A Strategy for the
Expansion of Flexible Learning in the Trades in British Columbia

A report prepared on behalf of the Ad Hoc
Flexible Learning in the Trades steering committee

Commissioned by the Industry Training Authority of B.C.

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Vancouver Community College

ita
industry training authority

This Report was prepared on behalf of the Ad Hoc Flexible Learning in the Trades Steering Committee and commissioned and funded by the Industry Training Authority of British Columbia.

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REPORT OUTLINE

REPORT OUTLINE, continued

EXECUTIVE SUMMARY

The focus of this Paper is the development of a Strategy for the expansion of Flexible Learning materials in the trades (with an emphasis on Distance E-learning), focusing on In-School Technical (theoretical) Training and, where possible, In-School Practical Training.

The Board of the Industry Training Authority has called for the development of a Strategy to develop alternative modes of delivery for trades training with the intent of increasing access for trainees and improving their success and completion rates.

The factors influencing this development include:

- Need to increase the percentage of apprentices who complete their programs
- Desire to increase the satisfaction rates of trainees with their programs
- Desire to attract more people into trades training
- Recognition that many trainees live at a considerable distance from traditional delivery sites and need more convenient access to training
- Recognition that block placements cause a financial hardship for trainees because of commuting and housing costs and loss of normal employment income
- Recognition that block placements cause a scheduling and business interruption hardship for employers
- Successful introduction of flexible learning in many programs across Canada including some trades in BC

A Steering Committee was appointed to oversee the development of the Strategy. Consultants were engaged to conduct interviews, carry out research on developments and best practices throughout BC, Canada and the rest of the world. This Paper is the result of that work.

Seventy-two of the trades in BC are national in scope (45 Red Seal and 27 other trades) with uniform tasks. A number of other trades have inter-provincial program guides. This suggests possibilities for using, in BC, flexible learning materials for trades developed in other provinces as well as opportunities to market material developed in BC to other provinces. As of April 30, 2007, over 34,000 apprentices were registered in BC in 130 programs. Registrants in only 15 programs account for 77% of the total. The completion rate in BC is 42% and the ITA wishes to improve this rate.

Interviews and research was focused on the three Canadian provinces where flexible learning is known to have been pursued with some degree of success: Alberta, Nova Scotia and Ontario. Interviews with Provincial officials in Alberta and Ontario indicate that neither have developed a provincial strategy and, instead, have left it up to individual institutions to come forward with their own proposals. Each of the provinces has provided some level of financial assistance for these projects. On the other hand, by virtue of its organization, Nova Scotia Community College has developed a Provincial strategy for trades training.

EXECUTIVE SUMMARY, continued

Virtually all of the Canadian colleges and organizations interviewed expressed an interest in partnering/collaborating with the BC flexible learning initiative.

Australia, New Zealand, United Kingdom, Europe and the United States were all contacted and studied as part of this Report. All jurisdictions except the United States are heavily involved in the promotion and development of E-learning in the trades. A wealth of research data from these jurisdictions has helped to inform the development of this Paper.

The research strongly supports the development of more flexible delivery of learning in the trades:
- o All institutions report that the main advantage of E-learning is to provide trainees with more convenient access to learning materials which, in turn, decreases time away from work and family, reduces costs to the trainee and increases the employer's productivity
- o All institutions indicate a significant reduction in the amount of time that trainees are away from work, typically a 20% reduction in Canada
- o The use of flexible learning in the trades in Europe and Australia is relatively high (reported at between 25 and 50% of total learning)
- o Employers use flexible modes for learning in the workplace and expect their employees to be conversant with this mode of learning
- o An exhaustive, longitudinal review of the literature, "No Significant Differences" found that an overwhelming number of studies showed there are no significant differences between student outcomes in a distance delivery course versus a face-to-face course
- o New flexible learning technologies are being continually developed, opening up opportunities for new applications in trades training

The following goals have been identified for the expansion of flexible learning in the trades:
- o Increase the percentage of apprentices who complete their programs
- o Remove barriers to access
- o Improve satisfaction rates of trainees
- o Attract more people into the trades
- o Reduce commuting time and attendant costs
- o Increase on-job time for trainees
- o Improve generic IT skills

A number of principles have guided the development and delivery of E-learning in the trades in BC for the purpose of this Paper:
- o Offer trainees alternative modes of learning but continue to offer a face-to-face mode for those who prefer it
- o To the extent possible, offer a range of alternatives within each mode to suit the learning styles of individual trainees: from low to high-tech

EXECUTIVE SUMMARY, continued

- o Concentrate development of alternative modes in those trades that are likely to benefit the most
- o Ensure trainees have equitable access to alternative modes
- o Use a Business Plan approach to assessing development proposals including a thorough cost/benefit analysis
- o Capitalize on the skills and resources within BC but consider learning material from outside the Province that adds value and complements BC's development strategy
- o Provide financial incentives for development, over the next 3-5 years, and require evidence that costs will eventually be funded through normal channels
- o Ensure that development is of a high quality and conforms to Provincial standards
- o Seek strong support from ITOs and employers before proceeding in particular trade areas
- o Engage all stakeholders throughout the process
- o Identify and manage risks

The Report makes the following recommendations:

1. The Province should pursue a collaborative approach to the expansion of flexible learning in the trades by establishing a Virtual Network (VN) model, fully involving the Province/ITA, ITOs/employers, Colleges and teachers.
2. The VN should develop a transparent selection process (for the development of flexible learning materials) that has the full input of major stakeholders.
3. Trainee accessibility to flexible learning material should be maximized by eliminating barriers, including ensuring that trainee costs are equivalent to face-to-face modes.
4. Maximize trainee uptake of flexible learning by ensuring that material is of a high quality and follows Provincial standards.
5. Use a Business Plan approach to the development of flexible learning materials including a full assessment of the benefits and costs.
6. Province/ITA to provide annual funding on a 50/50 matching grant basis, in the amount of $2-4 million per year.
7. Develop Provincial standards for development and delivery.
8. Ensure that implementation of the Strategy includes a thorough process of consultation, promotion and orientation, with the result that all stakeholders are involved, informed and engaged.
9. Establish specific, milestone targets and monitor results to measure progress and success.
10. Initiate a quantitative and qualitative, longitudinal research project to study the impact of flexible learning on student outcomes as well as benefits and costs.
11. Implement the Strategy cautiously, building on the positive results of initial developments.

THE CONTEXT

FLEXIBLE LEARNING, DISTANCE LEARNING, DISTRIBUTED LEARNING, OPEN LEARNING, BLENDED LEARNING, MIXED MODE: WHAT DOES IT MEAN?

SUMMARY:
This Strategy is concerned primarily with the development of Flexible Learning materials in the trades (with an emphasis on Distance E-learning), focussing on In-School Technical (theoretical) Training and, where possible, In-School Practical Training. Key terms used in the area of flexible learning are defined.

The following quotation provides an excellent overview of the term, Flexible Learning: "Flexible learning is the provision of learning in a flexible manner, built around the geographical, social and time constraints of individual learners, rather than those of an educational institution. Flexible learning may include distance education, but it also may include delivering face-to-face training in the workplace or opening the campus longer hours or organizing weekend or summer schools." (Bates, 2005, p. 5)

Bates contrasts the term Flexible Learning with Open Learning. The latter is described primarily as a goal or education policy involving the removal of barriers to learning, for example, no prior qualifications to study. "Openness has particular implications for the use of technology. If no one is to be denied access, then technologies that are available to everyone need to be used." (Bates, 2005, p. 5)

Mr. Bates describes Distance Education as the ability of students to study in their own time and place and without face-to-face contact with a teacher. In his view, Distance Education is a sub-set of Flexible learning.

While this report uses the broader term "Flexible Learning", in fact, it is believed that much of the future development of Flexible Learning, as it relates to the trades in British Columbia, will be in the area of Distance Education as defined above with an emphasis on E-learning.

In a trades context, it is generally accepted (with a few exceptions) that training is composed of three elements:

- o On-the-Job: the majority of a trainee's education will take place on the job carrying out tasks of ever-increasing complexity, under the supervision and guidance of a fully trained person
- o In-School Technical Training: the trainee will spend a number of hours per year in a college or private trainer setting acquiring the theoretical skills required for the trade
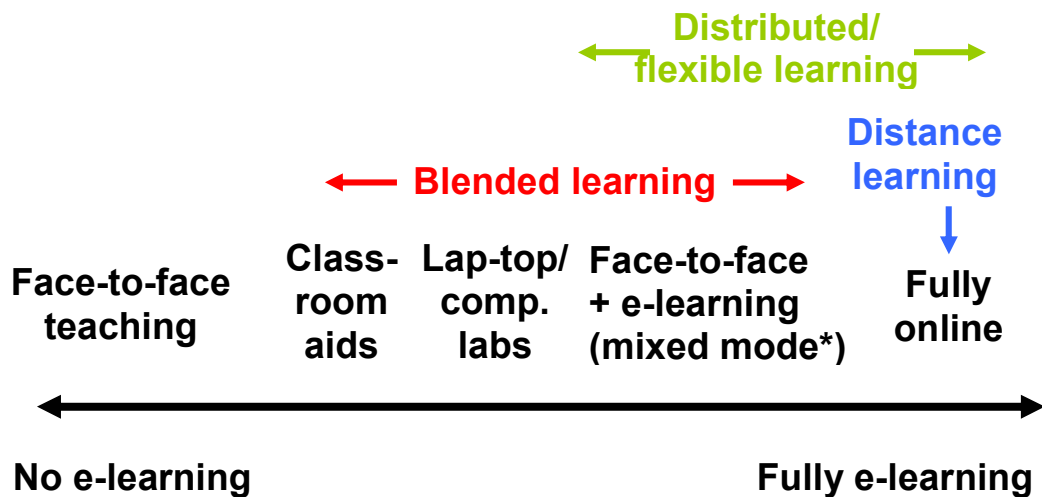
THE CONTEXT: FLEXIBLE LEARNING, DISTANCE LEARNING,
DISTRIBUTED LEARNING, OPEN LEARNING, BLENDED LEARNING, MIXED
MODE: WHAT DOES IT MEAN?, continued

- o In-School Practical Training: the trainee will spend a number of hours per year in a college or private trainer setting acquiring practical skills using the various tools, equipment and other requirements of the trade, generally in a simulated or controlled environment

This Report is concerned primarily with the second aspect, "In-School Technical Training". However, a number of resources have been (and can be) developed that can address a portion of the first and third components, "On-the-Job" and "In-School Practical Training" through the use of simulations, videos and flash technology.

