	4	4
-Use CoP	8	3
-Use COE	5	3
-Use Simulation	5	4
-Use SCORM for high value content	4	3
-Use SCORM	2	2

This divergent result implies a likely need for a robust technology platform to support an

umbrella of e-learning, including: 1) SCORM objects; 2) communities of practice; 3) centers of

excellence; 4) knowledge management; and 5) just-in-time training.

One respondent felt that the CF could benefit by subscribing to Rosette's (2005) "big tent

view" of e-learning, which encompasses five levels. At the first level there is learning, something

that an individual learns by heart. SCORM self-paced learning for instance. The second level corresponds to information support and technology-based coaching - a resource that a trained individual could access to ensure a procedure was being followed correctly. The third level, knowledge management, supports the capture of the organization's brainpower, allowing teams to communicate to produce work or illustrate, for instance, what a model business case proposal would look like and what makes it good. The next level is using technology to support interaction (e.g., CMC), collaboration (e.g., communities of practice), coaching and learner engagement with complex simulations or examples. Finally, the "big tent" includes guidance, tracking, and information, so that managers can see employee skills and knowledge.

The ultimate selection of an enterprise technology platform that will accommodate diverse learning requirements gives the impression of a good fit. Ideally, the platform could be expanded should the need for additional technologies be identified.

Use Learning Objects to Support KM and Jumpstart E-learning.

The Chapter 4 data indicates that constraints to e-learning adoption are complexity of IT/e-learning (Frequency=20, n=7). It also indicates that access is considered a primary reason for using technology-based training (Frequency=15, n=8). The focus of this recommendation is to advocate the development and deployment of smaller learning objects which could be highly "accessible" and ultimately "jumpstart" knowledge management and e-learning uptake.

Training magazine website (Training Mag.com, 2005) indicates "most learning takes place on the job, outside the purview of formal learning. When we do conduct formal training, 80 percent is wasted effort." The web site claims the half-life of newly learned material is three days. While specific research is not provided to substantiate this claim, it is generally accepted by training and development professionals that skill and knowledge fade do occur in a relatively short period of time; hence, the emphasis on drill and practice to acquire the skill at the onset.

The Training Magazine website goes on to state that "traditional courses are an albatross around our necks, and if we don't change our delivery mechanisms, we will be sidelined."

This notion is amplified by Conference Board of Canada (2003) research which indicates that 70% of our learning is acquired informally on the job. These findings have dramatic results, particularly for workers in the "knowledge economy," where one must deal with many singular and changing tasks. Should the face of learning change to accommodate the worker in the knowledge economy?

E-learning is typically defined as training that takes place over the Web rather than in a physical classroom. However, the Canadian Army's current strategy is to develop robust e-learning content, learning objects such as simulations, for classroom delivery, and eventually port this e-content to the web. This strategy aims to result in a pool of knowledge assets that will be accessible and shared by classroom instructors in Gagetown, New Brunswick. Knowledge assets would eventually support e-learning at a distance. Is this strategy for the knowledge worker?

Regardless of how it is labelled "e-learning," "knowledge management," or "just in time training," the Canadian Army appears to be charting a context for e-learning and access to content and components of courses that would be used informally, when needed. Qualitative results indicate that access to learning material after the individual is qualified represents a widespread and common vision for e-learning. Is this a form of knowledge management?

Knowledge management is not new to the CF. According to the Director General Strategic Change (DGSC), knowledge management (KM) is a concept that has been an integral part of military practice for centuries. The Directorate of Knowledge Management and Change Support (sub organization of the DGSC) is currently developing a strategic operating concept for knowledge management in the DND. The purpose of this concept will be to link the use of KM

approaches to the delivery of Defence outputs, and facilitate the design and delivery of KM enablers across Defence (DGSC Intranet site, 2005).

It is unclear how the DGSC initiatives will map with DLN project movement in this area. However "stovepipes" frequently prevent initiatives from maturing. A concept that has been around for at least five years is the pending merger of KM and e-learning, leaving the traditional concept of classroom training behind (Barron, 2000; Berry, 2000; Rosenberg, 2001, Rossette, 20005). According to Berry (2000), there are at least two factors driving the fusion of knowledge management and e-learning:

- Knowledge management and e-learning are essentially both about knowledge acquisition. The process of knowledge acquisition in the KM context is not much different from knowledge acquisition through self-paced interactive learning; the technology infrastructure employed is often the same and an equal investment of discipline and time is exerted by the employees in expanding their personal knowledge base and skills, whether they study from the knowledge management portal or the e-learning portal on the company intranet.

