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Project Report

2.

ATLANTIC LEARNING INITIATIVE

BUSINESS PLAN

Prepared for

Communications Canada
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EXECUTIVE SUMMARY

The attached document presents a business plan to establish a learning development initiative in Atlantic Canada, designed to take advantage of industrial opportunities created by evolving technologies in the merging fields of computers and communications. The initiative is considered important due to both the direct industrial development opportunity for the Atlantic region as well as the need to maintain the country's competitiveness through the application of the most efficient and effective possible education and training technologies.

The business plan defines a two year pilot initiative which will serve to lever additional future public and private investment in both the initiative and the industry itself. While the focus of the initiative is the courseware industry, the Atlantic Learning Initiative (ALI)s is designed to encompass a broader scope referred to as the computer and/or technology assisted learning (C/TAL) industry

The plan builds on a number of previous studies which defined available markets and identified the development constraints facing the industry. A process of industry consultation localized and clarified this research to produce an industry profile on which to develop this plan. The key industry characteristics are provided below.

- The Atlantic C/TAL industry is very small consisting of four or five firms actually marketing courseware products with perhaps another twenty five individuals, typically educators, who have worked at developing products.

- Firms require specialized knowledge in education, educational technology, computer use, marketing, the particular target market and the particular subject area as well as significant capital resources if they are to successfully develop and launch a courseware product. The software companies, educators and professional trainers in Atlantic Canada who represent the firms most likely to participate in the C/TAL industry typically lack a number of the requisite skills and resources.

- The training market provides immediate commercial opportunity for courseware firms. Nonetheless this market has only begun to open up. Work remains in demonstrating the cost benefit of C/TAL in the workplace and improving the accessibility of this market.

- The education market is fragmented, largely unconvinced of the benefits of C/TAL and generally lacking the resources to implement C/TAL on a wide basis. The passage of three to five years in combination with an active development program are required to create commercial opportunity in this segment.

- Firms will only be successful if they are able to develop products with nation-wide or international appeal. However, Atlantic region firms are only likely to develop such a product if they have a local customer or customer base with the resources to finance development costs.

In consideration of these industry characteristics, it was concluded that the business plan must address constraints on both the supply and demand sides of the industry. Further it was decided that both the training and education segments of the business should be supported. The training segment offers the immediate opportunity. The education segment must be developed so that Canada has the ability to service its needs from domestic suppliers when the market does, in fact, develop.

The key elements of the ALI which respond to these challenges are outlined below.

- Annual budget of $500,000.

- Staff of two full time professionals.

  The Managing Director would focus on market development activities primarily in the training segment, undertaking initiatives such as: visiting potential customers to encourage C/TAL purchases; developing contacts with out of region marketing/publishing firms and other industry personnel; delivering speeches; editing a newsletter; assisting firms in accessing available government assistance for marketing support; fostering the regional network; and organizing an annual conference. Effort would also be devoted to modifying the procurement policies of departments of education.

  The Director of Development would be more devoted to the education sector initiatives: establishing and managing a user lab where courseware, computers and technical assistance are available for use by interested parties; managing a loaner library of courseware and related publications; and managing the database supporting the information clearing house function.

  The ALI staff would have two other important objectives. First they must endeavour to identify opportunities for standardization in the use of platforms and authoring languages. Progress in this rapidly accelerates the rate of technology transfer. Second they must actively encourage interaction between their respective clientele in order that the research oriented education segment and the commercially oriented training segment both realize the many benefits possible from collaboration.

- An out-reach program. Interested educators would be contracted to make presentations or demonstrations relating to C/TAL topics to audiences of educators across the region.

- A product development fund. The monies from the fund would be awarded on a competing proposal basis to educators wishing to undertake a product development project.

- An investment fund. The fund would make equity investments in C/TAL products being developed by Atlantic region firms. The funds would be awarded on a competing proposal basis semi-annually.

- Sponsorship of Educational Technology courses. The ALI would provide the support required to encourage a university in partnership with a community college to offer at least two educational technology courses.

The ALI would be managed by a 5 member board representing private sector interests and whatever organization houses the Initiative. Committees would be established to award product development and investment funds. The Initiative would have non-profit status and require virtually full funding support from ACOA and the Department of Communications for the two year pilot. The ALI should nonetheless work aggressively to expand its financial support base to include other federal and provincial departments, corporate interests or private foundations. The ALI should monitor the opportunity to generate revenues by charging for any of its services. The detailed plan describes some areas where this could eventually be possible. The ALI must however avoid seeking to earn revenues through any means which would compete with the industry it is trying to develop.

The ALI represents a pragmatic program for addressing the fundamental development constraints facing the computer and technology assisted learning industries in Atlantic Canada. It represents an investment in industrial infrastructure necessary to support a competitive economy and make full advantage of an industrial development opportunity which matches well with the capabilities of Atlantic Canadians.

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I

INTRODUCTION

A. OBJECTIVE

This document presents a business plan, to establish a learning development initiative in Atlantic Canada, to take advantage of industrial opportunities created by evolving technologies in the merging fields of computers and communications.

The business plan is to define a two-year pilot initiative which will serve to lever additional public and private investment in both the initiative and the industry itself.

The learning development initiative is focused on the development of the "courseware" or computer assisted learning (CAL) industry. Nonetheless, in recognition of the variety of technologies such as artificial intelligence satellite transmission systems, and high definition television also being applied to education, the scope of this initiative is more broadly defined as relating to the computer and/or technology assisted learning (C/TAL) industries. This broader definition is to ensure that the initiative can evolve with the adaptation of technology and maintain its relevance over a long term horizon. The term Atlantic Learning Initiative (ALI) is applied to the development initiative described in this plan.

B. BACKGROUND

The roots of this business plan for the Atlantic Learning Initiative can be traced to the 1984 policy document: Towards a National Policy for A Computer-Assisted Learning Industry. This document was designed to alert governments to both the need and opportunity to develop a computer-assisted learning industry in Canada. The report identified an economic, social and cultural opportunity for a new industry and postulated that the industry could represent Canada's best opportunity to find a niche in the global high technology market place.

A number of events have been building on that 1984 policy document:

- 1985 Sponsorship of a national conference in Halifax on technology and education (in recognition of the fact that the courseware publishing industry faces similar challenges to those being addressed by the textbook industry).

- 1986 Sponsorship of a follow-up conference in Winnipeg in which the DOC played a lead role in addressing the need for inter-provincial and federal/provincial cooperative approaches.

- 1987 Assistance in the formation of the Canadian Association of Courseware Producers (CACP), an industry organization for which the Canadian Learning Materials Centre continues to provide a secretariat function.

The Department of Communications (DOC) and the Atlantic Canada Opportunities Agency (ACOA) sponsored the production of Phase I in April, 1989, of "Report of the Courseware Market Study" for the Canadian Learning Materials Centre (CLMC). The aim of the study was to stimulate the educational and training courseware industry by exploring the evolving markets and to identify the key issues facing both segments. The report articulated in comprehensive terms the importance of developing the most effective possible tools for use in education. We have quoted some of the most relevant sections of that report in the appendix. We have also listed the major issues and potential initiatives derived from Phase II of that Report in the appendix.

A major conclusion of the earlier work to date is that the industrial development benefits of building the computer-assisted learning industry in Canada, far exceed the direct employment consequences. This conclusion provides focus to this business plan and also highlights the need for putting in place economic infrastructure such as the Atlantic Learning Initiative.

Work done for the Department of Communication also points to significant contrasts between the education market and the training market. The training market is large, diverse, growing and offers clear commercial opportunities. The education market, however, particularly in Canada, offers little commercial opportunity and is unlikely to improve significantly in the short term.

C. NEED FOR THIS BUSINESS PLAN

This business plan has been designed to meet the challenge of actually delivering the initiatives required and described by the earlier studies.

The Statement of Work provided a clear rationale for such an initiative based on the pooling of resources from industry, academia and concerned agencies to address market barriers hindering the development of an Atlantic Canadian industry. The fundamental underlying premise of this business plan is to "kick start" the development and commercialization of new types of learning products and services before the strategic window of opportunity is missed and products and services, from other countries dominate the Canadian educational and training markets.

This business plan is designed to address the dispersed geographic nature of Atlantic Canada as well as the small population base and low levels of industrialization. It is designed to build on the strength of a superior pool of educators, innovative

entrepreneurs, and the strong desire of all concerned to build a Canadian industry. The basic purposes underlying the initiatives included in the business plan are:

- To get regional interests focused and working.
- To then move these regional activities toward national and international markets.

D. METHOD

The preparation of this business plan entailed three major phases of activity. First, a number of the individuals involved in the industry were consulted to review developments and to enable the team to build a detailed and current profile of the industry in Atlantic Canada. Input was received at this time regarding the specific actions which should be pursued in the business plan. This research, in combination with the previous studies and the knowledge of the project team, was then analyzed in detail and discussed with the project steering committee to establish the strategic direction to be supported by the business plan. The final phase entailed developing and documenting the specific elements of the plan.