The following chart, adapted from Bates and Poole (2003), provides an overview of the continuum of technology-based learning. Choices will be driven by student preference and, initially, availability of suitable programming.

The continuum of technology-based learning

Distributed/
flexible learning

Distance
learning

← Blended learning →

| Face-to-face teaching | Class-room aids | Lap-top/ comp. labs | Face-to-face + e-learning (mixed mode*) | Fully online |

No e-learning   **Fully e-learning**

*Mixed mode = reduction but not elimination of face-to-face/hands-on training.

Most vocational and trades training will likely be located within the centre of the continuum, but especially in the mixed mode area. The face-to-face/hands-on component may be provided either within a college, or within the workplace under supervision. The online component may be accessed by students from home, college, workplace or community facility (such as a library).

The challenge is to design courses and programs that serve not only the full-time, campus-based student, but also all those students who need training but have jobs and families.

THE CONTEXT: FLEXIBLE LEARNING, DISTANCE LEARNING, DISTRIBUTED LEARNING, OPEN LEARNING, BLENDED LEARNING, MIXED MODE: WHAT DOES IT MEAN?, continued

There is not now a single, homogeneous market for vocational and trades training, but several different markets with different needs. A further challenge in the vocational and trades area is to provide appropriate hands-on, supervised training, or to provide suitable substitutes through animations or simulations, for students who cannot access a college campus on a regular basis.

As the above diagram shows, though, it is now possible to deliver courses in a variety of ways combining 'virtual' and 'face-to-face' teaching. The challenge then is to design courses and programs that meet a variety of learners' needs.

It is also important to recognize that there are a variety of ways to make learning more "flexible" for the student including some that are relatively inexpensive to introduce; for example, the expansion of learning at the employer's place of business. Flexible learning opens up a wide range of possibilities for increasing access for the learner. E-learning, while important and potentially of great benefit, is only one of a number of options.

Appendix A provides a definition of common terms used in the field of Flexible Learning.

BACKGROUND AND METHODOLOGY

SUMMARY:
The Board of the Industry Training Authority has called for the development of a Strategy to develop alternative modes of delivery for trades training with the intent of increasing access for trainees and improving their success and completion rates. A Steering Committee is overseeing the development of the Strategy. The consultants conducted interviews and carried out research on developments and best practices throughout BC, Canada and the rest of the world.

The Board of the Industry Training Authority has identified, as part of their strategic planning process, that a key issue for the coming year is the development of alternative modes of delivery for trades training.

A number of factors have influenced this:

- o A recognized need to increase the percentage of apprentices who complete their programs
- o A desire to increase the satisfaction rates of trainees with their training programs
- o A desire to attract more people into trades training and a related perception that alternative modes of delivery will make the trades more attractive to prospective apprentices
- o A recognition that many apprentices live at a considerable distance from traditional delivery sites, such as colleges, and the practical difficulties that apprentices face in commuting
- o A recognition that block placements cause a financial hardship for apprentices who may need to move temporarily and pay for rental housing during their training period and live for a period on employment insurance benefits rather than their normal employment income
- o A recognition that block placements cause a scheduling and business interruption hardship for those businesses hiring apprentices as they lose the services of key employees for, typically, 8 to 12 weeks during the term of their apprenticeship period
- o Alternative modes of delivery, such as e-learning, have been introduced successfully in various trades and as a part of various pilot projects across British Columbia, Canada and elsewhere

The ITA Board directed that a Strategy be developed for the "Development and Use of E-Learning in the Trades". Subsequent deliberations led to the adoption of the broader term "Flexible Learning". The Strategy document is to incorporate at least the following:

- o A comprehensive analysis of best practices in flexible learning in the trades in British Columbia, the rest of Canada and leading institutions in other parts of the world

BACKGROUND AND METHODOLOGY, continued

- o An assessment of the impact of flexible learning on learners, teachers, employers, delivery institutions and the ITA
- o Delivery options and funding implications
- o Partnership and consortium opportunities and options
- o An assessment of priorities for introducing flexible learning and ensuring equitable access by students
- o Cost/benefit analysis
- o Evaluating success
- o Alternative models for the development and delivery of flexible learning
- o Funding issues
- o Provincial standards
- o Risks and management of risks

A Committee was formed under the leadership of Dr. Alan Davis, Vice-President Academic at Vancouver Community College. A consultant, Hans van der Slagt, was engaged to lead the project and a world-renowned expert, Dr. Tony Bates, was engaged to provide technical advice and assistance.

The work followed two primary streams of activity:
(1) face-to-face and telephone interviews with a number of institutions with a strong reputation in the development and delivery of flexible learning in the trades; these institutions were located in BC and throughout the rest of Canada, the United States, Australia, New Zealand, Europe and Great Britain. Appendix C identifies the organizations and individuals interviewed as part of the development of this Strategy. The latter part of Appendix C identifies organizations/individuals who might inform the implementation of the Strategy but who, for various reasons, were not interviewed as part of this Report.
(2) a thorough search and review of the most current reports and studies on the topic of flexible learning in the trades; a number of the documents reviewed provide assessments of the effectiveness of flexible learning under various conditions. Appendix B identifies the documents that were reviewed in the development of this Strategy.

The Steering Committee met regularly to provide direction and advice to the work of the consultants.

The author of the Report wishes to acknowledge the substantial contributions of Dr. Tony Bates, particularly with respect to the sections on Cost/Benefit Analysis, Best Practices in Flexible Delivery, Alternative Models for Development and Delivery and Funding Models. However, the author takes full responsibility for the contents of the Report.

APPRENTICESHIP TRAINING IN CANADA AND BC – AN OVERVIEW

SUMMARY:
Seventy-two of the trades in BC are national in scope (45 Red Seal and 27 other trades) with uniform tasks. A number of other trades have inter-provincial program guides (not all provinces participated).

This suggests possibilities for using flexible learning materials in BC for trades developed in other provinces as well as opportunities to market material developed in BC to other provinces.

The information contained in this section has been included only to the extent that it may inform the development of a strategy for flexible learning in the trades in BC. For example, it is useful to understand the degree of commonality of trades training between the provinces in order to explore the possibility of partnerships and collaborative opportunities.

Trades training in British Columbia has both a provincial and national identity. At the national level, the Canadian Council of Directors of Apprenticeship (CCDA), a body comprised of the provincial and territorial government officials responsible for managing and directing apprenticeship programs within their jurisdictions, oversee the Interprovincial Standards "Red Seal" Program. This body operates through the Human Resources Partnerships Directorate of the Interprovincial Partnerships and Occupational Information Division, Human Resources Department.

A National Occupational Analysis (NOA) exists for each of 45 Red Seal trades as well as an additional 27 trades for a total of 72 NOAs. A document has been developed for each trade that is recognized by the CCDA as the national standard for that trade. The NOA analysis is structured into Blocks, Tasks and Sub-Tasks. The Block reflects a "distinct operation relevant to the occupation"; the Task is a "distinct activity that the worker is required to perform to complete a specific assignment" and the Sub-Task acts as a sub-set to the Task.

The Provinces are responsible for managing the development and delivery of trades training. In British Columbia the Industry Training Authority (ITA) has this responsibility. The ITA identifies 125 trades in the Province of which 45 are Red Seal (Accredited) Programs and 80 are BC ("Recognized") Programs. The Province also recognizes 35 "Foundation" programs which can be characterized as the introductory portion for one of the 125 related trades. The Province determines the regulations governing each of the trades including entrance requirements, number of training hours and certification requirements.   The Province awards a "Certificate of Qualification" to those apprentices who successfully complete their programs within the prescribed period of time.

At the Provincial level, the ITA develops "Program Outlines" for each of the trades. These Program Outlines are based, where they are available, on the National Occupational Analysis for the trade. The Program Outline identifies: "competencies, learning objectives, learning tasks and content". Recently, two different groups of

provinces have begun to develop "Interprovincial Program Guides" for occupations that are most transferable between provinces. For example, the four Atlantic provinces and British Columbia have developed learning outcomes for the automotive, machinist and electrical trades. A second group of 8 provinces (excluding Alberta and BC) have begun to develop learning outcomes for the Auto Service Technician trade and a number of others.

Individual institutions that actually deliver the trades training may develop lesson plans around the provincial learning outcomes or they may develop their own learning material provided it falls within the provincial (and, where applicable, national) guidelines.

The fact that many of the trades in BC are nationally recognized (i.e. Red Seal) with clearly defined tasks as well as the fact that a number of provinces have agreed to develop inter-provincial program guides suggests several interesting possibilities:

- o Flexible learning material for trades developed in other Provincial jurisdictions, to the extent that these are Red Seal trades or one of those with inter-provincial program guides, should be readily useable in BC with minor modifications to recognize particular BC requirements
- o Similarly, for those same trades, opportunities will exist for flexible learning materials developed in BC to be useable in other Provinces, opening up markets beyond BC

Recently, the Province formed Industry Training Organizations (ITOs) in the following trades areas: Construction, Residential Construction, Natural Resources, Horticulture, Tourism and Automotive (these collectively represent approximately 80% of all BC trades). ITOs are industry based bodies that take lead responsibility for industry training within a recognized industry sector. ITOs are initiated and supported by industry and approved by the ITA. The ITOs act as a prime point of contact for employers and trainees and, in other ways, are important stakeholders in the development of alternative modes of delivery. The CEO's of all six ITOs were interviewed as part of the development of this Strategy. All six expressed support for the development of alternative delivery modes and, more particularly, all six expressed an interest in their organizations being involved in the process, albeit at different levels of detail.