- Both knowledge management and e-learning can encourage information sharing. Technology tools let employees contribute new pieces of knowledge in the context of work-knowledge archived in a knowledge management repository--or in the context of learning--course chat discussions, for instance, which can generate new knowledge and then which is archived in the knowledge management repository. Once information is captured and locked down as useful knowledge, its source becomes irrelevant in terms of its value.

    (Berry, 2000)

Barron (2000) states knowledge management is a great way to get e-learning to take root. However, he signals there are some important differences. Most significant is the training requirement to test to ensure the material is learned. This is lacking in a KM environment where the emphasis is capturing and sharing knowledge. Barron (2000) contends that a number of key strategic decisions need to be made, for instance "rather than replace courses and relegate content as e-learning, courses could be reduced and human-taught content could be combined with learning objects."

An e-learning strategy encompassing KM through the use of learning objects (vs. a community of practice approach) could be significant in that both "important" and "just in case" content could be related to an accessible repository. This strategy would ostensibly reduce in-house course length, add efficiency and effectiveness to the learning environment, which will ultimately free the instructor to tend to other tasks. Important content could be delivered as self-paced learning chunks prior to or while on course, and remain accessible to learners when skill has faded. Content of lessor importance, or "just in-case" content, could be skipped on course and acessed by the learner as dictated by the learner.

This strategy, when considered from the perspective of diffusion theory, is attractive because it is simple and the advantages may be understood at the grassroots level. However, a schoolhouse instructor's prime concern will be sharing content with the intended audience, the student at the schoolhouse. Instructors do not typically look beyond immediate qualification to the ongoing maintenance of knowledge or skill. Regardless, an e-learning strategy promoting the greater convergene of E-learning/KM, within the context of smaller information chunks (lessons, enabling or performance objectives) appears promising. In addition, it appears less daunting to implement, adds efficiency, supports KM, and may ultimately help with e-learning adoption.

<u>Emphasize "ease" in E-learning/SCORM Environment.</u>

Qualitative data, under the coding category "constraints," suggests that the SCORM/ IT are complex entities which must be understood. This is indicated in figure 9 below.

Figure 9 Constraints = Complexity of IT/SCORM

Coding Category	Sub Category	Frequency	n
Constraints	-Complexity of IT/e-learn -Complexity SCORM	20 9	7 3

The CF is aligned with the SCORM for many good reasons, including the adoption of the standard by its allies and NATO. To this end, the DLN Test Lab has joined the UK and US as one of only three Advanced Distributed Learning Partnership Labs in the world. Partnerships aside, it makes good sense to support a single CF wide e-learning standard. Woodward (2005, LTI website) explains:

> Standardization helps promote wide adoption by making the details of how things work together transparent to the user. For example, plug in a new printer and, presto, the operating system on your computer loads the correct printer driver. In other words, things just work together -- all because they were developed to a common standard that ensures interoperability and ubiquity.

However, qualitative data suggests that there is unlikely to be a large upswing in SCORM content in the near term (3-5 years), with sharing of content unlikely or ad hoc. One MA would SCORM assets of high value – high end simulations. Another would SCORM content only when there was a clear need (with non SCORM e-learning assets likely to be shared locally amongst interested schools). Another cited the classroom as a prime delivery mechanism, owing to the inability for most employees to access e-content due to hardware and infrastructure limitations. A final said that e-learning initiatives were not widely supported in the MA owing to operational imperatives.

Even outsourcing SCORM/ e-content takes considerable planning and effort including: 1) knowledge of contracting procedures; 2) securing funds at the right time; 3) negotiating the

complex defense expenditure management system; 4) producing an RFP; and 5) working with a vendor. This strategy is more likely to be embraced for developing higher-end content such as simulations.

Accordingly, the thrust of this recommendation is to leverage extant in-house cells and expertise in order to produce larger quantities of smaller content including objects, procedures and facts. To do this, the SCORM environment/repositories, practices and policies must be favourable to the production and accessibility of large numbers of e-learning assets. For instance, Dow Chemical has managed to implement a huge global e-learning program delivering 1,400 courses with 380,000 course completions per year and 55 million learning objects. Dow uses TopClass e-Learning Suite™ and Macromedia™ authoring tools (Crossman, 2004).

Does the CF vision for e-learning correspond to Dow, an industry success story? If so, e-learning stakeholders particularly at the grassroots level must appreciate that the SCORM and associated technologies do not represent a step back to the "good old days" of overhead projectors (OHP) and transparencies. Professionally produced OHP transparencies took considerable planning and care to ensure they were right. Typically, they were sent off site to be produced, requiring 100% accuracy. Then along came presentation software such as MS PowerPoint. It did not take long for this innovation to diffuse quickly and OHPs to fade. The benefits compared to the status quo (OHPs) were immediate and obvious to all.