E. ORGANIZATION OF THIS REPORT

Chapter II summarizes the research and analyses conducted to establish the strategic focus of the plan. Chapters III to VI outline the details of the Atlantic Learning Initiative: activities, staffing, organization and finances. Chapter VII considers the future and how this two-year plan will provide a base for an expanded initiative which develops with the industry into the 90's.

II

INDUSTRY ANALYSIS

A. DEVELOPMENT OF OPERATIONAL OBJECTIVES

The general objective of the Learning Initiative for Atlantic Canada is to develop the industry for learning based technologies, particularly the courseware industry.

The project team in conjunction with the steering committee transformed this global objective into two more operational statements which provided more specific direction upon which to base the business plan.

1. The operational objective on the supply side can be stated as: increasing the rate at which new products are developed and successfully marketed. In concise terms this means increasing the launch rate of new products.

2. On the demand side the operational objective is to: increase the use of technology-based learning tools produced in the Atlantic Region.

Exhibit II-1 presents these objectives as well as their supporting requirements. The Exhibit illustrates that three main components: skills and knowledge; professional time; and, operating capital are required for any project to move from a concept to a finished product. In the area of skills and knowledge, five components are identified:

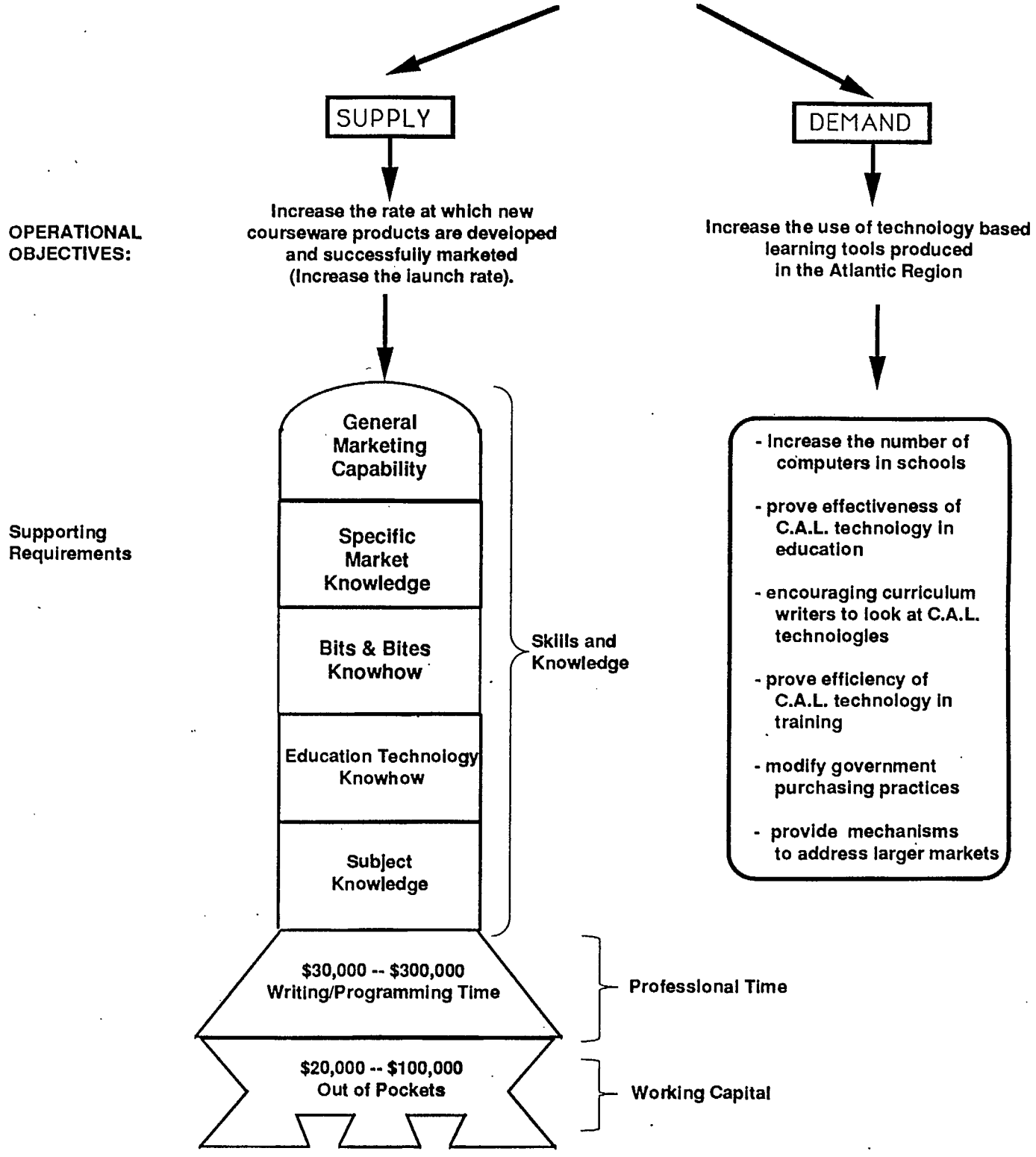
- Subject knowledge.
- Educational technology knowledge.
- Bits and bytes knowhow (general programming and operating abilities).
- Specific market knowledge (customers and their requirements, competing products, market structure).
- General marketing capability.

Also required are the resources of professional time (contributed, subsidized, or paid) to write the programme, and operating capital to cover the basic expenses of documentation, marketing and administrative support.

The important conclusion of the analysis is that a successful launch requires considerable financial resources and a variety of skills. This raises the question of which firms have or potentially have the skills and resources required to succeed at a launch. This question which is central to understanding supply side development constraints is addressed later in the chapter.

EXHIBIT II-1
Operationalizing the development objective

GENERAL OBJECTIVE: Develop the Technology Based Learning Industry



On the demand side, research indicates that a number of requirements must be met to increase technology assisted learning activities:

- Increasing the number of computers in school classrooms.
- Proving the effectiveness of computer-assisted learning technology in education. Teachers will use C/TAL if it enhances their presentation.
- Proving the efficiency of computer-assisted learning in training.
- Modifying government purchasing practices.
- Providing mechanisms to address larger markets.
- Encouraging curriculum writers to look at computer-assisted learning tools.

Any Learning Initiative needs to address both the supply and demand sides of the issue, to have any chance at a positive influence on the general objective of developing the technology-based learning industry in Atlantic Canada. We emphasize this conclusion because it has important implications for the types of activities to be programmed into the business plan.

B. SUPPLY SIDE ANALYSIS

An overview of the industry in Atlantic Canada and the main categories of players are provided below. This is followed by an analysis which compares the capabilities of the players to the identified requirements for a successful launch.

1. The Atlantic Canadian Industry

As with any business or technology in its early stages of growth, or the emerging technology phase of the technology life cycle model, industry potential is unclear and only perceived as being an opportunity by a small group. In the case of courseware in Atlantic Canada the actual participants number fewer than thirty. Four or five firms could be considered players, plus a number of individuals active in various levels of educational institutions. Appendix II contains our list of firms or individuals currently developing some form of technology based learning materials, and those firms that use such technology but have not yet developed their own. All of the firms in this latter group have expressed an interest in doing so.

In addition to those who can be considered active in developing products for education and training markets, five other groups of stakeholders were identified as potential industry participants:

- Teachers/academics.
- Curriculum advisors.
- Computer educators.
- Software firms.
- Training groups in business firms.

The premise of this business plan is that industry development entails motivating some of these stakeholders to become directly involved in producing or selling C/TAL products. Training groups were interviewed to ensure both the supply and demand sides of the emerging industry were understood. In each case key characteristics emerged that guided the definition of the proposed learning initiative. In all cases the issues raised in both earlier studies continue to lie at the heart of difficulties facing the development of a courseware industry in Atlantic Canada.

2. Courseware developers

As indicated, the number of firms and individuals actually participating at this time in developing courseware is small. The small number of developers are widely dispersed across Atlantic Canada, with no one province dominating. The slightly greater concentration in Nova Scotia, particularly the Halifax area, appears to represent the larger concentration of educational institutions. Discussions with these developers reinforced the lack of marketing skills described in the "Courseware Development Strategy," and confirmed that this lack was a significant barrier to commercialization, particularly among the independent producers.

Members of this group typically developed their products from scratch, using a programming language rather then an authoring tool, and in several cases creating their own specialized authoring tools. This most often occurred because of the desire to work across several platforms. The PROGRAPH product produced by TGS Systems was examined by one independent author, but had not yet been used. More problematic to these producers, particularly the firms with five or more employees, was finding and keeping knowledgeable instructional technologists on their staff.

One additional point that emerged as a major concern to current producers was the heavy demands placed on their time to educate potential customers in the basics of computer-assisted learning and then investing more time in educating these potential customers in the advantages and savings they could achieve. Again the small size of the participant firms means that this places a heavy burden of up-front time and effort on these individuals. Most difficult was the producers inability to point to local examples that demonstrated a clear cost/benefit of adopting the technology.