A staff person from the Provincial Strategic Support unit at TELUS in British Columbia was interviewed about their interest and involvement in E-learning. While TELUS is not an ITO, they are a significant employer of people in the Communications Trade, a new trade in BC. They have contracted with NAIT for training for their employees but have approached several BC colleges with an interest in modifying the training to create a base year and then three streams as well as introducing a higher level of flexible learning.

ISSUES IN APPRENTICESHIP TRAINING IN BC

SUMMARY:

Over 34,000 apprentices were registered in BC as of April 30/07 in 130 programs. Registrants in only 15 programs account for 77% of the total. The completion rate in BC is 42%. The ITA would like to improve the completion rate.

A number of factors argue for the expansion of flexible learning in BC:
- o Relatively low level of completion rates
- o The concentration of apprentices in a relatively small number of trades which increases the potential for impact and cost-effectiveness
- o Relative youth of apprentices should increase their affinity for web-based tools
- o Demographics of trainees suggests that many reside beyond ready commuting distance of a training institution
- o Impending labor shortage
- o Need to reduce financial hardship to trainees commuting to training
- o Successful introduction of flexible training in BC and elsewhere
- o Introduction of competency-based certification and modularization of curriculum

The ITA Performance Measurement Report (as at April 30, 2007) indicates that there were 34,049 registered participants in 130 ITA programs, of which 5.647 were in youth programs. Foundation Program trainees were not reported but numbered 6,864 in the previous year. Growth has been at a healthy 32% and 28% for the last two years respectively. The completion rate (measure of the number of apprentices who have completed their program and obtained their certificate of qualification within 6 years of initial registration) was 42% in 2005/06 and 39% in 2006/07. A recent report on the national apprenticeship scene (CSLS, 2005) notes that the completion rate of apprentices in 2001 was 46.9%, down from 62.9 % in 1982 (the earliest year available)

The number of apprentices in each of the trades varies from one (several trades) to 5749 (Carpenter). There are eight programs with 1000 or more active apprentices; these eight programs account for 62% of total apprentices in the Province. When programs with 500-999 apprentices are added in, a total of 15 programs account for 77% of all active apprentices.

ISSUES IN APPRENTICESHIP TRAINING IN BC, continued

These programs (in descending order) are:

TRADE	# ACTIVE APP'S	% OF TOTAL
Carpenter*	5749	16.9
Electrician*	5553	16.3
Plumber*	2778	8.2
Automotive Service Technician*	2214	6.5
Cook*	1691	5.0
Residential Construction Framing Tech	1111	3.3
Heavy Duty Equipment Mech.*	1075	3.2
Millwright	1066	3.1
Sub-total, 8 trades	21237	62.4
Cosmetologist	934	2.7
Sheet Metal Worker*	860	2.5
Welder, Level "A"*	786	2.3
Commercial Trans. Vehicle Mech.	612	1.8
Joiner	567	1.7
Metal Fabricator (Fitter)*	551	1.6
Refrigeration & A/C Mechanic*	530	1.6
Sub-total, 15 trades	26077	76.6
All other, 115 trades	7976	23.4
Total, all 130 trades	34053	100%
* Red Seal Trade		

Ten of the 15 top trades are Red Seal which means that occupational outcomes are standard across Canada.

As of March 31, 2007, 53% of all registered apprentices in BC were under 25 years of age while 85% were under age 35. Forty-three percent of all registered apprentices reside in the lower mainland, 20% on Vancouver Island, 10% in the Okanagan Valley and the remaining 27% reside in other parts of the Province.

The Industry Training Authority has identified the following factors, as reasons for the development of a provincial flexible learning strategy:

o A recognized need to increase the percentage of apprentices who complete their programs
o A desire to attract more people into trades training and a recognition that alternative modes of delivery will make the trades more attractive to prospective apprentices

ISSUES IN APPRENTICESHIP TRAINING IN BC, continued

- A recognition that many apprentices live at a considerable distance from traditional delivery sites, such as colleges, and the practical difficulties that apprentices face in commuting
- A recognition that block placements cause a financial hardship for apprentices who may need to move and find rental housing during their training period
- Alternative modes of delivery, such as e-learning, have been introduced successfully in various trades and as a part of various pilot projects across the Province, Canada and elsewhere
- Apprentices entering the work force are well versed in the use of computers and should be encouraged to become even more computer literate in the work place

While national in scope, the Report prepared for the Canadian Apprenticeship Forum (Canada, 2004) addresses the issue of barriers to trainees in accessing, maintaining and completing apprenticeship programs. Of the nine factors identified in the Report, several may be mitigated by the introduction of alternative approaches to training:

- Costs of apprenticeship to individuals, employers and unions
- Concerns over the impact of economic factors on work and apprenticeship continuation (interruption or termination of apprentices in periods of economic downturn)
- Concerns about apprentices' basic and essential skills
- Shortcomings of workplace-based and technical training

The national study, "The Apprenticeship System in Canada: Trends and Issues" (CSLS, 2005) notes a number of national concerns in the area of apprenticeship training including the low number of completions relative to total registrations as well as the impending skills shortage that faces Canada.

The recent reforms of the apprenticeship system in British Columbia have set the stage for a more flexible approach to learning:

- The introduction of competency-based certification
- The modularization of certification into component modules that stand independently
- The devolution of much of the responsibility for the apprenticeship system to industry

Thus, at least on an intuitive basis, there are a number of factors that should encourage the expansion of flexible learning in the trades in British Columbia:

- A relatively low level of completion rates such that, currently, only 2 apprentices out of 5 complete their program

ISSUES IN APPRENTICESHIP TRAINING IN BC, continued

o The concentration of apprentices in a relatively small number of trades which increases the potential for impact and cost-effectiveness
o The relative youth of apprentices and, likely, their ready access to and affinity for computer-based resources
o The demographics of trainees such that many are likely to reside beyond commuting distance of an institution that offers the training they require
o An impending skills shortage due to demographics (aging of the population) and a slower rate of immigration
o A need to reduce the financial hardship that training represents to a number of apprentices
o The successful introduction of flexible training in BC, other parts of Canada and, for that matter, the world
o The introduction of competency-based certification in BC and the concomitant modularization of curriculum

FLEXIBLE LEARNING IN THE TRADES IN BC

SUMMARY:
There are active pockets of flexible learning at certain postsecondary institutions in BC while at least two institutions have made a deliberate decision not to pursue this option. A number of institutions indicate that, while they have not developed flexible learning material to this point, they would be interested in being involved in a Provincial initiative. At least two organizations in BC have a Provincial mandate to support flexible/open learning at the Provincial level: BCcampus and Thompson Rivers University.

Programs that are currently available in some form of flexible learning mode include: Automotive Collision Repair, Automotive Refinishing, Electrical   Level 1, Gas Fitter, Millwright Level 1, Plumbing, 4th class Power Engineering, 3rd class Power Engineering, Steam Fitting/Pipe Fitting, Sprinkler System Installer – Fire Protection.

Up to this point, there has not been an overall strategy for the expansion of E-Learning in the trades in British Columbia. At the same time, ITA, BCcampus and other organizations have supported the development of flexible learning at various institutions. A Report was prepared in 2006 (ITA 2006) which documents "Alternative Trades Training: Best Practices from Across Canada", and, in particular, certain programs at Vancouver Community College and British Columbia Institute of Technology. The information below is an attempt to summarize and update that information as it relates to this Report as well as to provide examples of Flexible Learning at other BC colleges (although this is not a comprehensive survey of all flexible learning in the trades at all of BC's institutions). A brief profile is also provided of some of the other organizations in BC that have made a major commitment to the area of flexible learning.

COLLEGES

Many of the BC colleges were interviewed although not all the interview results are reported below. The colleges included below provide a representative sample of the state of flexible learning in the BC college system. The experiences of several private colleges are also included because of the experimental work that was done there.

British Columbia Institute of Technology, Vancouver

BCIT has made a major commitment to the development of flexible learning with the support of a Vice-President in charge of Learning and Technology Services and a staff of 60 including instructional materials developers, instructional development consultants, multi-media developers, graphic artists and other staff to assist teachers in developing flexible learning materials.

FLEXIBLE LEARNING IN THE TRADES IN BC, continued

Level 1 of the Millwright program (of 4 levels) is currently on-line with about 60% of the program content exhibiting a "high level" of alternative learning modes: simulations
of safety issues, on-line exercises to simulate hands-on skills, on-line access to course
materials, on-line assessment. The College is planning to deliver Millwright Level 1 with other colleges and/or industry providers in BC, allowing students in remote areas of the
Province to complete the technical training on-line and then complete the practical component at a local college or with an industry provider. The College used Alberta's Individualized Learning Modules (ILMs) as a basis for the curriculum. The Learning Manager (TLM) is the Learning Management System used to deliver the content.

The 1-year, 4th class and 2-year, 3rd class Power Engineering programs are entirely available via distance education. These programs were developed through a consortium including the Northern Alberta Institute of Technology, the Southern Alberta Institute of Technology and British Columbia Institute of Technology. The three partners have incorporated a company (Pan Global) which produces and sells the program across Canada and the world.

On the whole, these are not sophisticated programs (except for the boiler simulation) rather relying on a computer-managed set of questions that relate to the program's self-study guides. The consortium uses an on-line synchronous technology called Elluminate to allow real time interactions between instructors and students who are in various locations. The intent is to expand on-line learning material.

BCIT offers other trades programs in a flexible learning mode; however, information about these programs was not available at the time this Report was published.