The SCORM is likely here to stay, regardless of the growing pains that the fragmented e-learning industry will go through, on its march to maturation. However, within SCORM meta tagging alone can be daunting. One respondent believed it took sixty odd meta tags. Contrarily, another respondent believed that it took mere moments to meta tag using the editor that they had developed. However, even this individual questioned the need for SCORM content when local e-learning needs could be met without invoking this latter step.

The SCORM will likely mean little to an instructor whose interests are narrower. Instructors will want content developed quickly and on the LMP in short order. They will want a measure of control, ensuring that content is accessible to them for undoubtedly frequent content changes and amendments (not unlike changing a lesson plan or Power Point briefing). At the local level, content can be accessed and shared locally through the DWAN without concern for issues of: 1) meta tagging; 2) intricacies of SCORM compliance; 3) shipping content to Ottawa for compliance testing and loading on the LMP; 4) learning how to operate in a managed learning environment afforded by the latest LMP; and 5) coping with transactional distance of content located in Ottawa.

If SCORM in particular self-paced learning is to take off in a big way (in support of e-learning/ KM) it must correspond to elements of diffusion theory. SCORM and IT procedures must be clear, easy to use and offer relevant advantage over extant practices. Alternatively, it may be more attractive to maintain the status quo and conduct ad hoc e-learning activities using the CF intranet (DWAN) rather than a rigid central repository, satisfying local aims versus stringent enterprise objectives. Diffusion theory suggests the status quo will be the norm. Stakeholders must appreciate that the SCORM and associated e-learning technology are things that work quietly in the background.

Leverage In-House Development to Rapidly Develop E-content .

The favourable results under the coding category "facilitating factors/use in-house development" suggests that this may be a prime vehicle to leverage in order to rapidly develop and deploy e-learning.

Figure 10 Strategy - Leverage In-house Development

Category	Sub Category	Frequency	n
Facilitating Factors	Use In-House Development	18	7

Industry estimates that rapid e-learning development grew 80 percent over the last year, with growth expected to be 40 to 50 percent over the next two years (Bersin, 2005). Given the MA establishment of robust in-house development cells and the fact that 72 percent of all training challenges are time critical (Bersin, 2005), rapid in-house development of content appears to be a strategy that could be leveraged to expand content, particularly at lower levels of the learning spectrum or to support KM, and just-in-time training requirements.

Rapid e-learning entails developing content in a matter of weeks as opposed to months. Authored by SMEs and similar in scope to the in-house development of PowerPoint for the in-house delivery of lectures, the strategy is suited for lower levels of learning, information broadcast or smaller information objects (e.g., processes, procedures). Using template-based authoring tools, SMEs are able to put their knowledge into a content format to deliver e-learning. Many tools have embedded instructional design principles or pedagogy built in, in order to guide users in authoring content. The Canadian Army has developed an "Army Content Authoring Tool" (ACAT). Other tools used or "trailed" were reported to be *Ready Go™*, *Articulate™* and *Breeze™*.

However, the focus in this strategy is not merely the development of content; rather, the development of quality content in a timely manner. Bates (2000) discusses strategies to support in-house development activities using two approaches – lone ranger (adhoc developers and development), or using a project management approach. Qualitative results indicate that there are few 'lone ranger' projects being undertaken.

Accordingly, a project management approach relying on individual team members contributing appropriate levels of skill and knowledge to the successful completion of the in-house project may be applicable. There are many project management models and approaches that could be employed. However, a project management approach could include minimum elements such as: 1) a systematic way of identifying projects; 2) a method of determining

resources to support the in-house effort (ISD, funds); and 3) reporting results annually. The idea here is not to hinder rapid in-house development with a cumbersome team, but balance in-house efforts with effective management to ensure the development of rapid, efficient and effective content.

<u>Ensure MA Strategic Plans mesh with Departmental Authority Plan .</u>

The Chapter 4 data (Table 8) suggests a wide range of potential MA strategies. Accordingly, A most critical recommendation is the development of an enterprise wide e-learning strategy. This need not be a weighty tome; rather, key e-learning stakeholders should participate in the development of the strategy that will guide and serve to coordinate e-learning efforts in the department. Departmental Authority (DA) candidates indicated that their plan drew from elements of miscellaneous documents. However, a singular strategy document remains a vital task requiring completion.