As was stated earlier, all of the issues of small size, fragmented markets, lack of a history of inter-provincial cooperation and a perceived lack of critical mass characterized the existing Atlantic Canadian producers of technology based, learning tools.

3. Teachers/academics/curriculum advisors

In each and every educational institution in Atlantic Canada at least one individual can be found who has created, or is interested in creating, a technology-based learning tool. These individuals have the subject matter expertise and typically want to create a product out of a desire to do a better or more effective job of imparting their knowledge. This ranges from distance education initiatives to expert systems and simulations.

These individuals are isolated, both geographically, and within their own institutions, except perhaps at Holland College in Prince Edward Island which supports these types of initiatives at an institutional level. They have difficulty in accessing both hardware and software tools to create products based on their ideas; and frequently have virtually no access to capital to support their initiatives. (Teaching tools development typically does not fall within current funding initiatives or programs.) All of these barriers act together to stifle most creative urges as potential producers abandon projects after brief exploration of the difficulties they will face if they wish to take their idea from a concept to a reality.

In all cases guarded interest would characterize the attitudes of senior curriculum advisors in Atlantic Canada. These individuals have experienced the initial rush of enthusiasm associated with the introduction of computers into the classroom and then have been left to deal with the resentment and frustration that followed as few resources (both the capital resources; hardware and software and human resources) and inadequate quality of available software disenchanted many teachers. This frustration with the early products and lack of resources has resulted in relatively limited use with attention now focused on a few pilot projects, most noticeably in the areas of literacy skills and remedial support in math education. The best way to encourage greater educational participation was expressed as a need to go to the individual teachers and get their participation in putting forward projects and ideas that they felt would work at the classroom level and structure a process through which they can learn about and access resources.

4. Computer educators

This group typically provides commercial instruction in computer skills. Their operations are focused around providing individuals with an understanding of basic computing and skills in using off-the-shelf software such as spreadsheet, database and word processing applications. Most of these companies have purchased programs to support their training process. In designing their teaching programs these firms have developed extensive support materials in the form of overheads, handbooks and some software.

As a group they understand the potential of technology-based learning tools but they have little interest in developing their own products for commercialization. Their interest in the immediate future is to keep abreast of technical developments and then leverage on those products that enhance their ability to attract customers to their classrooms.

5. Software development firms

A small cross section of software development firms were contacted to verify the conclusions of the earlier studies. In all cases the firms expressed an interest in developing products, but only if a customer existed and their development costs were covered. These firms are essentially like consulting firms. They work on a contract basis building custom solutions and generally do not invest in products suitable for expanded distribution. By and large they do not yet see the payback of learning technologies, particularly courseware. The companies lack subject matter expertise and do not have access to an authoring language. Like the computer educators their interest is in being advised of developments and opportunities and then responding to those that allow them to leverage their existing resources.

C. CAPABILITIES AND RESOURCES OF POTENTIAL PRODUCERS

An analysis of the potential producers of C/TAL products was undertaken, comparing their attributes to those required of a firm capable of a successful product launch. The potential suppliers include the four groups profiled above and one additional group:

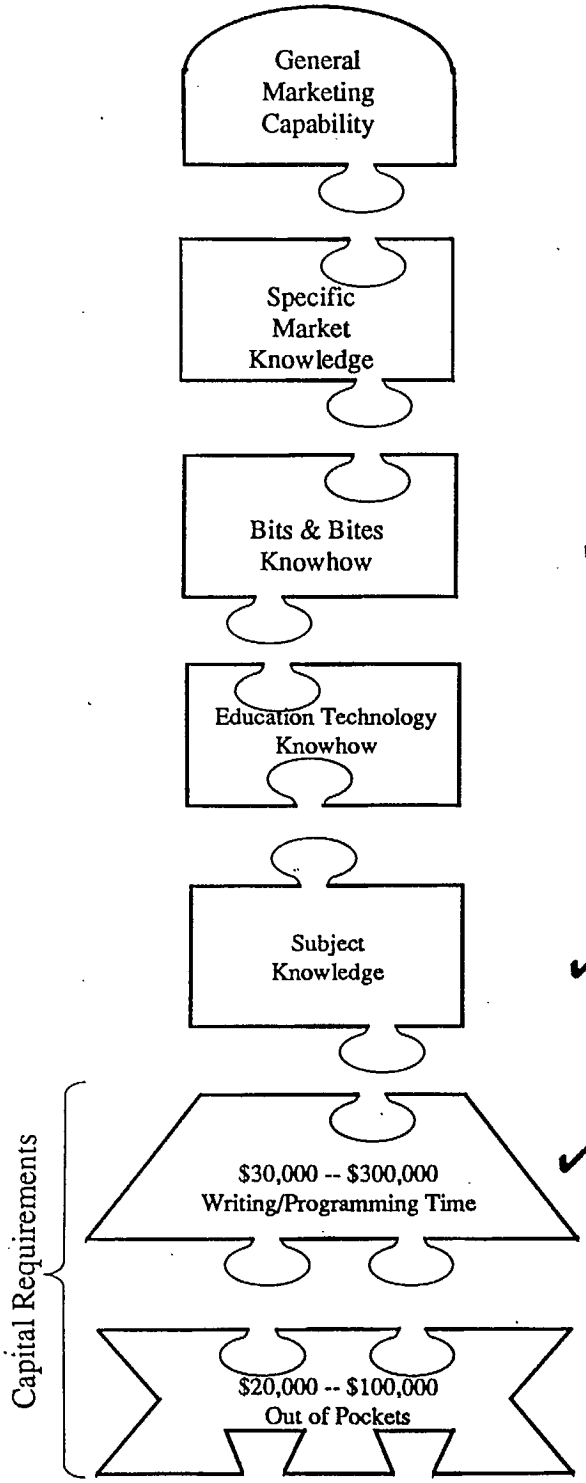
- The private and public trainers working in industry and government.

Exhibit II-2 illustrates that no group by itself has the required components to assure the successful launch of new products. In particular, the potential producers tend to lack the cash resources required to finance a product launch, even if development is successfully completed. The business plan must address these strategic deficiencies in resources and skills.

D. INDUSTRY STRUCTURE AND CONSTRAINTS

In the technology-based learning industry, products can be created anywhere there is an adequate knowledge of both the subject matter and the technology, matched by some clear sense or understanding of market need. In the case of university academics, the level of subject matter knowledge is high, technical knowledge has usually been gathered

EXHIBIT II-2
CAPABILITIES AND RESOURCES OF POTENTIAL SOURCEWARE PRODUCERS



	Public Educators	Vertical Market Software Developers	Custom Software Developers (Contract work)	Computer Training Facilities	Private and Professional Trainers
General Marketing Capability		✔	✔		✔
Specific Market Knowledge				✔	✔
Bits & Bites Knowhow	✔	✔	✔	✔	
Education Technology Knowhow				✔	
Subject Knowledge	✔				✔
$30,000 -- $300,000 Writing/Programming Time	✔	✔			
$20,000 -- $100,000 Out of Pockets		✓			

as a matter of interest, and the market need expressed as a more effective way to impart knowledge to captive students (who have little or no choice in the matter). A majority of individuals producing courseware in Atlantic Canada fit this description. The important point is the production of technology-based learning products can occur anywhere when these three factors are present.

Although the production component can occur virtually anywhere, it is the marketing component that becomes particularly problematic in Atlantic Canada. To be most effective, the marketing element of an industry tends to be located near the largest concentration of customers. The textbook publishing industry is a case in point. Authors (the actual producers) can be located anywhere, and are frequently in Atlantic Canada. The marketing (sales, distribution and promotion functions) are almost exclusively centered in Toronto area, proximate to the Southern Ontario (largest) market.

The implications of this fact for the successful commercial production in Atlantic Canada of technology-based learning tools is a dependance upon either:

- A strong linkage with an effective marketing organization located outside of the region; or,
- The presence of a local customer base sufficient to both: provide the required market understanding; and to provide adequate sales to finance product development.

However, marketing organizations in other centers are not generally interested in concepts, they want proven products. For this reason producers in Atlantic Canada must find local customers willing to serve as a Beta site for their new product development. This conclusion has important implications for the business plan's relative emphasis on the training versus education markets. Since the local market for educational-based products is small, and some three to five years from any real potential, the training-based product market offers the greatest short-term potential for new product development and sale. In order to give this short-term pilot undertaking the opportunity to generate commercial activity, the steering committee directed the project team to devote the majority of the resources in the plan toward the training sector. However, it was also decided that significant effort was to be directed to education sector initiatives. The rationale was that this market will eventually develop and it is vital that Atlantic Canada develop the expertise to make advantage of the coming opportunities.