Community Skills Centre, Abbotsford

Community Skills Centre (CSC) responded to an RFP to offer alternative delivery of Electrical Level 1 Apprentice Training. Alberta's Individualized Learning Modules were used as a basis for content. Open School BC provided support for the WebCT software.

Material was delivered through WebCT with trainees logging on two evenings per week to discuss the content of their learning materials with their instructor and peers and to test their knowledge using on-line quizzes and feedback. Trainees also attended "lab sessions" at the Abbotsford Training Centre for 8 hours, two days per week.

Twelve students enrolled in the program with most being selected on the basis of their marks. The results can be summarized as follows:
- o High level of satisfaction on the part of trainees with the course, instructor and learning materials (no comparative data provided for face-to-face delivery)

FLEXIBLE LEARNING IN THE TRADES IN BC, continued

- o Very favorable comments from employers
- o An average grade of 88% on in-class testing (worth 0.7) and 61% on the ITA exam (worth 0.3) for an overall grade of 80% (no comparative data provided for face-to-face delivery
- o There were significant technical problems with the support of WebCT

Kwantlen University College, Surrey

Kwantlen University College offers training in 12 trades, "mostly in a traditional mode of delivery". The College has been looking at various models to introduce some level of flexible learning, primarily for assessment purposes, using Moodle learning software. However, they do not believe that the trainees enrolled in their trades programs are, on the whole, inclined to elect to pursue flexible learning options for mainstream learning. They believe that a lack of motivation will prevent many students from completing their studies under this model.

The University is interested in being involved in a Provincial initiative but would see flexible learning as a secondary, supportive mode of learning rather than as a mainstream activity.

Northern Lights College, various locations in Northern BC

Northern Lights provides all of its trades training in a face-to-face mode although they do use a mobile trailer for Welder training in several communities. The College also has Smart Classrooms and video conferencing capabilities.

The College is somewhat skeptical about the potential interest in flexible learning. Their sense is that students need a high degree of motivation; many of the trainees work long hours making part-time study difficult and many of the camps where trainees live do not have access to the internet.

Okanagan College, Kelowna

Okanagan College has developed some flexible trades training material, primarily in the area of Trades Upgrading, for example, CFC Emissions and R134A Air-Conditioning certification. These have been developed in an asynchronous mode. The College has also developed some inter-provincial Red Seal "refresher" material in a flexible mode as well as level 1 of the Recreation Vehicle Service Technician trade. Approximately one-half of the latter program is delivered by distance, in a synchronous mode, through the use of Smartboards, Powerpoint and the internet.

The College indicates that it would prefer to continue to concentrate its future development in the area of trades upgrading as this lends itself well to flexible learning strategies.

FLEXIBLE LEARNING IN THE TRADES IN BC, continued

Pacific Vocational College (private college), Burnaby
Piping Trades

Pacific Vocational College offers training in the following trades: Plumbing, Steam Fitting/Pipe Fitting, Sprinkler System Installer – Fire Protection and Gas Fitting. Training is offered in both a face-to-face classroom setting as well as in a continuous intake, self-paced mode at the College's site in Burnaby. Students work through self-paced materials, complete self-assessment activities and view customized videos that compliment the self-paced print materials.

Sprott-Shaw Community College, (private) located in 20 communities in BC

In 2006, Sprott-Shaw responded to an RFP to offer alternate delivery of Electrical Level 1 Apprentice Training. Sprott-Shaw used the NAIT program of "fixed-entry, open-exit" which provides flexible learning periods for trainees. Alberta's Individualized Learning Modules were used in a structure that involved 2 hours/day of face-to-face instruction, 2 hours of lab work and 2 hours of supported self-study. "The Learning Manager" software was used to provide the students with practice and final module tests. While overall hours remained the same, Sprott-Shaw proposed a longer day (from 6 to 7 ½ hours) with the result that students were able to complete the program in 8 weeks rather than 10.

Eighteen students were accepted into the program based on interviews as well as the results of literacy and numeracy tests. Results of this experimental offering can be summarized as follows:
- High levels of satisfaction on the part of students and employers (no comparative data was provided with regard to more traditional models of learning)
- An average grade of 87% on in-class testing (worth 0.7) and 72% on the ITA exam (worth 0.3) for an overall grade of 82% (no comparisons provided)
- 16 of 18 apprentices completed the program (no comparisons provided)
- While individual trainee experiences varied, trainees reduced their class time by 2-3 weeks
- The NAIT ILMs were appropriate for use in BC with some adjustments to reflect BC requirements
- It was noted that trainees must be more self-directed in this mode of delivery than trainees in a traditional mode of delivery
- Employer responses pointed to a pent-up demand for more offerings of this program

Thompson Rivers University, Kamloops

Thompson Rivers University and the former BC Open Learning organization merged in 2005 with the result that TRU has a major commitment to the development and delivery of flexible learning in the Province. Their charter indicates that the "university must serve the open learning needs of British Columbia" as well as to "provide an open learning credit bank for students". Their Open Learning division is

headed up by a Vice-President. TRU's philosophy of Open Learning is learning that enhances accessibility, minimizes the need to be on the institutional site and that recognizes past learning.

The Open Learning division offers all of its programming at a distance with no face-to-face teaching except for practicum's (Nursing was given as an example). Materials are provided in paper form or via the web depending on the needs of the student. Tutorial assistance is available via e-mail or phone. Their research shows that learners prefer asynchronous modes of distance learning to avoid the need to follow a predetermined schedule. Their research also shows that a majority of their students reside in the lower mainland (driven by the convenience of self-paced learning).

While much of the development has been in the post-secondary sphere, the University wishes to play a major part in the trades as well. Staff have identified the Electrical, Welding and Carpentry trades as the highest priority for development over the next one to two years. The University has indicated a strong interest in partnering with other institutions in order to share resources and reduce costs.

Vancouver Community College, Vancouver
Automotive Collision Repair and Refinishing Programs

Industry feedback encouraged staff at VCC to develop extensive flexible learning materials for its Automotive Collision Repair and Refinishing Programs. The materials reflect significant use of interactive media such as Flash animation, video clips, message boards, e-mail communication, on-line quizzes and downloadable printed material. Most of the material relates to the "theory" portion of the courses and can be used either in class or accessed from another location such as home or the work place.

There has also been a parallel attempt to delegate some of the hands-on training to the employer. There is an expectation that training at the College will be reduced from 15 to 9 weeks.

The project is being tested and plans are to introduce the full range of delivery options in September of 2007. The project was partially funded by BCcampus on condition that the material be made available free of charge to BC postsecondary institutions. VCC has begun to market the material outside the Province.

It is likely that the project has progressed to this point because of the enthusiasm and dedication of the two principal staff that have been involved in the project for about three years.

FLEXIBLE LEARNING IN THE TRADES IN BC, continued

OTHER ORGANIZATIONS

BCcampus, Vancouver

BCcampus is a provincial organization that serves both colleges and universities in the Province. It has a staff of 13 (plus contract staff) and an annual budget of about $3.2 million.

The services offered by BCcampus include:
- Administer funds for the development of flexible learning materials
- A digital repository for all flexible e-learning products that are funded by BCcampus plus other products that were previously owned by the Provincial government and that have been transferred to BCcampus
- An intellectual property licensing system for products funded by BCcampus
- A shared services system for such products as Moodle and Desire2Learn that provide a basic level of service for all postsecondary institutions; servers are housed at Simon Fraser University
- Act as a conduit for on-line courses offered by all postsecondary institutions; manage the Learning Management System
- An on-line application service for all BC postsecondary institutions
- A secure system for real-time exchange of student and institutional information between BC post-secondary institutions

Commonwealth of Learning, Vancouver
While the Commonwealth of Learning (CoL) does not develop or deliver flexible vocational training in Canada, their philosophy and mode of operation may be helpful in formulating the strategic framework for flexible trades training in BC.

The Commonwealth of Learning organization is located in Vancouver and is involved in extending and expanding access to distance education (their term) throughout the Commonwealth. The organization is funded by voluntary donations from the member nations.

Although the CoL is involved in all levels of learning, the focus is on secondary and vocational education. They do not provide funding, do not teach and do not develop curriculum but, rather, are in the business of providing advice, building capacity and building collaborative relationships. Their primary interest is in free, open content and they are driven by the values of freedom and democracy. They believe that organizations are driven to collaborate through the ability to, collectively, develop free content. The overall goals of CoL are (1) reduce costs, (2) improve access to distance courseware, (3) promote the development of high quality material

CoL uses nationally approved frameworks for standards; for example, the standards used by New Zealand.

FLEXIBLE LEARNING IN THE TRADES IN OTHER PARTS OF CANADA

SUMMARY:

Apart from BC, interviews and research was focussed on the three Canadian provinces where flexible learning is known to have been pursued with some degree of success: Alberta, Nova Scotia and Ontario. Interestingly, interviews with Provincial officials in Alberta and Ontario indicate that neither have developed a provincial strategy and, instead, have left it up to individual institutions to come forward with their own proposals. Each of the provinces has provided some level of financial assistance for these projects. On the other hand, by virtue of its organization, Nova Scotia Community College has developed a Provincial strategy for trades training.

SAIT and NAIT, the two largest provincial institutions in Alberta, have developed Individual Learning Modules which have become the basis for a low-tech delivery of a number of trades. NAIT has also developed NAITDATE to deliver the theory portion of the apprenticeship courses in one of two modes: to individual trainees in their own community or at as part of a group at a second institution.

A number of the Ontario colleges offer some level of flexible training in a few of the trades. Durham College and College Boreal are two of the more active colleges. OntarioLearn is a consortium of 20 of Ontario's 22 colleges that provides a pool of distance learning courses developed by any of the member colleges.

Nova Scotia offers the option of flexible learning in 21 trades. While much of their learning material is paper-based they do use the web for email, computer testing, video and some graphic material.