There are a number of elements that may be included in the strategy document. Moreover, strategic planning is relatively well known for CF organizations. However, most strategies (Bates, 2000; Rosenberg 2001) will include:

- Vision – what the successful e-learning situation will look like;

- Mission – what needs to be done to achieve the vision;

- Environmental Scan – what is happening that could impact the plan;

- Gap Analysis – of the desired state with the current state. This could consist of a force field analysis (above) or a Strength, Weaknesses, Opportunities or Threats (SWOT) assessment;

- Objectives – in observable terms of what is hoped to be achieved in the next 3-5 years;

- Strategies – actions to achieve goals; and

- Monitoring – measuring achievements and adjusting strategies as needed (six months to one year).

Bates (2000) indicates that after an intense period of development, strategic plans are frequently forgotten. However, he indicates that one half day per year is all that is required to review and adjust a well-written plan. A strong vision statement and clearly identified goals are critical aspects of the strategy. Because circumstances change frequently, a great deal of time in developing detailed strategies is not required. As most MAs have completed or drafted their plans, an important task will be assuring that these plans mesh with the DA plan.

Consider adding CFITES DL/E-learning volume.

Four candidates felt strongly that more DL/e-learning guidance was required. In other words, it was believed that the current Manual of Individual training (MITE or 9050 series) was lacking with respect to e-learning and distributed learning guidance. While other rich sources of information are available, a dedicated CFITES volume may help to clarify CF requirements.

Conclusion

The implementation of a project of the size and complexity of the DLN into a Department as large and varied as the DND represents a significant undertaking. The Defence Learning Network (DLN) is a joint military and civilian initiative, which aims to introduce an enterprise e-learning solution into the DND. The DLN vision is to provide the tools and services to make learning available "anywhere, anytime and just-in-time" to both civilian employees and military members.

Technological advances in training and education have expanded rapidly in recent years. Unfortunately, the ability to integrate newer technologies has not kept pace with these rapid developments. This study explored the perceptions of e-learning professionals within the Department to understand and appreciate the challenges of integrating technology-based learning into the mainstream. The perceptions of individuals when collectively taken provide a rich

account of the implementation challenges that have been tackled and those that remain. DLN project personnel and Managing Authorities have made considerable progress in providing learning experiences for a growing number of on-line students. However, the ability to offer a critical mass of quality e-learning remains a considerable challenge for the organization.

It seems fitting to conclude by stating that technology and associated applications form critical components of many distance education programs. However, it is equally important to remember that the technology is just a part of the overall equation. Technology may facilitate the delivery of learning content; it should not, however, become the focus of the learning endeavour. Meeting the instructional needs of students is the raison d'etre of distance education. In order to accomplish this goal, e-learning requires the integrated and coordinated efforts of a number of key participants, including students, facilitators, support staff, and administrators. When the efforts of all stakeholders in the learning process have been effectively integrated, the distance education system becomes both efficient and effective.

REFERENCES

Advanced Distributed Learning (ADL). Retrieved January 2005. Available:

http://www.adlnet.org/index.cfm?fuseaction=SCORDown

Archibald D. (2005). Rapid E-learning – A growing Trend. Retrieved June 2005. Available:

http://www.learningcircuits.org/2005/jan2005/archibald.htm

Army [British] E-learning Guidelines. Retrieved June 2005. Available:

http://agweb.asei.mod.uk/tag/resources

Atlas ti Tutorial. Retrieved June 05. Available:

http://erel.tamu.edu/video/atlasf2.htmlhttp://erel.tamu.edu/video/atlasf2.htmlhttp://erel.tamu.edu/video/atlasf2.html

Barron, T. (2002). Learning Object Approach Is Making Inroads. Retrieved May 2004.

Available:http://www.learningcircuits.org/2002/may2002/barron.html

Barron T. (2000). A Smarter Frankenstein: The Merging of E-Learning and Knowledge

Management. Retrieved July 2004. Available:

http://www.learningcircuits.org/2000/aug2000/barron1.html

Bates, A.W. (1995). *Technology, Open Learning and Distance Education*. New York: Routledge.

Bates A. W. (1997). The Impact of Technological Change on Open and Distance Learning. *Distance Education, 18* (1), 93-109.

Bates A.W. & Poole G. (2003). *Effective Teaching with Technology in Higher Education.* San Francisco: Jossey-Bass Publishers.

Bates, A.W. (2000). *Managing Technological Change.* San Francisco: Jossey-Bass Publishers.

Berry J. (2000). Traditional Training Fades In Favor Of E-Learning. Retrieved May 2005.

Available:

http://www.internetweek.com/lead/lead020700.htm

Bersin and Associates. The Four Categories of E-learning. Retrieved May 2003. Available:

www.bersin.com/tips_techniques/Breeze2.htm

Bersin & Associates Releases Update on Rapid e-Learning Market. Retrieved June 2005.