E. POTENTIAL TACTICS

Exhibit II-3 contains the specific tactics (or initiatives) available to encourage both the supply and demand side of the industry. These are separated into the two fields of interest; education and training. Many of these are directly related to the eleven initiatives identified in the earlier studies, but have been expressed as specific activities that could be incorporated into a business plan.

Several initiatives, such as networking and newsletters, serve both educators and trainers. These activities form the nucleus of an information clearing house activity, an important role for the Learning Initiative. Encapsulated in the concept of an Information Clearing House is the role of market intelligence gathering (market opportunities, competitive offers, strategic initiatives in other areas); and, marketing support (bringing together joint ventures, cooperative marketing efforts, marketing education initiatives) and missionary selling on behalf of the whole industry (public speaking, conference sponsorship, supporting research presentations). Other initiatives assist in only one quadrant of the range of possible activities.

Based on the analysis of both earlier studies, the results of discussions and research undertaken in preparing this business plan, and the steering committee's review of this material, a consensus picture emerged of the role and functions needed at this time to "kick start" the Learning Initiative. The next chapter presents our proposed business plan.

EXHIBIT II-3
Tactics

	SUPPLY	DEMAND
EDUCATORS/ EDUCATION	- networking (meetings) - newsletter - electronic bulletin board - laboratory - loaner materials - outreach effort - link with out of region publishers - publish "how to" standards guide - fund market studies/travel/ research - cost share for cooperative marketing efforts	- computers in schools - fund demonstration projects (cost share if possible) - coordinate provincial procurement - commission courseware - product development competitions - increase number of instructional technologists - increase awareness of technology as a teaching tool
TRAINING	- increase qualified staff - cost share for cooperative marketing efforts - fund market studies/travel research - networking - electronic bulletin board - collaborating across Canada - joint venturing to produce	- education/increase awareness of technology as a training tool - modify procurement practices (primarily federal) - subsidize projects where there is a customer willing to cost share - investment incentives (such as tax breaks)

III

ELEMENTS OF THE INITIATIVE

A. INTRODUCTION

The plan provided draws on the consulting team's exposure to and analysis of a wide variety of industry development approaches. There is a pragmatic bias to the plan whereby its objectives have been defined in very concrete terms and all supporting elements link unambiguously to the objectives.

The plan takes particular inspiration from the Craft Council of Nova Scotia. This organization which focuses on the information clearing house function and organizing markets has played a central role in moving the craft industry in the province from hobby/cottage status to a multi-million dollar commercial concern. The Council which has the equivalent of two full-time employees provides evidence of the potential of this type of undertaking.

The specific elements of the proposed initiative address two types of objectives:

- Developmental, targeting supply side deficiencies primarily with respect to the education sector.
- Applications and marketing, targeting demand stimulation in both education and training but primarily in the training sector.

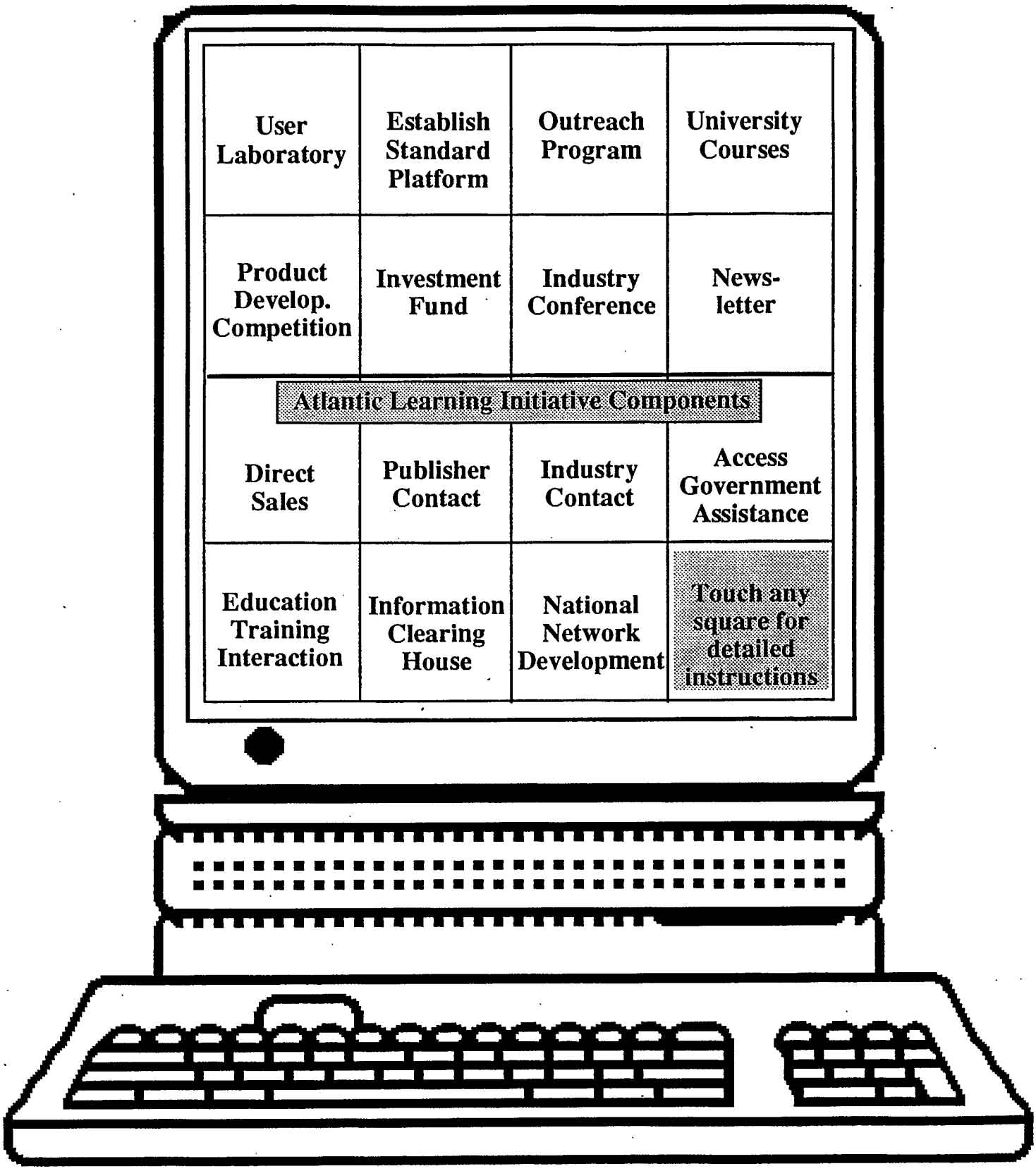
A summary presentation of the activities is provided in Exhibit III-1 with the details of each provided below.

B. USER LABORATORY/LIBRARY

Potential courseware writers and users need to be able to learn about and use available products and authoring languages. A laboratory equipped with computers, copies of packages and staffed by a knowledgeable user ready to provide assistance, will address this need. The lab would also maintain a library of:

- Product reviews.
- CAL literature.
- Product documentation.

EXHIBIT III-1
Atlantic learning initiative



- Demonstration diskettes.
- Lists of product users who could be contacted for support.

The lab would also operate a loan system which would enable interested parties from across the region to borrow software or materials. The lab should pay all mail costs associated with distributing loaner materials and also operate a "call collect" support service. This support service should be provided on an unrestricted basis to any education or commercial sector user in the region who wishes to access the knowledge of the lab manager (Director of Development).

The Director of Development has another important responsibility related to making materials widely available. This entails negotiating suitable expanded distribution or licencing terms with courseware and authoring language suppliers. It it necessary that suppliers agree to allow a package to be operated by a variety of users on machines at a variety of sites and also that copies be made available complete with documentation at reasonable unit costs. An attempt should be made to procure a regional licence for packages -- provided it is used only for educating educators in its use.

C. ESTABLISH STANDARD

The ALI has an important role to play in working with the industry to establish standards in the areas of authoring languages and operating systems. In general the fewer the number of languages and systems in use, the faster expertise will develop and spread, and the faster the industry will develop. It is recognized that there is no consensus whatsoever as to the best available tools for C.A.L. In fact, there is a current debate about whether authoring languages will even be used in the future. Nonetheless, if progress toward standardization can be made it will dramatically improve the growth rate of the local industry. The ALI should therefore make it a priority to address this issue and design a process to stimulate industry discussion.

D. OUTREACH PROGRAM

This activity involves making presentations to educators across the region on a variety of subjects related to computer or technology assisted learning (C/TAL). These could include:

- Demonstrations of particular products.
- Presentations regarding the results of current pilot projects.

- Reviews of particular products.
- Trends in use of C/TAL across North America.
- Demonstrations of authoring languages.

Further discussion with education officials is necessary to develop the best possible "distribution" strategy for this element. It may be possible to reach suitable audiences directly during teacher in-service (professional development) days. In other cases it will be necessary to present the materials to school or regional representatives who would then transfer the presentation content to their local colleagues.