Virtually all of the Colleges interviewed as part of this section expressed an interest in partnering/collaborating with the BC flexible learning initiative.

While there is, undoubtedly, some level of flexible learning being pursued in every province and territory in Canada, this section of the Report concentrates on the three provinces that appear to have made a significant investment, both in dollars and results: Alberta, Ontario, Nova Scotia.

ALBERTA

Alberta's Apprenticeship and Industry Training branch (part of the Ministry of Advanced Education and Technology) has taken the position, at least to this point, that it will not lead a Provincial initiative but, rather, support institutional initiatives. At the same time, they have been encouraging institutions to do more work in the area of flexible learning in the trades.

FLEXIBLE LEARNING IN THE TRADES IN OTHER PARTS OF CANADA, continued

A number of institutions have led "small" initiatives some of which are managed electronically but, in the opinion of Branch staff, there is much more that needs to be done. Flexible learning development seems to be initiated by "mavericks" in the system rather than as a result of a demonstrated need or demand from industry. There has also been some experimentation with Competency-Based Apprenticeship Training (CBAT) whereby apprentices are able to take a program on a part-time rather than full-time basis, progressing on the basis of their success on each successive module of material. Recently, employers in Fort McMurray negotiated an arrangement whereby theoretical material was delivered on the employer's site with on-site coaches to assist trainees. Employers paid for the extra costs involved in this model

The Ministry supported and led the development of Individualized Learning Modules (ILMs) and, in fact, holds the copyright to this material. The ILMs were developed by a number of the Alberta postsecondary institutions, including NAIT and SAIT. Branch staff indicated that the initial reluctance of industry to support flexible learning eased as they became familiar with the modular approach. The Province seeks the advice of industry through Provincial Apprenticeship Committees which are not funded.

A number of delivery institutions in other provinces (including BC) use Alberta's ILMs as the basis for their curriculum.

Southern Alberta Institute of Technology (SAIT), Calgary

SAIT currently has developed flexible learning material in 14 trades, a number of construction trades, Electrician, Plumber, Sheet Metal Worker and others. Essentially, the material is based on the Individual Learning Modules for each of the trades. SAIT also uses the Total Learning Manager (TLM) as a repository for test banks; these are available to the students from home and the college

At the beginning of their program, students are provided with a paper copy of the ILMs (currently the Province does not permit these to be provided electronically) and they are registered in the TLM. Students are required to attend classes for a minimum number of hours per day to be eligible for Employment Insurance; however, within this restriction, they are able to complete the ILMs from home as well as accessing test banks to measure their progress. Typically, students in an 8-week program have been able to shorten their on-campus stay to 5 or 6 weeks, increasing their time on the job as well as their earning power.

SAIT developed and approved, in 2005, a detailed strategic plan for e-learning, the implementation of which is the responsibility of the Associate Vice President for Academic Development. The plan sets out targets for mixed mode and distance education courses, recommends resources and infrastructure needed to support e-learning (including faculty development), and includes a financial plan. SAIT has also established a research chair in e-learning, partly funded by Cisco Systems Inc.

manager for the Cisco Academy). SAIT has received/is receiving grants from the private sector (Cisco, EnCana and CIBC) totaling $3.1 million between 2001-2010 to support the development of e-learning.

In 2005, SAIT had 42 courses fully online, with approximately 600 student registrations. It had a total of 123 DE courses (the remainder being predominantly print-based) with a total of over 6,000 DE course registrations. SAIT's distance education enrolments (print + online) were growing by 12 per cent per annum, despite the fact that the DE courses receive no grant funding, being solely self-financed from student fees. On campus, 192 courses were using WebCT to supplement classroom/lab teaching, including 23 courses in the Construction department. There were over 6,000 WebCT course registrations. SAIT is a founding member of eCampusAlberta, an organization similar to BCcampus.

SAIT is keenly interested in developing more sophisticated flexible learning systems and has prioritized some of the larger trades: Carpentry, Electrical and Welding for further development. Progress has been slow for a number of reasons:
- o Lack of funding support from the Province
- o Inability to free up instructors for development purposes at a time when enrolment is very high
- o Difficulty in finding instructor "champions" with an interest in developing flexible learning materials as well as lack of institutional support for faculty development
- o Relatively high cost of development of flexible learning materials

SAIT collaborated with BCIT on the development of a flexible model of delivery for Power Engineering although it is also paper-based. The Associate Vice President for Academic Development and his staff have expressed a strong interest in working with other organizations (such as the proposed BC initiative) in developing and enhancing flexible learning materials in the trades. They are motivated by the opportunity to share the high costs of development with others.

Northern Alberta Institute of Technology (NAIT), Edmonton

Similar to SAIT, NAIT uses the Individualized Learning Modules in hard copy and The Learning Manager for electronic test banks for approximately 25 trades with varying levels of impact on the programs. NAIT claims that the use of the ILMs has helped to improve the quality of many of their programs.

NAIT has developed a Competency-Based Apprenticeship Training (CBAT) system for the Welder and Electrician trades. The CBAT is based on ILMs with the hands-on training being provided primarily through the trainee's employer (NAIT is open evenings and week-ends as a back-up).

FLEXIBLE LEARNING IN THE TRADES IN OTHER PARTS OF CANADA, continued

NAIT has also developed "Distance Apprenticeship Training and Education" (NAITDATE) in order to offer more flexible and accessible trades training programs within Alberta. The NAITDATE Program provides different modes of delivery, ranging from traditional, print-based correspondence to interactive video conferencing coupled with on-line learning. This project uses Alberta's high speed SuperNet to provide video conferencing and on-line learning for several of the trades: Welder, Electrician, Steam Pipefitter, Auto Parts Technician. With regard to the videoconferencing component, NAITDATE is used to deliver the theory portion of the apprenticeship courses in one of two modes: to individual trainees in their own community or as part of a group at a second institution. NAITDATE was independently evaluated as part of a study commissioned in 2006 for NAIT and determined to be successful.

ONTARIO

Like Alberta, Ontario does not have a Provincial strategy for the development and expansion of E-learning. However, the Province has used its "Apprenticeship Incentive Fund", among others, to fund particular projects at institutions across the Province. These include:
- Algonquin College (2005/6), Plumber
- Conestoga College (2004/5), Precision Machining and Tooling; Welder
- Boreal College (2004/5), Parts Technician

A number of Ontario colleges were interviewed with the striking result that several reported that promising flexible learning projects were initiated and then dropped for a variety of reasons: lack of industry support, Province discontinued financial support.

College Boreal, Sudbury, Kapuskasing, Hearst

Boreal (a French language college serving about half the Province) appears to be one of the most active Ontario colleges in developing flexible learning materials, particularly to serve the many small communities in its catchment area. While enrolment in trades programs using online resources is small (60 annually), the College offers the following in a flexible mode:
- Educational Assistant (completely online)
- Early Childhood Educator (blended Distance Education model)
- Parts Technician (completely online)
- Welder (theory portion online)

The Welder program contains some very interactive, high-end multimedia resources using 3-D software. Simulations of various welding techniques are showcased and learners can change variables to see effects.

The College also uses a trailer, dubbed "Mobile College", at its Hearst Campus to bring specialized training directly to its clients in the Forestry and Mining sectors.

FLEXIBLE LEARNING IN THE TRADES IN OTHER PARTS OF CANADA, continued

Durham College, Oshawa

Durham has a fairly long history of delivering trades training in a flexible learning format. Currently, the Industrial Millwright, Electrician (Construction, Maintenance, Industrial), Machine Shop (first year), Tool & Die Technician (first year) are delivered in a flexible mode.

Durham uses WebCT as its primary learning management system with offerings ranging from some use of on-line materials to complete on-line offerings. In order to maintain maximum flexibility, the practical component is provided, in some cases, on weekends.

OntarioLearn

OntarioLearn is a consortium of 22 of Ontario's 24 community colleges. The consortium acts as a broker for on-line courses developed by any of the member colleges. Over 850, primarily postsecondary, courses are currently being offered with an enrolment of approximately 45,000 students. While the consortium has very limited offerings in the trades area, the OntarioLearn structure may help to inform the strategy being developed for BC.

Each college retains ownership over the courses it develops. A prospective student registers for one of the OntarioLearn offerings at any one of the member colleges and then is enrolled through a third party organization, "Embanet", which has developed its own student management system. Embanet hosts most of the popular learning management systems including Blackboard, WebCT, Moodle and Angel. Course fees are split between the institution with whom the student is registered and the institution offering the course.

There is a very small secretariat supporting OntarioLearn and a volunteer Board, drawn from the member colleges, oversees the enterprise. The organization has recently introduced a process to create uniform standards for its course offerings.

NOVA SCOTIA

Nova Scotia Community College (NSCC) is a single corporate entity with 13 campuses spread across the Province, each campus managed by a Principal. This structure has allowed the Department of Education to implement a province-wide strategy for the development and expansion of flexible learning in the trades. Nova Scotia is the only Province to do so.

The Province offers 21 trades programs of which the following are provided in a flexible mode: Auto Service Technician, Carpenter, Cook, Electrician (Construction and Industrial), Gas Fitter Levels 3, 2, 1), Gas Fitter Section 30 (Levels 3, 2), Machinist, Oil Burner Mechanic, Plumber, Power Engineer (4th , 3rd, 2nd class),

FLEXIBLE LEARNING IN THE TRADES IN OTHER PARTS OF CANADA, continued

Refrigerator Plan Operator (2nd class). Students are offered a choice in which they can access some of their courses through in-class training and some through the Web. The motivation for students is convenience and the ability to reduce time away from the job. On average, 400-600 students are registered in flexible learning trades programs at any one time, about 50 of whom are from outside the Province.