Available: http://biz.yahoo.com/bw/050517/175618.html?.v=1

Bersin, J.R. (2004) Rapid Instructional Design A Breakthrough. Retrieved July 2004. Available:

http://www.bersin.com/tips_techniques/jul-aug_04_rapid_ID.asp

Bonk, C.J. (2002). Online Training in an Online World. Retrieved March 2005. Available:

http://www.courseshare.com

Canadian Defence Academy (CDA). Retrieved June 2005. Available: http://www.cda-

acd.forces.gc.ca/index/engraph/about/about_e.aspis

Canadian Forces Transformation – From Vision to Mission. Retrieved April 2006. Available:

http://cds.mil.ca/cft-tfc/intro_e.asp

Chen, Y.J. & Willits, F.K. (1998). A Path Analysis of the Concepts in Moore's Theory of

Transactional Distance in a Videoconferencing Learning Environment. *Journal of*

Distance Education. Retrieved June 22, 2005 from

http://cade.athabascau.ca/vol13.2/chen.html

Clark R. & Rossett, A. (2002). Learning Solutions - Learning Objects: Behind the Buzz.

Retrieved March 2004. Available:

http://www.clomedia.com/content/templates/clo_feature.asp?articleid=24&zoneid=30

Clarke R.C, & Mayer, R.E. (2003). *e-learning and the Science of Instruction*. San Francisco:

Jossey-Bass Publishers.

Clarke R.C. (1998). Recycling Knowledge with Learning Objects. *Training & Development.*

October 1998.

Chisholm D. Organizational Change in Uncertain Times:

   The U.S. Military and Millennium Challenge 2002. Retrieved: Available:

   http://cds.mil.ca/cft-tfc/intro_e.asp.

Cisco Systems. Retrieved February 2005. Available: www.cisco.com

Cleveland-Innes, M. (2003). *Research Methods in Distance Education, MDDE 602, Study*

   Guide. Athabasca, AB: Athabasca University.

Crawford, G. (2001). *Introduction to distance Education and Training, MDDE 601, Study Guide.*

   Athabasca, AB: Athabasca University.

Creswell J.W. (2003). *Research Design, Qualitative, Quantitative, and Mixed Methods*

   Approaches. London: Sage Publications.

Crossman P.L. (2005). E-Learning For Short Attention Spans. Retrieved July 2005. Available:

   http://www.transformmag.com/shared/cp/print_article.jhtml?articleID=22101169Dirr P.J.

   (1999). Distance and virtual learning in the United States. In G.M. Farrell (Ed.), *The*

   Development of Virtual Education: A global perspective, (pp. 23-48). The

   Commonwealth of Learning.

Downes, S. (2001a). Design principles for a distributed learning object repository network.

   Retrieved October 2004. Available: http://www.downes.ca/

Downes, S. (2001b). Learning Objects: Resources for Distance Education Worldwide.

   International Review for Research in Open and Distance Learning. ISSN: 1492-3831.

Defence Administrative Orders and Directives. (2003). Individual Training and Education

   Management Framework 5031-2. Retrieved February 2005. Available:

   http://www.admfincs.forces.gc.ca/admfincs/subjects/daod/5031/2_e.asp

Defence Learning Network (2003). *Project Charter.* Ottawa, ON: Department of National

   Defence.

Earle R.S. (2002). The Integration of Instructional Technology into Public Education: Promises

and Challenges. Retrieved March 2005. Available: http://bookstoread.com/etp/earle.pdf

Ellis R. (2005) Interview : Mark Rosenberg is positive about the future. Retrieved April 2005.

   Available: http://www.learningcircuits.org/2005/mar2005/rosenberg.htm

Ellis R. (2005). Allison Rossette's Big Tent View. Retrieved May 2005. Available:

   http://www.learningcircuits.org/2005/may2005/rossett.htm

Fahy, P.J. (2004a). *Advanced Technology for Distance Education and Training, MDDE 620,*

   Study Guide. Athabasca, AB: Athabasca University.

Fahy, P.J. (2004b). *Online teaching in Distance Education and Training, MDDE 621, Study*

   Guide. Athabasca, AB: Athabasca University.

Firdywirk, Y. (1999). Web-based courseware tools: where is the pedagogy? *Educational*

   Technology, 39(1), 29-34.

Fletcher, J.D. (1992). Individualized systems of instruction. Institute for Defense Analyses,

   Alexandria, VA.

Freeman J. & Hannan M.T. & Structural Inertia and Organizational Change**.**

   American Sociological Review, 49(2). 149-164.