It is recommended that this outreach activity not be conducted by ALI staff but be contracted out to increase the number of people with an interest in and knowledge of the industry. The ALI would develop a slate of topics and audiences in consultation with suitable representatives of the various levels of educational institutions. They would then recruit interested educators or Masters of Education students to develop suitable presentations and deliver them. The ALI would pay the expenses of each contractor according to a pre-determined budget. The contractors would donate their time as a result of their interest in the subject and a desire to meet other people working in that field.

E. UNIVERSITY COURSES

The ALI must identify a Masters of Education program in the region and convince them to add instructional technology courses to their program. Presumably two courses should be offered:

- An introductory one which provides an overview of the technology, available products and how to use them.
- An advanced version which would involve pursuing one package or subject in greater depth requiring for example:
  - a research project examining the effectiveness of a particular C/TAL package; and,
  - a development project whereby a C/TAL module would be developed.

The ALI has two means of promoting this initiative. One alternative is to locate itself at the institution where the courses are to be offered. This places all of the resources of the lab at the disposal of the school and covers many of the costs that would be incurred in putting new curriculum in place. A second and seemingly less efficient option is to provide the cooperating institution with funding to acquire the necessary materials and offset curriculum development expenses. This option would no doubt create duplicate expenditures between ALI and the selected institution and divide the critical mass of the development component of the initiative.

- ► To be eligible, firms must have a contract with at least one customer agreeing to purchase the product and cooperate as a test site.

- ► Preference will be given to projects:

  - maximizing the investment leverage achieved by each equity dollar
  - appearing to have the best commercial potential
  - which involve joint ventures between firms or firms and educators or entities from a variety of provinces or regions
  - which use the "standard" authoring language
  - which are to be developed in a manner which facilitates multi-lingual translation
  - which employ leading technologies

- ► Successful applicants must place their development project into a separate corporate shell such that the ALI would own equity only in the product, not the responsible company.

- ► The ALI's equity would be non-voting while in its hands and eligible for dividends only through royalties based on sales.

- ► The ALI's equity interests would be saleable to any third party approved by the company with the company having first option to buy.

A committee of the Board of the ALI would be responsible for making the investment decisions in the semi-annual competition. It is presumed that arrangements can be made with an agency such as ACOA to actually administer these investments once the decisions are made.

The investment fund is a critical element of the Atlantic Learning Initiative. It directly addresses demand related development constraints. It is also the building block which could develop a significant revenue stream for the Initiative.

H. CONFERENCE

The Atlantic Learning Initiative should plan and coordinate an annual conference to provide a networking forum for industry participants. The operational theme or objective most likely to attract industry members would be marketing related. A speaker panel comprised of:

- ► Courseware publishing house executives.

- ► Department of education courseware buyers.

- Corporation/government department training manager courseware buyers.

- Out of region industry association leaders from across Canada and the United States could address market trends and requirements and the strategies necessary to address these trends.

The conference should involve at least regional participants but consideration should be given to making it a national, or international event or hosting a national conference periodically if it appears possible to do so.

The conference is unlikely to be self-supporting for a few years. Registration fees should be set at a level which encourages attendance.

I. NEWSLETTER

The Centre should produce a newsletter -- probably bi-monthly directed toward all individuals and organizations with an interest in C/TAL to share information on a variety of topics:

- C/TAL firm or product profiles.

- Hiring announcements within the industry.

- Winners of product development competition funds and investment funding.

- Examples of C/TAL use in the region.

- C/TAL contract opportunities among public sector clients.

- Technology developments such as launch of new authoring languages.

- Descriptions of research projects undertaken by MED students.

- Notices of skills or products wanted by any publishing houses.

- Significant activities at organizations such as the Technical Education Research Centre or the Minnesota Educational Computer Consortium.

- Available government assistance.

The mailing list for the newsletter should be as wide as possible including all potential producers, markets, buyers or users of C/TAL.

J. DIRECT SALES

Direct contact should be made with potential buyers of C/TAL in the Atlantic region to encourage them to buy C/TAL produced in the region. This includes training directors within federal and provincial government departments on major companies. The objective is to convince these individuals to experiment with C/TAL and isolate a portion of their budget for C/TAL. Further, the buying practices of these organizations should be reviewed to ensure the process is structured so as to be accessible to Atlantic region firms. Finally, effort should be devoted to education sector buyers, in an attempt to encourage inter-provincial cooperation in procurement so as to reduce market fragmentation.

K. PUBLISHER CONTACT

Courseware publishers should be contacted on a regular basis (perhaps semi-annually) to determine if they have authoring requirements which could be met by Atlantic region expertise or if there are opportunities in general for collaboration with Atlantic region players.

L. INDUSTRY CONTACT

The Managing Director will systematically maintain contact with the firms and individuals in the region active in and interested in the industry. This will require a combination of personal visits, telephone contact and correspondence. Time must also be devoted to maintaining contact with related industry personnel across the country. This could include personnel in other regional associations, potential marketing channels or any aspect of the industry.

M. ACCESS GOVERNMENT ASSISTANCE

A variety of assistance programs particularly for marketing support exist which could be a benefit to C/TAL firms. The ALI should be familiar with all available federal and provincial programs, who is really eligible, how to efficiently apply and who to contact for further information.

N. EDUCATION TRAINING INTERACTION

The success of the ALI will hinge to a great degree on its ability to stimulate cooperative activity between the educators and the commercial interests targeting primarily training markets. The educators represent a valuable skill pool who are able to contribute their talents at low cost. The commercial interests can utilize this capability to dramatically lower their development costs. At the same time they can offer commercial and marketing expertise to the educators. Interaction between the two groups benefits everyone. The commercial exposure improves the quality and relevance of the education provided by educators in the classroom.

The activities of the ALI have thus been designed to foster this interaction:

- One newsletter for both groups.
- One conference for both groups.
- One laboratory for both groups.
- Funding preference given to collaborative projects.
- Educators receiving funding must market through a private firm.

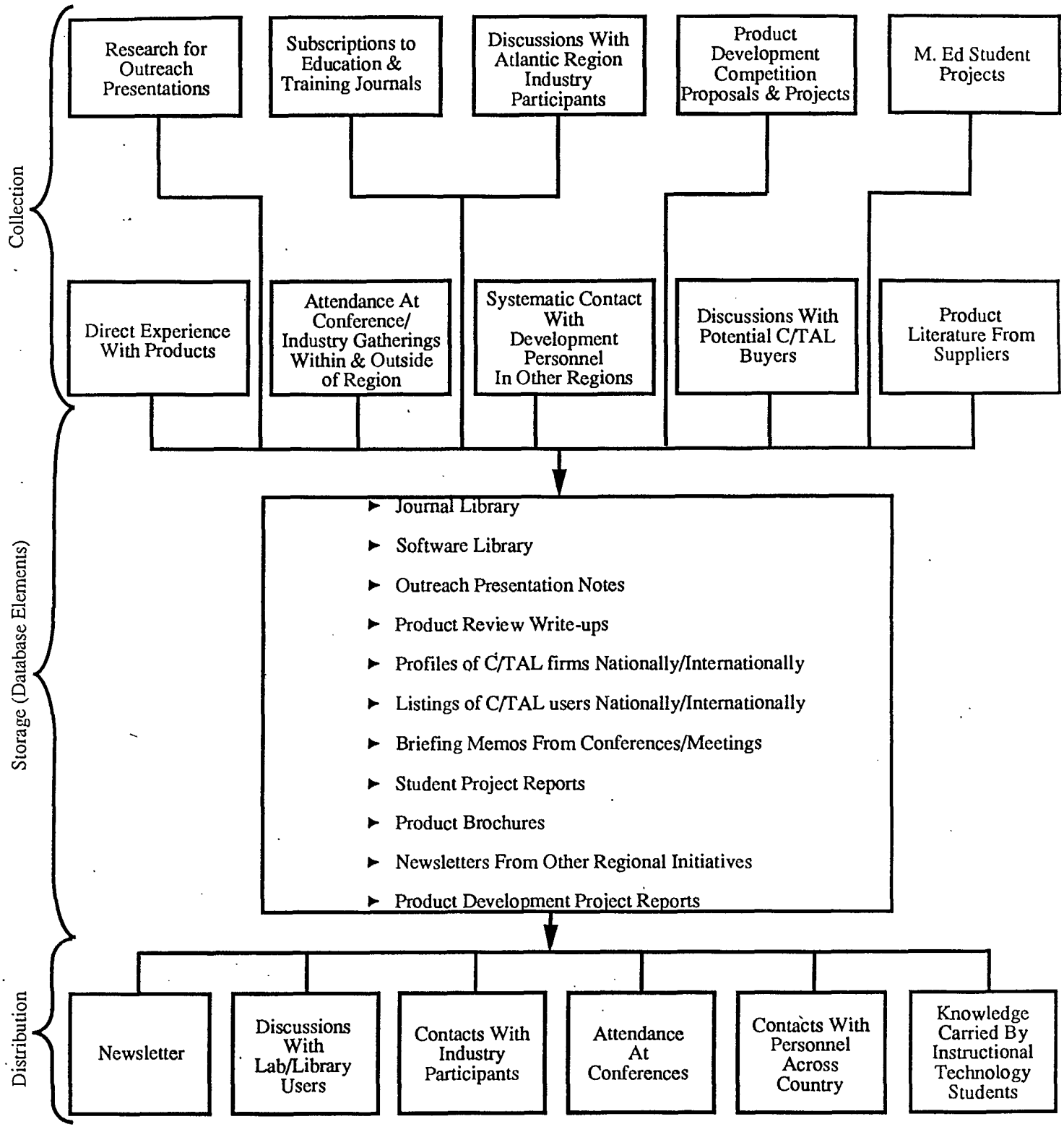
ALI staff should conduct all activities with the need to promote this type of interaction in mind.