The following is a generic description of how the programs are offered/structured:
- o NSCC uses The Learning Manager (developed by SAIT) as its learning management system
- o An orientation to flexible learning is now required of all trainees
- o Trainees receive hard copy course material (NSCC uses Alberta's Individual Learning Modules) and they use the web primarily for email, computer testing (randomly generated), video and some graphics presentations
- o There has been a trend to push some of the hands-on training back to the employers
- o NSCC has developed over 1000 videos to support their programs
- o Instructors provide a number of functions including answering questions through e-mail as well as monitoring student progress

Excluding development costs, delivery costs for flexible learning are estimated to be about 75% of face to face delivery costs. NSCC is anxious to develop flexible learning materials for more of their programs as well as to upgrade, substantially, the web-based content of existing programs. Senior staff at NSCC have expressed a strong interest in working with other organizations to develop more sophisticated flexible learning materials, driven at least partially by the desire to share the costs. Staff estimate that their cost of developing a flexible learning program, equivalent to 700 hours of traditional face-to-face instruction, would be about $250,000 in 2007 dollars.

NSCC has developed programming, on a contract basis, for third party clients such as EXXON (world wide training) and the Nova Scotia Liquor Corporation (2,000 accounts). The Learning Management systems have been structured to make it appear as if the student is accessing an EXXON or NS Liquor Corporation web-site. NSCC is more than willing to offer their trades training programs to other colleges/institutions understanding that modifications would have to be made to suit the requirements of a particular province.

FLEXIBLE LEARNING IN THE TRADES OUTSIDE CANADA

SUMMARY:
This section of the Report focusses on New Zealand, Australia, Great Britain and the United States.

In New Zealand, trades training is managed by the Industry Training Organizations (ITO's). Surprisingly, there is no clear, national strategy for flexible training in the trades and attempts at collaboration has been sparse with poor results. Much of the flexible training in New Zealand is paper-based with some limited use of the web.

Australia is a leader in the area of flexible and alternative learning modes using a national set of standards (which have been adopted by other countries). A recent initiative focusses on the need to develop learning material that responds to how and when clients want training.

The U.S. system of trades training is diffuse and decentralized with development and delivery being dominated by large, private organizations. The League For Innovation has developed 'SAIL', a model of collaborative activity involving 28 colleges (similar to the OntarioLearn model); the focus is on post-secondary rather than trades training.

In the United Kingdom, the Learning and Skills Council has identified a need to expand the use of e-learning for the trades and has partnered with Learn Direct to accomplish this. Learn Direct provides flexible learning materials primarily in the "soft" skills area, e.g. mathematics, english, basic skill sets.

A simple web search will demonstrate that flexible learning is a world-wide phenomenon. However, much of the practice and, accordingly, the literature focuses on post-secondary diploma and degree levels of education. Examples of flexible learning in the trades area are far less common.

Nevertheless, there are a number of jurisdictions that provide flexible learning for individuals in the trades. Chief among these are: New Zealand, Australia and the United Kingdom. A brief note on the situation in the United States is included here, not because the U.S. is providing exemplary leadership in this area but, rather, because of its proximity and the potential to learn from their experiences in partnership and collaboration as well as private sector involvement.

There is a long history of apprenticeship training throughout much of Europe and, similarly, there is an extensive use of flexible learning in the trades. The existence of the European Union has fostered organizations such as CEDEFOP, the European Training Village and Helios, European E-learning Observation System. These organizations have developed excellent research and survey material which has been used extensively in the next section of this Report.

FLEXIBLE LEARNING IN THE TRADES OUTSIDE CANADA, continued

The following is a brief summary of the organization, development and delivery of flexible learning in the jurisdictions of Australia, New Zealand, the United Kingdom and the United States.

AUSTRALIA

(The following information has been drawn from the ITA (2006) document "Alternative Trades Training: Best Practices from Across Canada" and from an interview with a manager at Australian Flexible Learning Framework; the manager is responsible for implementing a national strategy)

Australia is leading the globe with the implementation of flexible and alternative modes of trades training using new technologies. The vocational education and training system (VET) operates across state borders and is focused on industry needs.

Australia has nationally recognized portable qualifications offered by over 4000 registered training providers, both public and private and all registered in accordance with a national set of standards. There are also standards for Training Packages, which include industry defined competency outcomes, assessment guidelines and national qualifications.

Flexible delivery of training is a national priority under the "Australian Flexible Learning Framework" (AFLN) where an enormous body of research is conducted on the processes, tools and interoperability of the various national web platforms. The Framework was established in 2000 to "increase the sustainable uptake of quality e-learning in vocational and technical education". The Framework is a national strategy collaboratively funded by the Australian Government and all states and territories to achieve the shared vision of a skilled Australian workforce.

The Framework provides approximately 15 million dollars towards flexible learning projects that meet its goals and purposes. The funds are divided among the States which manage an RFP process to determine the successful bidders. Partnerships between colleges and between colleges and industry are encouraged. One of the roles of the AFLN is to ensure that project outcomes are shared at a national level. There are strong similarities between the goals and activities of the AFLN and the Strategy model that is proposed in this Report.

NEW ZEALAND

New Zealand has a strong, industry-based and industry-driven training culture, led by the Industry Training Organizations (ITOs). ITOs, in turn, belong to the Industry Training Federation (ITF) which acts as a collective voice for the ITOs. According to the Executive Director of the ITF, there is not a clear, national strategy for E-learning in the trades in New Zealand. Generally, while there has been some attempt at collaboration among institutions, development has been decentralized, patchy and

driven by individual initiatives. There is an attempt to maintain some level of national standard and New Zealand has adopted Australia's E-learning standards to accomplish this.

Skill Training in New Zealand is in a state of flux as the delivery of training activity has vacillated between the postsecondary institutions (ITT's) and private training agencies. The current trend is for the majority of training to be brought back under the ITT's.

Much of the flexible learning material in New Zealand is paper-based with not a great deal of use of the Web. To the extent that electronic media is used, the tendency is to used CD's or DVD's. Trades training is entirely funded by government; however, industry has provided the bulk of funding for new initiatives such as E-learning. Their motivation is the reality that training is spread thinly across the country with the result that it needs to be brought to the student rather than the other way around.

There are some ITOs which are working on a grander vision for flexible learning, for example, the Aviation, Tourism and Travel ITO. Their new Executive Director, over the next two years, is planning to upgrade the quality and validity of on-the-job training for 40 occupations using ICT wherever it is practicable. They plan to pursue this in combination with 4 other ITOs involved in similar skills such as the Retail Trade ITO. They hope to offer trainees a clear choice between "supported" on-job training and off-job training depending on the trainees' preferences. Wherever possible, they plan to access learning object depositories on an international scale. However, much of New Zealand's training issues are driven by the fact that trainees are dispersed across wide geographic areas making flexible learning, in any form, a necessity rather than a choice.

UNITED KINGDOM

(The following information has been drawn from the ITA (2006) document "Alternative Trades Training: Best Practices from Across Canada" and from an interview with a staff member with the Learn Direct organization, "University for Industry").

Apprenticeship training in England is administered through the Learning and Skills Council, a government body. Apprenticeship is competency-based in conformity with the National Occupational Standards. A Sector Skills Council produces a framework for each trade and there are now more than 160 apprenticeship frameworks.

In 2006, the Learning and Skills Council identified a need to expand the use of e-learning for the trades under the term Vocational Education and Training (VET). The Council has partnered with the University for Industry (UFI, now operating as "Learn Direct") to accomplish its goals. Learn Direct is one of the largest government supported e-learning organizations in the world and offers over 800 different learning

packages on-line, supported by over 2000 learning centres in venues such as libraries, community centres, home and the workplace. Learn Direct works closely with government, industry, unions, delivery institutions and the Sector Skills Development Agency and Councils to develop material that responds to the needs of these various bodies.

The British system of apprentice training is fairly complex with various levels of training requirements including a "Technical Certificate" (evidence of knowledge specific to the trade) and the National Vocational Qualification (based on practical skills), the latter providing the "licence" to practice in the trade. Learn Direct provides flexible learning materials primarily in the "soft" skills, for example, mathematics, English and basic skill sets in various disciplines. There are 900 Learn Direct centres (non-institution-based) throughout the U.K. that provide staff support for learners. Learn Direct staff indicated that there are attempts within specific Sector Skills Councils to expand the use of flexible learning in the trades.

UNITED STATES

The trades training system in the United States appears to be much more diffuse and decentralized than that which is available in Canada, New Zealand, Australia, the United Kingdom and elsewhere. The U.S. Department of Labor Employment and Training Administration assists industry in developing and improving apprenticeship and other skill training programs. However, individual States control skill training and issue licenses to qualified candidates.

According to ITA (2006), "vocational education and training in the U.S. is currently dominated by national and mostly publicly listed institutions…through mergers and acquisitions these institutions began offering more comprehensive VET programs that resembled programs being delivered through public organizations in the UK, Canada and Australia."

Discussions with representatives of the Instructional Technology Council, a branch of the American Association of Community Colleges, suggested that there is a strong interest in flexible learning at the college level but that much of the interest has been focused on post-secondary education, particularly general skills. However, there is a growing interest in expanding the use of flexible learning in new areas such as skill trades.

The League For Innovation has been involved in the development of the SAIL project (Specialty Asynchronous Industry Learning) through a collaborative effort of 28 colleges. A Memorandum of Understanding is negotiated between each of the colleges, determining such things as standards, fee-splitting, etc. The project is funded by the Alfred P. Sloan Foundation with the intent of creating a network of on-line courses, very similar to the OntarioLearn model. A review of the course offerings indicates that, while the courses are industry based, they are not focused on building complete sets of skills in the trades area. The League has begun to market its courses outside the United States.

CHARACTERISTICS OF FLEXIBLE LEARNING – WHAT THE RESEARCH TELLS US

SUMMARY:

There is evidence that there is a strong need for more flexible delivery of apprenticeship and trades training in Canada for demographic, cost, effectiveness and labour supply reasons.