Friesen, N. (2004). *Three Objections to Learning Objects*. Retrieved February 2004. Available:

   http://phenom.educ.ualberta.ca/nfriesen/

Greenberg, L. (2002). LMS and LCMS What's the difference? Retrieved December 2002.

   Available: http://www.learningcircuits.org/2002/dec2002/greenberg.htm

Grow, G. (1991). Teaching learners to be self-directed. *Adult Education Quarterly, 41*(3),

   Spring, pp. 125-149.

Hamel, C.J. and Ryan-Jones, D. (2002). Designing Instruction with Learning Objects.

   International Journal of Educational Technology, 3(1).

Hodgins, Wayne (2002). The Future of Learning Objects. Retrieved February 2005. Available:

   http://www.academiccolab.org/resources/UFE Future of Learning Objects.doc

Hodgins, W. & Conner, M. (2000). Everything you ever wanted to know about learning

    standards but were afraid to ask. Retrieved January 2005. Available:

    http://www.learnativity.com/standards.html

Kearsley, G. (1995). The nature and value of interaction in distance learning. *Distance Education*

    Symposium 3: Instruction, May 1995, pp, 83-2. Pensylvania State University.

Keegan, D. (1996). *Foundations of Distance Education*. New York: Routledge.

Krauss, F. (2004). IDEAS. Instructional Design for E-learning Approaches. Retrieved January

    2004. Available: http://www.ideas.blogs.com/lo/2004/01/the_reusability.html

Long, J. (1997). Transactional Distance. Retrieved June 2005. Available:

    http://seamonkey.ed.asu.edu/~mcisaac/emc703old97/spring97/4/long4.htm

Longmire, W. (2000). A primer on learning objects. Retrieved June 2003. Available:

    http://www.learningcircuits.com/mar2000/primer.html

Manual of Individual Training and Education – Volume 1 - Introduction/Description (1997).

    Ottawa, ON: Department of National Defence.

Manual of Individual Training and Education – Volume 2 – Design of Instructional Programmes.

    (1997). Ottawa, ON: Department of National Defence.

Manual of Individual Training and Education – Volume 10 – Managing Individual Training and

    Education Projects. (1999). Ottawa, ON: Department of National Defence.

Masie Center. Making Sense of Learning Specifications and Standards. A Decision Maker's

    Guide to Their Adoption. Retrieved October 2004. Available:

    http://www.masie.com/standards/s3_2nd_edition.pdf

Mayberry E. (2004). Online Learning for Tough Times: Keys to Rapid Development. Retrieved

    June 2005. Available: http://www.learningcircuits.org/2004/jun2004/mayberry.htm

Multimedia Educational Resource for Learning and Online Education (MERLOT). Retrieved

    January 2005. Available: http://www.merlot.org/Home.po

Merrill, M.D. (2002). A pebble in the pond Instructional Design. Retrieved February 2005.

Available: http://www.ispi.org/pdf/Merrill.pdf#search='Merrill%20First%20Principles'

Mills, S. (2004). Learning about Learning Objects with Learning Objects. Retrieved May 2004.

Available:www.alivetek.com/learningobjects/site_paper.htmr

Morrison, G.R., Ross, S.M., & Kemp, J.E. (2004). *Designing Effective Instruction.* John Wiley &

Sons.

Nesbit, J., Belfer, K., & Vargo, J. (2002). A Convergent Participation Model for Evaluation of

Learning Objects. *Canadian Journal of Leaning and Technology.* 28 (3), 105 – 120.

Neuman, W. L., (2003). *Social Research Methods Qualitative and Quantitative Approaches.*

Boston, MA: Pearson Education, Inc.

Owston, R.D. (1997). The World Wide Web: A technology to enhance teaching and learning?

Educational Researcher, 26(2), 27-33.

Patsula P.J. (2001). MDDE Thesis: Web Design for Effective On-line Training and Instruction.

Paul R.H. (1995). Virtual Reality or Fantasies. Technology and the Future. In J. Roberts & E.

Keough (Eds.), *Why the Information Highway? Lessons from Open and Distance*

Learning (pp. 126-145). Toronto: Trifolium Books.

Plaisent, M. (2005). Evaluating e-labs Experimentation. Retrieved June 2005. Available:

http://www.ejel.org/volume-2/vol2-issue1/issue1-art5.htm

Polsani, P.R. (2003). Use and Abuse of Reusable Learning Objects, *Journal of Digital*

Information, 3, 4. Retrieved February 2004. Available:

http://jodi.ecs.soton.ac.uk/Articles/vo3/i04/Polsani/

Quinn, J.& Baily, M. (1994). Information technology: the key to service performance. *Brookings*

Review, 12 (summer), 36-41. Brooking Institute Press

Readygo.com. Retrieved January 2005. Available: http://www.readygo.com

Rogers, E. M. (1995). *Diffusion of innovations.* 4th ed. New York: The Free Press.