O. INFORMATION CLEARING HOUSE

A critical responsibility of the ALI is to function as an information clearing house for the C/TAL industry. This function involves a number of elements of the Initiative and essentially requires that a planned and systematic approach be taken to the collection, storage, and dissemination of related information. The dynamics of this function are presented in Exhibit III-2. ALI staff will collect information through most of the elements of the Initiative described above. Particular effort must be devoted to documentation and filing of the information collected so that it does not reside solely in the heads of the ALI staff. This entails requiring, for example, that winners of product development competitions provide the ALI with documentation as to the results of their efforts. This would probably require a written product description and the results of trials conducted, in addition to a copy of the product.

It also requires that energy and attention be devoted to effective filing and retrieval systems. This could be facilitated by engaging a summer co-op or intern student periodically to maintain the database. Finally, ALI staff must constantly be on the look-out for opportunities to distribute their information to the widest possible interested audience.

EXHIBIT III-2
Information clearing house process



P. NATIONAL NETWORK

The ALI is part of a national initiative to develop the C/TAL industry and while it is focused upon the firms and potential C/TAL users and authors in the Atlantic region, the broader context must always be recognized. There are two principal dimensions to this objective. First, the commercial success of Atlantic region firms is directly linked to their ability to sell into a least a nation-wide market. Atlantic region customers will provide in most cases, only test sites. Second, the industry as a whole is small even at the national level. This dictates that industry development will require information sharing and collaboration on a nation-wide basis to establish the necessary critical mass of intelligence and activity.

In its first two years, the ALI will obviously concentrate the majority of its efforts on cultivating local profile and interest. Nonetheless, many of its activities have been designed to promote the national level interaction desired. These are summarized below:

- The user lab/library/database is to be stocked with software, literature, product information, etc., from at least North America-wide sources.
- Projects in the product development competition with the best potential for adoption outside of the region will be given preference.
- Projects competing for investment funding in all but the rarest cases must have strong potential in out-of-region markets to be considered.
- The annual conference, even if an essentially regional event must bring in industry players from across the continent.
- The newsletter is to be distributed across the country.
- Publisher contact will involve developing relationships with primarily out-of-region players.
- Industry contact will involve developing relationships and exchanging information with appropriate personnel across the country through attendance at conferences, telephone contact, subscribing to their newsletters and general correspondence.
- Direct sales will involve contact with out-of-region personnel, specifically Ottawa-based training coordinators in federal departments.

The combined effect of these initiatives will provide the ALI with the desired profile outside of the region and generate the contact network necessary to access expertise and markets.

IV

STAFFING

A. DIVISION OF RESPONSIBILITIES

The ALI should be staffed with two professionals, one devoted to the developmental initiatives and one to the applications and marketing activities. The individual devoted to applications and marketing would be in charge and will be referred to as the Managing Director. The other staff member will be referred to as the Director of Development.

The Managing Director would be responsible for:

- coordinating investment fund competitions.
- direct sales
- conference planning
- publisher contact
- industry contact
- government assistance
- newsletter production

as well as overall management and administration of the ALI which includes duties such as:

- financial reporting and controls
- budget preparation
- preparation of strategic plan for subsequent years
- overall reporting to the Board of Directors
- monitoring the results of the slate of initiatives described in this plan and proposing alternative direction to the board as appropriate.

The Director of Development would be primarily responsible for:

- user laboratory/library
- organization and maintenance of database in support of the information clearing house function
- outreach programs
- university courses
- coordinating the product development competition

Two staff are necessary for the ALI for a number of reasons. Effective operation of the lab and information clearing house function requires that a person be physically present in the office at least 75% of a full-time schedule. This would not be possible for a person with direct sales responsibilities. The ALI serves two related but nonetheless essentially distinct communities: the education sector which is in development mode and the

commercial training sector which requires principally marketing assistance. Both networks will be best served if they have their own focal point or clearing house. The naturally close working relationship of the two ALI staff will ensure the two networks meet and share information at the appropriate times.

The ALI does not need to begin with dedicated support staff. It is presumed that support service would be available on an as required basis from the host organization.

V

ORGANIZATION

A. STATUS

The ALI is to be established as a non-profit entity with authority to generate revenue but a mandate to re-invest any surplus which might occur, into development initiatives.

B. BOARD COMPOSITION

The ALI will be managed by a board of Directors to be appointed by the organization which houses and takes responsibility for it. The board is to be comprised of representatives from:

- The responsible organization.
- Two private sectors representatives familiar with the industry but who will be at arms length from the ALI, that is not apply for ALI investment funds and not be a test site for any firm who has received ALI investment funds.
- Two private sector industry representatives.

A subcommittee of three members of this board will be established to award investment funds. The two industry representatives would not be eligible for inclusion on this committee.

A separate committee will also be established to award product development competition funds. This committee will be comprised of one Board member and two non-board members nominated from the public at large but who have a knowledge of the public education system.

Assuming that the Department of Communication and the Atlantic Canada Opportunities Agency are primary funders of the ALI, each would designate a contact person to monitor their financial stake and be available for consultation as required. These agencies need not be directly involved in the management of the ALI.

C. FINDING A HOME

The bundle of initiatives described for the ALI would most logically be housed at whatever institution, offering a Masters of Education Program, which chooses to add instructional technology courses. The ALI with its user lab and reference/support service will be a valuable support resource to any instructional technology program.

It is possible that with proper promotion, proposals could be attracted from each of the M.Ed granting institutions in the region to house the ALI. The decision as to where to locate the ALI should depend upon:

- The economics of the proposals -- which provides the best space, terms for administrative support, least additional cash investment in curriculum development.
- Leverage in terms of access to university funding sources.
- Support for the objectives of ALI.
- Preparedness to collaborate and perhaps even operate ALI jointly with a community college. This type of collaboration will provide the ALI with improved contact with a training environment and as such a closer link to an important potential market.

VI

FINANCES

A. BUDGETED EXPENDITURES

A budget for years one and two is provided in Exhibit VI-1. A funding rate in the range of $500,000 per year is necessary to undertake the proposed slate of initiatives at a scale and in a fashion sufficient to significantly increase the level of activity within the industry.

Most of the line items in the budget are discussed in Chapter III. For those which are not, further detail is provided here.

1. User laboratory and library

The $60,000 budgeted for the laboratory and library would be divided about evenly between expenditures on hardware and software or published materials.

Regarding hardware, it is anticipated that two or three workstations would be required. At least one should have high resolution colour graphics capability. Consideration should be given to the question of whether it is necessary to have both Apple and MS DOS type equipment. The advantages of a networked versus stand-alone configuration must also be assessed.

Software purchases will be a combination of authoring languages and popular packages. Input from curriculum advisors will help set priorities in this area. A desktop publishing package is also necessary to produce the newsletter.

The year 2 budget is significantly smaller than that for the first year as most spending should relate to upgrading the software library.

2. Travel

Both the Managing Director and the Director of Development are provided with a travel budget. The Managing Director's budget is simply based on an assumption of 6 trips of $1,000 each to out-of-region destinations plus another $6,000 for within region travel. The Director of Development would travel less perhaps making only one out-of-region trip.

3. Shared costs

This category essentially represents overhead costs. Office administration and support expense have been budgeted assuming that there is an existing organization, probably a university prepared to house the ALI. This organization would provide

approximately 1,000 square feet of suitably furnished space at something of a discount to normal market rates -- or even gratis. It would also make available the services of support staff and office equipment so that the ALI would not need to buy items such as a photo copier, telephone system, word processors or facsimile. The ALI would also not require its own secretary. Budget is nonetheless provided to cover user fees of $1,000 per month for these services.

Significant budgets are provided for communications costs, almost $2,000 per month for telephone and all other means combined. This allocation reflects the importance of the information clearing house and exchange function of the Initiative.

Board expenses are provided to pay costs incurred by Board members while conducting ALI business. These costs will primarily relate to attendance at meetings and telephone charges. It is also proposed that some nominal honorarium be paid to Board members. This could take the form of cash or alternatively ALI could fund their attendance at a related conference being held outside of the region.