All institutions report that the main advantage of e-learning is to provide students with more convenient access to learning materials which, in turn, improves student flexibility; students also need to take less time away from work which means they earn more, save the government EI payments and, in many cases, reduce the cost of travel and board and room; employers report that they like the fact that apprentices are able to spend more time on the job.

All institutions offering flexible learning indicate that they were able to make significant reductions in the amount of time that apprentices were away from work (one typical example was a reduction from 10 to 8 weeks, a saving of 20%).

Flexible learning needs to be viewed as an integral part of the learning process (rather than as a separate learning phenomenon) and should be "learner-driven" where the needs of the learner and the context are appropriate. Teaching strategies need to become more learner-focussed rather than teacher-focussed.

Barriers to the introduction/expansion of E-learning include: need for changes in organizational structures (enrolment, scheduling), resistance to change (learners and teachers), increase in technological infrastructure requirements, job security.

Use of flexible learning in the trades in Europe and Australia is relatively high (between 25 and 50% of total learning). Employers are using flexible learning in the workplace in increasing numbers underscoring the need for trainees to be conversant with this mode of learning. Individual teacher initiative is reported as the most effective way to promote the interest in and expansion of flexible learning.

The appropriate use and selection of technology will be influenced by context and personal choice. Each organization approaches the introduction of flexible learning differently.

An exhaustive, longitudinal review of the literature "No Significant Differences" found that an overwhelming number of studies showed that when the course materials and teaching methodology were held constant, there were *no significant differences* between student outcomes in a distance delivery course as compared to a face-to-face course.

SUMMARY, continued

Learner and employer feedback suggests a neutral to positive reaction to flexible learning with satisfaction focussing more on the process than on the results. Trainees must possess a certain level of skill (ability to study on own, learning skills) and motivation in order to succeed in a flexible learning environment.

While there is a natural resistance to change, many teachers feel excited about the prospect of introducing more flexible learning into their course material.

This section provides an overview of the flexible learning literature (from throughout the world) and is organized under the following headings: Nature of Flexible Learning, Challenges and Perceived Barriers, Growth, Modes, Learner Retention/Completion, Learner Success, Learner and Employer Feedback, Teacher and Trainee Feedback.

NATURE OF FLEXIBLE LEARNING

- o "One of the basic premises… is that newer technologies such as the World Wide Web are not necessarily better (or worse) for teaching or learning than older technologies such as print or video-conferencing. New technologies are just different, and we need to understand the differences and the appropriate circumstances for applying various technologies for effective distance teaching and learning. The choice of technology should be driven not by its novelty but by the needs of the learners and the context in which we are working." (Bates, 2005, p. 3)
- o "…e-learning is not an isolated debate of some specialists but a comprehensive discussion about education on the whole. It becomes clear that where e-learning is integrated, it functions like a magnifying glass: challenges and barriers of the educational process become obvious and must be addressed." (CEDEFOP, "E-Learning in Europe, 2005, Executive Summary)
- o "It is our strong belief that widespread adoption will only happen when e-learning is seen and promoted as integral to a strategy to produce quality learning. In this respect, it is preferable to view e-learning as offering a set of electronic tools that can be used in a mix and match way within the current trades teaching practice, rather than arguing that e-learning requires a fundamental or radical change of pedagogy or teaching practice." (The Australia Department of Education document, E-Learning Within the Building… 2006, p. 37)
"The introduction of e-learning modes of delivery requires a reshaping of current teaching practice…There is a fundamental shift, from broadcasting information to active participant engagement. It is important that trainers and learners are aware of how their teaching and learning roles have changed." (Clayton and Elliott, 2007, A Review of the Literature, I.3 Initial Findings, pages not numbered)

- "Although much of the research on the effectiveness of distance learning is still inconclusive, there is general acceptance in the research community that (1) distance education is just as effective as traditional education with regard to learners' outcomes; (2) distance education learners generally have a more favorable attitude toward distance education than traditional learners; (3) successful distance education learners tend to be abstract learners who are intrinsically motivated and possess internal locus of control; (4) each form of distance education technology has its own advantages in contributing to the overall quality of the learning experience." (Synergy Plus, 2002)

CHALLENGES AND PERCEIVED BARRIERS

- "The introduction of e-learning brings with it unknown levels of complexity. In short, changes to the traditional classroom methods can create unease, uncertainty and instability for both instructors and learners. At an organizational level the following barriers to implementation can be seen to exist:…"
  - new structures need to be created to manage e-learning through enrolment, scheduling, financial and other systems
  - the normal resistance to change on the part of learners and teachers
  - lack of technical expertise on the part of learners and teachers
  - lack of or inadequate technical infrastructure to support e-learning, either on the part of the student or on the part of the delivering institution
  - a fear that teaching jobs will be lost
  - concern that the quality of the learning experience will be reduced through lack of person-to-person contact and the need to rely on self-motivated learning
  (Clayton and Elliott (2007, A Review of the Literature, section 2.6 pages not numbered)
- "Although the environment for adopting 'leading-edge' technologies has improved…the challenge to teachers and faculty is to understand and be able to apply new technologies in concert with, in addition to, or in some instances in place of traditional learning methods. The challenge to developers is to design methods and content with an open architecture and to have systems that are sharable." (Synergy Plus, 2002)
- "Several key informants similarly indicated that a key issue facing educational institutions is keeping the curriculum up-to-date, as products change more rapidly than the adjustment of the curriculum." (VCC, 2007)

CHARACTERISTICS OF FLEXIBLE LEARNING – WHAT THE RESEARCH TELLS US, continued

GROWTH

- According to a survey carried out by the European Centre for the Development of Vocational Education, European Training Village (2004, p. 9), 22.5% of learners reported that they used technology in more than 50% of their learning
- "The benchmarking report found that 46% of the 155 organizations delivering training for the traditional trades were using e-learning." (Australia Department of Education, E-Learning Within the Building…Trades, p. 4)
- Surveys reported in the CEDEFOP Info newsletter (No 1/2002) indicates that e-Learning is now responsible for over 30% of the earnings of private and public sector training suppliers, compared to 18% two years ago
- The Australia Department of Education document, E-Learning Within the Building…(2006, p. 5) reports that there are several factors influencing the increased uptake of e-learning within the trades:
  - word of mouth: teachers sharing ideas within and across organizations
  - networks in action: framework and edna networks (online resource collection and collaborative networks, various blogs, wikis and subject networks and networks started by trade teachers)
  - the emergence of e-learning "playgrounds", for example Elluminate, Moodle, YouTube and the Instructables website
  - showcase events
  - grants and funding projects
  - flexible learning toolboxes and learning objects developed for the trades
- "E-learning initiatives were found to be driven from both "bottom-up" and "top-down". Overwhelmingly though, at the centre of e-learning is an enthusiastic and innovative teacher wanting to improve teaching and respond to student and industry needs." (The Australia Department of Education document, E-Learning Within the Building… 2006, p. 7)
- "The introduction of e-learning…does not end with the creation of a business case…it must be sustained through ongoing reviews of the technical infrastructure, support for (teachers) and support for participants learning within these environments and the provision of media-rich interactive content."
- "For vocational and technical instruction to benefit from 'cutting-edge' developments, the (U.S. Department of Education) might want to create funding incentives to:
  - encourage broad consortium-type participation by community colleges and secondary schools
  - Promote and advance licensing of learning objects or courseware as a system that can scale utilization to a national level
  - Promote the concepts of world-class standards, re-usability of content and modularization around learning objects

CHARACTERISTICS OF FLEXIBLE LEARNING – WHAT THE RESEARCH
TELLS US, continued

- promote a credible 'national peer-review' process of academic content and compliance to technical standards to be applied in the development and distribution of high-quality learning objects or courseware" (Synergy Plus, 2002)

MODES

- o The appropriate use and selection of technology will be very much influenced by local circumstances: context is all-important…One then should have no illusions that there are simple solutions to selecting and using technology…Decision making about media and technology in e-learning and distance education is a complex process, requiring consideration of a great number of factors…It is also about personal choice, driven as much by values and beliefs as by technical considerations. These different factors cannot easily be related to one another quantitatively. In the end an intuitive decision has to be made, but based on a careful analysis of the situation. (Bates, 2005, p. 66)
- o "In reviewing the data generated during this phase of the research project it became clear a "one size fits all" approach would not truly reflect the state of e-learning activity in the ITOs (Industrial Training Organizations). It is clear the size and nature of each individual ITO would influence their approach to the introduction of ICT and e-learning tools for their trainees." (Clayton and Elliott, 2007, Report 2, Executive Summary)
- o "ITOs current use of e-learning tools is based on a personal computer delivery format where digital materials (CD's, DVD's and computer based resources) are the most common forms of e-learning delivery." (Ibid)
- o "All organizations considered "e" and "m" learning as teaching tools and (not as) independent learning concepts. Therefore, respondents believed a "blended approach" where "e" and "m" tools are used in conjunction with other teaching and learning modes, is the only viable option for their organizations." (Ibid)

LEARNER RETENTION/COMPLETION

While some of the literature makes reference to completion rates for trainees in a flexible learning mode, none of the literature provides comparative information between trainees in a traditional mode versus those in a flexible mode.