Rosenberg, M.J. (2001). *e-Learning:Strategies for delivering knowledge in the digital age*. New York, NY: McGraw-Hill.

Rumble G. (1989). Open learning, distance learning and the misuse of language. *Open Learning* (June), 28-36.

SCORM Best Practices Guide for Content Developers. Retrieved January 2005. Available: http://www.lsal.cmu.edu/lsal/expertise/projects/developersguide/

Siemens, G. (2002). Instructional Design in E-Learning. Retrieved January 2005. Available: http://www.elearnspace.org/Articles/InstructionalDesign.htm

Smith, P. & Ragan, T. (1999). Instructional Design (2nd ed.). New York: John Wiley & Sons Inc.

Spitzer, D.R. (1996). Motivation the neglected factor in instructional design. *Educational Technology,* May/June, 45-49. Englewood Cliffs, NJ.

Swinton L. Kurt Lewin's Force Field Analysis: Decision Making Made Easy. Retrieved June 2005. Available: http://www.trans4mind.com/counterpoint/swinton4.shtml

Surry, D.W. & Farquihar, J.D. (1997). Diffusion theory and instructional technology. *Journal of Instructional Science and Technology* 2(1), University of Southern Quenensland.

The Training Place. Building A Strategic Plan for E-learning. Retrieved February 2005. Available: http://www.trainingplace.com/building.htm#planning

Trainingmag.com. Workplace Learning Gets Real. Retrieved from July 2005. Available: http://www.trainingmag.com/training/reports_analysis/feature_display.jsp?vnu_content_id=1000780824

Tottschalk, T. H. (2003). Strategies for learning at a distance. Retrieved October 2004. Available: http://www.uidaho.edu/eo/dist8.html

Van Liew, R. (2005). *Hands On Technology Transfer, Inc.* Bursting the e-learning bubble.

    Retreived June 2005. Available: http://www.itworld.com/Career/3710/050603elearning/

Wagner, E. (2002). Steps to Creating a Content Strategy for Your Organization. *The eLearning*

    Developer's Journal. Retrieved February 2005. Available:

    http://www.academiccolab.org/resources/Creating a learning strategy.pdf

Wiley, D. A. (2000). Connecting learning objects to instructional design theory: A definition, a

    metaphor, and a taxonomy. In D. A. Wiley (Ed.), *The Instructional Use of Learning*

    Objects: Online Version. Retrieved January 2004. Available:

    http://reusability.org/read/chapters/wiley.doc

Wiley. D. The Reusability Paradox. Retrieved October 2004. Available:

    http://rclt.usu.edu/whitepapers/paradox.html#internal%20context

Woodword K.M. (2005). Exploring e-learning Myths Retrieved June 2005. Available:

    http://www.ltimagazine.com/ltimagazine/article/articleDetail.jsp?id=96225

Yates, B.L. (2001). Applying Diffusion Theory. Retrieved February 2005. Available:

    http://www.westga.edu/~byates/applying.htm

APPENDIX A

INVITATION TO PARTICIPATE IN RESEARCH STUDY

Dear (insert name),

      The purpose of this letter is to invite you to participate in a study investigating the adoption of e-learning within the Canadian Forces. The research is part of a requirement for a Master of Distance Education, Athabasca University. The student is Ray Golka. Participation will consist of an interview of approximately sixty minutes duration. Interviews would be scheduled at a mutually acceptable time in the latter part of May or early June, 2005.

      You would be asked to respond to a number of open-ended questions regarding e-learning, on-line strategies and your/the organizations current and future web-based training plans. Questions and a general outline of the interview would be e-mailed to you approximately one week before the interview. You may choose not to answer questions or, withdraw from the interview at any time. To assure the accurately of expressed views, it is being proposed that the interview be recorded. (Please advise before the interview if you object to the use of a tape recorder during the interview – alternatively notes could be taken). Moreover, a summary of the interview would be made available to you within 5 calendar days so that you will be able to assess accuracy of responses or, upon reflection, elaborate further. Data gathered will be held in the strictest of confidence and at no time would information be presented in the context of the final report such that it could attributable to a particular individual. You would also be welcome to view a final copy of the research.

      Should you have questions or concerns regarding your participation in this study you may feel free to contact me via e-mail or at the telephone number, provided in the forwarding e-mail.