B. REVENUES

1. Pilot requires full support

The budget level indicated represents a base level of funding required to get the ALI up and running. The envelope suggested: $500,000 per year for two years should be provided entirely by the Department of Communications and the Atlantic Canada Opportunities Agency to place the ALI in a secure position from which to commence operations.

2. Funding leverage

The Board and management of the ALI should proceed almost immediately to seek additional funding sources which would allow them to both, expand their scope of operations during the pilot years, and ensure future continuance. There are a variety of potential funding sources for the Initiative.

- Other government departments, primarily provincial but the possibility exists for other federal portfolios such as Employment and Immigration or Defence to participate.

- Private foundations -- there are a variety of philanthropic foundations in Canada which fund educational initiatives and which are capable of making significant contributions.

- Corporate sponsors could provide support in the form of computer hardware or conference sponsorship if approached with proposals which provide some visibility in return for their assistance.

In general the Initiative will have more success attracting funding from these sources if it can link funds from a particular sources to particular initiatives. This improves the opportunity to provide reciprocal visibility to the sponsor.

3. Fee for service opportunities

In the near term it is unlikely that it will be feasible for the ALI to charge for any of its services without significantly risking participation rates. This should not always be the case as the Industry develops. The ALI should be on the look out for opportunities to charge a fee for services. The most likely possibilities to this end are:

- Instructional revenues from teaching courses, seminars or workshops to either regular students or in continuing education programs.
- Newsletters subscriptions: the potential here expands if the content can also appeal to readers outside of the region.
- Newsletter advertising, again if broad circulation can be developed.
- Brokering fees from either distribution activities or marketing activities.
- Paid product review work.
- Organizing trade fairs in conjunction with the conferences.
- Royalties from equity investments.
- Capital appreciation from equity investments.

In seeking opportunities for revenue generation, it is essential that the ALI avoid activities which place it in competition with industry members.

EXHIBIT VI-1
Atlantic learning initiative

	Year 1 Budget	Year 2 Budget
Development		
Coordinator's Salary and Benefits - responsibilities to include administration of items below	50,000	52,500
Contracted Out-reach Program (presentations to educators at a variety of levels on Professional Development days)	25,000	26,250
User laboratory equipped with machines, authoring languages, packages, demos, studies, articles, reviews also desktop publishing system with laser printer	60,000	20,000
Course Development fund - to get a couple of instructional technology courses on the curriculum at region universities / community colleges	20,000	0
Travel	6,000	6,300
Product Development Competition fund expenses associated with selected development projects funds awarded on the basis of an annual competition with maximum of $2,500 per project and funds to be spread across elementary, junior, high, technical and post-secondary levels	25,000	25,000
Applications and Marketing		
Coordinator's Salary and Benefits (primary responsibilites to include: - lobbying with government departments to consider C/TAL and locally produced C/TAL - notifying local C/TAL firms of opportunities - organizing conference - producing newsletter - assisting C/TAL firms in accessing available gov't assistance - contacting our of region publishers to identify opportunities for collaboration	70,000	73,500
Travel	12,000	12,600
Investment Fund - This pool of funds is to be invested in projects with apparent commercial potential and which have their first customer in the region signed up to purchase as well as to cooperate as a test site - preference to be given to projects providing maximum leverage of government investment, best commercial potential, strategic alliances, and innovative technology	150,000	200,000
Conference	25,000	20,000
Shared		
Office	10,000	10,500
Telephone	12,000	12,600
Newsletter distribution	2,700	2,835
Administrative support and board expenses	16,000	16,800
Professional fees	5,000	5,250
Subscriptions and memberships	1,500	1,575
Misc. communications: video conferencing, facsimile, mail, courier, printing	9,800	14,290
Total	500,000	500,000

VII

ACHIEVING THE WILLED FUTURE

A. INTRODUCTION

The ALI is a pilot initiative wherein ACOA and DOC are attempting to address the fundamental barriers to development of the Computer and Technology Aided Learning Industry. This chapter describes the type of evolution foreseen for the ALI as its initiatives create a positive impact on the industry. It also defines the timing and nature of evaluation processes necessary to assess the effectiveness of the Initiative and provide input to the process of reshaping the Initiative as conditions change. It should be remembered that the Atlantic Learning Initiative is by design directed at the needs of the business, training, and educational communities, and is not just driven by the thrust of the "technological imperative".

B. DEFINING THE WILLED FUTURE

As the C/TAL industry across Canada matures, initiatives such as the ALI must evolve to maintain their relevance. To provide assistance in managing this evolution a scenario has been developed and presented below which describes both the environment facing the industry and the manner in which the ALI could be expected to adapt. The scenario represents a 5 to 10 year forecast.

- There will be ten firms in the Atlantic Region generating revenues from the sale of C/TAL products to a national and international marketplace. Some of these firms will have been taken over by out-of-region firms providing market access and capital. Others will be consolidations of previously independent local firms. The majority of these firms will be providing products for training markets. One or two of these firms will be marketing hybrid technologies whereby courseware drives a variety of hardware in addition video display terminals.

- Adult education and vocational training programs will be major consumers of C/TAL products and Canada will be an international leader in the application of C/TAL technology in this area.

- C/TAL will constitute 10% of curriculum delivery in public schools with modules for remedial application and gifted students representing the majority of usage. In core programs, C/TAL will be applied in essentially a supplementary fashion to provide media variation.

- The training and education segments of the business will differ in terms of their support requirements.

- The Atlantic Region's C/TAL industry training component will be firmly established as part of the national industry. The networking and information clearing house functions initially provided by ALI will now be performed by a national industry association.

- Support for education sector development initiatives will continue to be provided by the ALI through the user lab/library clearing house. The ALI will evolve to resemble the Technical Education Research Centre (TERC) in Cambridge Massachusetts. Funding for ALI will come from a broad base of corporate, government and foundation sources. Academics will sabbatical at the ALI and the ALI will have a research focus as opposed to a short-term commercial orientation.

- A small number of Canadian investors will become comfortable with assessing the opportunities and risks associated with C/TAL projects and provide a source of venture capital.

- Educational technology courses will be offered at all institutions providing educational training in the region.

To the extent that this scenario unfolds, the ALI must adapt, adjusting its staff, funding base and focus.

In order to manage this evolution, management must monitor the Initiative closely. A monitoring program for the pilot phase is outlined below. Reviews might be conducted at 6, 12 and 18 month intervals with each focusing on different questions.

At six months the issues to be addressed by the ALI Board are:

- What has been the level of response to product development and investment fund competitions?

- Has the lab/library/database been set up?

- Has a "network" been established (contact established with industry across the country)?

- Are educational technology courses on the calendar?

- Are potential buyers receptive to C/TAL and local suppliers?

At twelve months, the questions to be addressed by the ALI Board are:

- How much interest has been expressed in the newsletter?

- Have potential clients invited Atlantic region firms to bid on C/TAL requirements?
- What quality of projects are in process under development or investment programs?
- How busy is the lab and technology support service?
- Was the conference well attended?
- Have other funding sources been attracted?

At eighteen months, the ALI will need to have identified new funding sources or have commitments from ACOA and DOC that funding is to be renewed.

The evaluation issues at this time would be:

- What has been the employment impact?
- Have any product development projects produced packages which were or are likely to be adopted in the public education system?
- Are there good prospects for out-of-region sales for any investment fund recipients?
- Have any new companies been established?
- Is there potential for revenue generation from ALI activities?

These questions provide the fundamental yardsticks for the ALI to determine its effectiveness and how its mandate and activities should be managed and modified to enable it to be effective on an ongoing basis as the catalyst for industry development.

This business plan combines proven approaches to developing new technology-based business as well as innovative combinations of expertise from the academic and commercial worlds. New communication patterns and behaviour among those people involved, along with their application of the new technologies, can enhance learning and create new learning based industries in Atlantic Canada.

APPENDIX A

COURSEWARE INDUSTRY IN

ATLANTIC CANADA

Major players currently producing courseware

Firms with more than 5 staff:

Knowledge House	Halifax	(902) 455-1962
Commtech Data Services	Fredericton	(506) 458-5830
Crisis Simulations	Halifax	(902) 420-9775
TGS Systems	Halifax	(902) 429-5642

Firms with less than 5 staff

Foretel Technologies	Stellarton	(902) 755-1884
Galloway Info Systems	Halifax	(902) 434-3889

Individuals

Jim Shand & Assoc.	Truro	(902) 893-7138
George White	Halifax	(902) 426-8509
Ron Brunton	Wolfville	(902) 542-5253
Gord Beanlands	Halifax	(902) 424-3632
Richard Sherrington	Halifax	(902) 863-3361
Gerry Costello	St. John's	(709) 753-1336
Michael Collins	St. John's	(709) 737-8801
Salem Massery	Fredericton	(506) 458-8533
Bill McPherson	Charlottetown	(902) 566-9510
Paul Vreland	Charlottetown	Not Available
Terry Mathews	Chatham	Not Available

Firms and individuals interested, but not creating their own courseware at this time

Spectrum Design	St. John's	(709) 738-3053
Fundy Computer Services	Saint John	(506) 632-0185
Atlantic Computer Institute	Halifax	(902) 423-8383
S.E.A. Ltd.	St. John's	(709) 364-2075
Scotia Tech Ltd.	Halifax	(902) 835-6677
Brunswick Data Inc.	Saint John	(506) 623-2990

APPENDIX B

EXERPTS FROM PREVIOUS STUDIES

A. PHASE I - REPORT OF THE COURSEWARE MARKET STUDY

The following test describes the context and importance of courseware industry.