Alternatively, should you wish verify my status as a student or discuss aspects of the study,

contact information regarding my research supervisor at Athabasca, University could be made

available. Your participation in this survey is completely voluntarily. You have been asked to

participate as it is believed that your views will result in a greater understanding of e-learning

within the department and assist the department in moving forward in this initiative. By signing

this letter, you affirm your intent to freely participate in this study (signed letters will be

collected at the time of the interview). In the meantime, an e-mail affirming or, declining

participation is requested. In advance, thank you for your consideration of this request.

Ray Golka

Name: _____

Signature: _____

APPENDIX B

INTERVIEW QUESTIONS

First, thank you for agreeing to participate in this survey. Collected information will be presented in a manner so that individual responses will not be identified. Raw data will be securely stored, and will only be made available to the thesis supervisor and will be destroyed within four years. Moreover, to ensure that your views are transcribed correctly, interview data will be e-mailed back to you, within five days of this interview.

Over the next 60 minutes or so, we will be discussing e-learning courseware issues. The purpose of the interview is to understand your perceptions regarding the quality and quantity of e-learning courseware offerings. Some of the issues that will be discussed are:

- Characteristics of your organizations E-learning efforts;
- Technology used to Support Distance Education;
- Constraints and Barriers to Using Technology; and
- Units Strategic Plan and Vision for Technology supported learning.

You may refuse to answer individual questions at your discretion. In addition, you are free to terminate the interview at any time. There are no penalties or negative consequences attached to these decisions.

Questions:

1. What is the current state of e-learning in your/the organization, in terms of 1) usage, 2) value perception, 3) sophistication of technology and approach –instruction vs. informational in nature, 4) perceived level of success or failure, 4) vendor management, outsourcing, 5) consistency of policies and 6) implementation across the organization).

2. What is the current state of your internal e-learning talent?

3. How coordinated are your e-learning efforts?

4. What is your organizations primary reason for using instructional technology? Bates (1997) has suggested the following main categories: 1) to improve access to education and training; 2) improve the quality of the learning; 3) reduce the costs of education; 4) to improve the cost-effectiveness of education.

5. What specific learning e-learning technologies (SCORM objects, CMC, simulations) show the greatest promise to support learning within your organization. What type of courseware makes the most sense?

6. The SCORM standard promises to facilitate sharing, reuse and repurposing of e-learning content. What is the level of sharing SCORM assets in your organization?

7. Do you see greater sharing of resources either internally (other CF units) or externally (eg. between NATO allies) in 3 – 5 years?

8. Does complexity of e-learning (e.g., SCORM/ meta tagging of resources) represent a barrier to widespread adoption?

9. Is "rapid" in-house development of learning objects or smaller information objects (e.g., processes, procedures) using templates and tools a viable option? If yes, does/will your organization have a content strategy for the various types of e-learning content (e.g., pictures, facts, processes, learning objects, modules)?

10. Does your organization have an e-learning strategy? If so what are some of the key aspects of the strategy (e.g. vision, mission). What type of strategy would seem to make the most sense to increase the quality and quantity of courseware in: 1) your organization; 2) the Canadian Forces?

11. Presently e-learning courseware is decentralized to the Managing Authorities. Would centralized development of some/all e-learning programs approaches be favourable?

12. Looking forward, 3-5 years, what vision do you have for e-learning (increase in number of offerings, quality of offerings, other).

13. Does individual training policy provide adequate guidance to Managing Authorities?

14. Earle (2002) has identified the following constraints and barriers to implementing technology. Are any of these barriers to integrating technology:

    a. Access to hardware and software and funding?

    b. Time for planning personal exploration and skill development of instructors;

    c. Adequacy of Technical and administrative support and resources.

    d. Training and expertise (e.g., alienating instructors)

    e. Resistance passivity, school cultures and traditions of teaching;

    e. Vision and leadership.

15. What are driving factors supporting e-learning implementation

Before concluding, is there anything that has not been covered that you would like to add?

APPENDIX C

The following screen capture illustrates the Atlas.ti software with transcript (interview) data

loaded. The exposed dropdown menu illustrates some of the codes used (and coding

frequencies). Some coding themes are illustrated in the far right dialogue box (running the

length of the illustration). A list of final coding categories/codes may be found at Table 8 (p. 53.

Some coding overlap is evident – see brackets adjacent to tags – by clicking on the tag, the

applicable text, would be highlighted. Numerous basic and advanced features make the usage of

a qualitative software analysis tool worth the initial learning curve. While too numerous to list

features include: ability to easily change code names, jump to instances of codes, constant

display of coding frequency, and ease of organizing codes into families.