1. Work Readjustment and the Training Crisis
de Grandpré Advisory Council Recommendation

On Thursday, March 30, 1989, the federally-appointed de Grandpré Advisory Council recommended that the government double the current $255 million a year for training under unemployment insurance programs and increase, by $200-300 million, the current $250 million skills shortage program.

"The Council identifies improvements in basic education and training, as well as life-long re-education and retraining, as among the critical steps Canada must take to enhance its international competitiveness .... Canada's education systems must adapt quickly to this new reality, and make continuing education and retraining routinely available to all who need them ... As an incentive to stimulate private sector training, the council recommends that the government establish a tax liability that would be offset by a firm's expenditures for training, up to the full amount of the tax."

- quoted from the full text in the Chronicle-Herald, Halifax 3/30/89

The de Grandpré Commission is responding to two major trends: increased international integration of economies and the introduction of new technologies.

2. Integration of economies

In recent years there has been increasing integration of the major national economies; the export share of world production has risen steadily. This trend has been particular pronounced in Canada where the export share of Gross Domestic Product has risen from 18 to 33 percent since 1960. Raw material exports now represent a smaller proportion of our total exports than ever before, and manufactured goods and services are the ground for new international competition.

3. New technology means new skill requirements

These manufactured goods and services are produced and supported by increasingly complex technologies and information systems, that require sophisticated skills from a significant segment of the labour force. Between 1981 and 1988, about two-thirds of the new employment growth in Canada was in occupations which Statistics Canada has classified as "professional or managerial." A high proportion of current and future job openings require at least some post-secondary education and computer literacy. At the same time, people possessing few technical skills are becoming increasingly disadvantaged in the labour market. To make matters more critical, some skills that are highly specialized are becoming swiftly obsolete. For example, each year, we see new types of software packages emerge, from desk-top publishing to personal information managers. Software favourites such as dBase, WordPerfect, and MS-Word continue to change versions with increasing velocity. Meanwhile, major consultants report that corporate training budgets are expected to rise by only 5% per year through 1991. Requirements for computer-related skills training, especially at the microcomputer level, far exceed the supply of training resources.

4. Training resources are inadequate

According to the Report of the Business/Labour Task Force on Adjustment, "The Canadian Jobs Strategy Investment Program is not sufficient to meet Canada's training needs. New programs are needed to raise the skill level of the labour force as a whole and provide support for ongoing retaining if we are to be more adaptable and thus be more receptive to change ... Little assistance is made available to support training and retaining programs implemented by industry to forestall adjustment problems, to raise productivity, and to enhance competitiveness. Such programs are important if the skill level of the labour force as a whole is to be increased and if individual workers are to be given marketable skills which will ensure continued employment with their current employer or elsewhere."

5. Public education is responding too slowly

If workers will have to be better prepared and retrained frequently to cope with technological change, the importance of early acquisition of the basic skills and aptitudes cannot be over-emphasized. School systems, especially in Atlantic Canada, are introducing technology very slowly. Even in the best schools with a

microcomputer in every classroom, students are barely learning how to use basic applications, let alone apply the technology to their standard curriculum. Technology is not integrated into the classroom; it is still an unrelated, added activity. Where microcomputers are in place, the current emphasis is primarily on learning about computers, rather than using computers to deliver instruction in math, science, etc. This has been a necessary first step. It is now time to give teachers and curriculum planners the encouragement and skills to use Computer Assisted Learning (CAL) as an instructional delivery mode for a variety of subjects.

Students are gradually becoming computer literate; they are not intimidated by computers. There is no question that students would welcome CAL into their everyday learning, if the educators and school boards could find courseware that met their needs.

6. Relevance of this study

The recommendations of the de Grandpré Advisory Council demonstrate the growing need for educational and training materials and services. Canada does not have the resources in place to capitalize on these emerging opportunities. In fact, Canada imports most of these products and services, primarily from the US. In this context, this study, aimed at stimulating the educational and training courseware industry, particularly in Atlantic Canada, becomes increasingly relevant.

Just as large corporations, government, and the military pioneered the use of computers in the 1950's, they are now pioneering the use of computer-assisted learning (CAL). CAL offers one of the prime remedies for Canada's work adjustment and training crisis. In many cases it has been shown to be less expensive and more effective than traditional classroom training. CAL can be linked by telecommunications media to remote sites; it can be used to access and create data banks that serve education and industry; and most importantly, it can be used to substantially reduce the skills shortage that threatens Canada's international competitiveness.

The use of technology in education and training addresses the issue of improving academic and occupational skills in the most cost-effective manner. It addresses the issue of increasing the educational and training capabilities of Canadian resources, keeping Canadian dollars in Canada, and creating more employment in a new and essential field.

B. PHASE II REPORT: COURSEWARE INDUSTRY DEVELOPMENT STRATEGY

In July, 1989, DPA's Phase II report, "Courseware Industry Development Strategy" addressed the issues of increasing the training and educational capabilities in the private and public sectors, keeping Canadian dollars in Canada, and creating more employment in new and essential fields. The report recommended the creation of a lead agency to stimulate the development of the industry as one of the key elements of such a strategy. Thirteen major issues were identified:

- Fragmentation of the education market in terms of decision making and purchases of courseware.
- The lack of a strong history of inter-provincial cooperation in defining courseware needs, sponsoring courseware development, and making joint courseware purchases.
- User dissatisfaction in terms of available courseware, its lack of relationship with curricula, and its relative lack of design sophistication.
- A lack of CAL initiatives at the heart of the educational process and a tendency by educators to treat CAL in a peripheral manner.
- An apparent inability of producers to sell courseware products in Canada before proving their acceptance through sales in the U.S.
- Barriers to market entry in terms of the small size of the existing Canadian courseware industry and its inability to provide sufficient marketing effort to bid on large contracts (for example, Department of National Defence training projects).
- The relative lack of appropriate computer hardware at the classroom level.
- The frequent requirement by large scale users that training suppliers officer a mix of delivery modes, only one of which is courseware.
- A relative lack of interest in the education market by many courseware producers in favour of the more easily penetrated training market.
- A shortage of instructional technologists (experts in both the technical considerations of courseware production and the theory and application of teaching methodology).

- A perceived lack of "critical mass" (activity and interaction among academic researchers, private sector trainers, military trainers, etc.) within the Canadian courseware industry.

- Reservations expressed by some as to whether government agencies can play effective roles in supporting the industry.

- The extremely small size of the Atlantic Canadian courseware industry, the need to expand the capabilities of the many promising software companies in the region, and the potential need for transplanting companies or branches of companies from elsewhere.

The report stressed that these issues must be addressed in any strategy that seeks to promote the development of an Atlantic Canadian courseware industry.

In conclusion the report presented eleven potential initiatives that could form the basis for creating a viable courseware industry in Atlantic Canada. These initiatives were:

1. Training teachers and managers in the context of their changing roles (no longer the sole source of information, interaction, and feedback in the classroom and the office, they act alternately as teacher/manager and "facilitator" as new technologies are introduced into their environments).

2. Encouraging strategic procurement by governments by assisting companies wishing to respond to large public sector courseware requirements, establishing a "buy Canadian" policy, and breaking courseware "mega projects" into manageable pieces.

3. Encouraging inter-provincial cooperation for courseware development by providing financial incentives for provincial cooperative efforts in developing or purchasing appropriate courseware products.

4. Coordinating test sites in Atlantic Canada to facilitate the evaluation of the most promising new courseware, improve the quality of education in the region and establish the region as a leader in instructional technology.

5. Training instructional technologists to produce individuals skilled in both the technical capabilities of hardware and software and in the theory and application of sound teaching methodology to high-tech learning materials.

6. Creating high-tech training/educational consortia to address particular courseware market opportunities.

7. Helping companies link up with market/exporting expertise to fill the gap evident in small courseware companies.

8. Encouraging joint marketing efforts to overcome the cost barriers facing small companies in accessing markets.

9. Establishing a courseware trading company to provide marketing and after sales follow-up for a group of smaller courseware producers.

10. Providing access to federal technical resources in terms of regional or national data banks (such as the Jean Talon project, planned by the Canadian Studies Directorate of Secretary of State) and professional technical skills.

11. Providing grants for product development (possibly on a repayable loan basis dependant on the degree of commercial success).