LEARNER SUCCESS

- "The 'No Significant Difference' phenomenon refers to a body of literature consisting of a particular type of comparison studies (MCS in education) –

CHARACTERISTICS OF FLEXIBLE LEARNING – WHAT THE RESEARCH TELLS US, continued

  those comparing student outcomes between face to face and distance delivery courses…originally compiled by Thomas Russell…found that an overwhelming number of studies showed that when the course materials and teaching methodology were held constant, there were *no significant differences* between student outcomes in a distance delivery course as compared to a face to face course." (No Significant Difference Web-site)
- Having computer skills and feeling at ease with information tools that are now considered by many to be tools of the trade have benefits that extend far beyond the classroom. They are transportable skills. These skills equip students for any place of work or study." (The Australia Department of Education document, E-Learning Within the Building… 2006, p. 22)

LEARNER AND EMPLOYER FEEDBACK

- "The overall impression…is that e-learning is perceived very positively by the target group and that its future is seen as bright and expanding…Respondents also stress the fact that e-learning requires a lot of skills (self-study discipline, learning skills, etc) which are not (yet) acquired by all learners and which therefore often lead to exclusion from these educational opportunities." (CEDEFOP, "E-Learning in Europe, 2005, Executive Summary)
- "The positive impact of e-learning is more perceived in relation (to) the process than with the results: flexibility (65%), better time management (53%) or autonomy/responsibility (51%) are the most quoted enhancing factors of e-learning for teaching/study, whereas quality of content (24%) or efficiency (29%) seem to be of less importance." (CEDEFOP, "E-Learning in Europe, 2005, Executive Summary)
- "While the agreement rates…all exceed the indifferent point of 2.5, they are not strongly positive scores, suggesting that the level of overall satisfaction with the Virtual Campus has been moderate to date." (Nova Scotia, 2006)

TEACHER/TRAINER FEEDBACK

- Surveys reported in the CEDEFOP Info newsletter (No 1/2002) show that teachers and trainers are excited by the potential for changes in approach while severely concerned about their own abilities to follow through
- "The strongest motivation for teachers using e-learning is to engage the student. This factor was mentioned in all the case study interviews….Many teachers felt that they would be going against the stream if they did not provide a more digital learning environment. And when they did, they observed that students were more attentive in class." (The Australia Department of Education document, E-

Learning Within the Building… 2006, p. 16)

CHARACTERISTICS OF FLEXIBLE LEARNING – WHAT THE RESEARCH TELLS US, continued

OVERALL CONCLUSIONS FROM STUDIES AND INTERVIEWS

- There is evidence that there is a strong need for more flexible delivery of apprenticeship and trades training in Canada for demographic, cost, effectiveness and labour supply reasons: see Canadian Council for Learning, 2006; Canada, 2004
- The literature indicates that there is a wide range of acceptance of alternative, flexible learning on the part of students; many students embrace it while others prefer face-to-face interaction with their teachers and fellow students.
- There is strong evidence of growing student demand for online learning. Annual rate of growth for online DE students in American two year colleges is 15%, compared with 2% increase in on-campus enrolments. 70% of colleges reported that student demand far exceeds current class offerings (ITC, 2007)
- Similarly, there is a wide range of acceptance among teachers; some feel very comfortable in a flexible learning environment while others are convinced that the traditional, face-to-face approach is the most effective mode of teaching and learning. Faculty acceptance appears to be increasing from year to year (ITC, 2007).
- There is a similar range of acceptance amongst employers and ITOs; a majority of employers intend to move to e-learning, but the tendency is greatest in large organizations (Clayton and Elliot, 2007). In Canada, Conference Board of Canada (2003) reported 77% of its member organizations were using e-learning, but e-learning then constituted less than 15% of all training for a majority of the respondents.
- Student achievement in an E-learning mode is not significantly different from student achievement in a traditional, face-to-face learning mode (NCSS and BC Ministry of Education, 2007).
- Some improvement in completion rates was reported by NCSS. However, ITC (2007) found a 6 per cent lower completion rate for distance learners in two year colleges (72% compared with 78% for campus-based students).
- Overall satisfaction levels with various forms of E-learning vary considerably. NCSS found satisfaction levels were not strongly positive (NCSS, Community Skills Centre); other data suggests that satisfaction levels are higher in an e-learning compared to a face-to-face mode. For instance, the BC Ministry of Education (2007) found that student, teacher and parent satisfaction was higher for distributed learning courses than for school-based courses.
- All institutions report that the main advantage of e-learning is to provide students with more convenient access to learning materials which, in turn, improves student flexibility; students also need to take less time away from work which means they earn more, save the government EI payments and, in many cases, reduce the cost of travel and board and room; employers report that they like the fact that apprentices are able to spend more time on the job

- All institutions indicate that they were able to make significant reductions in the amount of time that apprentices were away from work (one typical example was a reduction from 10 to 8 weeks, a saving of 20%)

CHARACTERISTICS OF FLEXIBLE LEARNING – WHAT THE RESEARCH TELLS US, continued

- All of the institutions interviewed indicate an interest in partnering with the ITA initiative; in most cases, the motivating factor is the opportunity to upgrade the flexible learning material that has already been developed and share the cost of improvements
- Barriers to greater use of flexible learning are as follows:

  • lack of consistent, stable funding for alternative delivery methods
  • lack of awareness by employers of benefits of 'virtual' learning
  • concern about replacing hands-on training with virtual training
  • workload issues for instructors
  • lack of training in pedagogy/technology for instructors
  • fear of high costs of developing e-learning materials
  • lack of e-learning partnerships between industry and colleges
  • lack of systematic planning and analysis to identify where e-learning best fits within vocational and technical training

  While some of these barriers are real, others are based on lack of knowledge or information about flexible learning, or can be addressed by changes in management and practice.

BEST PRACTICES IN FLEXIBLE DELIVERY

SUMMARY:
This section summarizes Best Practices in the development and delivery of flexible learning under the topic areas: Information Transmission, Interaction (learner with materials), Animation and Simulations, Remote Hands-on Training and Role of the Instructor.

Most critically, the research points to the need for colleges to change their organizational structures (at least insofar as E-learning is concerned) by modifying teacher workloads and schedules, freeing up teacher time for development and providing access to faculty development programs. This is the area where the major costs of flexible learning are incurred.

There has been a great deal of research conducted into distance education and flexible delivery since the establishment of the British Open University in 1969. British Columbia has a long and distinguished history in distance education, from the first university correspondence courses developed by UBC in 1949, through the use of satellite technology by BCIT in the early 1980s, to the establishment of the Open Learning Institute and Knowledge Network, later integrated within the Open Learning Agency in 1989 (which also included an Open College for vocational and trades training, as well as the Open University of BC), through to the fully online distance education courses developed by UBC in the mid 1990s, and subsequently by many other colleges and universities within the province, to the mixed mode and flexible learning programs now available from BCIT and Vancouver Community College. Many of these developments in distance education and flexible delivery, both in British Columbia and elsewhere, have been closely studied and evaluated. As online learning and e-learning has been gradually introduced, this too has been carefully studied and evaluated.

From this research has emerged a set of guidelines or best practice to ensure the quality and success of e-learning and flexible delivery. These will be discussed again later in the section on provincial standards, but in this section these guidelines are used to highlight issues specific to the design of vocational and trades training programs.

Information transmission

Much if not most of the information a tradesperson needs to know can now be recorded and digitized so it is immediately available when needed. Learning Management Systems such as WebCT, Blackboard or Moodle can be used to manage and organize information, and also to test learners' understanding of the information presented. This means an instructor need not be physically present in order to deliver information or even to test comprehension, although an instructor is needed to select, organize and provide feedback or answer questions that may arise from the provision of information.

BEST PRACTICES IN FLEXIBLE DELIVERY, continued

Experience in other sectors show that abstract concepts, data, rules, principles, arguments and ideas can all be clearly transmitted digitally, and at very low cost, in terms of media production, if LMSs are used. However, materials do need to be well organized and structured, and students need opportunities to interact with the materials, through multiple-choice testing or written assignments.

Dynamic principles, real-world examples, high quality graphics, animations, simulations, and virtual interaction with real or virtual equipment can also be represented digitally, but at a much higher cost in terms of design and media production. However, the high cost of developing such materials may be justified if economies of scale can be applied by making the materials available to large numbers (a whole trade for instance), or by reducing time spent away from work, or by reducing time for training on expensive production equipment.

Interaction

Students need to be active learners if studying online. This means building into the design of learning materials plenty of opportunities for students to interact with the materials. Self-paced digital learning, used by many private trainers, depends entirely on the interaction between learners and the computer program. Research has shown that while this works well for low-level, simple tasks, it is not sufficient for more complex tasks, particularly those requiring some form of human interaction.

More commonly, students need an instructor to help with explanations, interpretation of data, and possible adaptation to local contexts. It may also be necessary for instructors to work online with students, either individually or more often collectively, where tasks are complex, have more than one possible outcome or process, or where value judgments need to be made.

For some trades interaction between students, e.g. collaborative learning or problem-solving, may also be needed. This can be provided through the normal text-based discussion forums available in all LMS. Where students need to see each others' work or working contexts, web conferencing can be used at relatively low cost.

Animations and simulations

The importance of hands-on training for the operation of equipment or machinery in the trades area is essential. Animations (describing the operation of machinery or equipment) and simulations (allowing students to interact with animated software replicating an operation of equipment, and to receive feedback on their input in real time) has the potential to reduce the amount of time needed in labs or using actual equipment. Very little research has been done in this area (one of the goals in the establishment of the recent Cisco Chair in e-Learning at SAIT is to investigate this area), but anecdotal information where animations and simulations have been used for trades training point to the following conclusions:

BEST PRACTICES IN FLEXIBLE DELIVERY, continued

- o good quality digital animations can be produced at reasonable cost using off-the-shelf software such as Flash; the main costs are the design time spent by web and instructional designers, working with an instructor
- o good quality simulations are expensive to produce. Consequently they involve a major up-front investment, involving highly skilled instructional designers, web programmers, and instructors with imagination and a deep understanding of the equipment and training needs
- o animations and simulations can reduce dramatically the amount of training time needed on actual equipment, and have the added value of allowing trainees to make mistakes safely and without damage to actual equipment
- o animations and simulations tend to work best with learners who already have some practical experience in using identical or similar equipment, or in preparing learners for the 'real thing'; thus often a mix of hands/on and simulated learning will be needed
- o an increasing number of tasks in the trades are now partially or fully automated or controlled through computer technology; thus the use of simulations may not differ at all from the use of actual equipment
- o high quality animations and simulations tend not to be used unless they are carefully integrated within a broader teaching context. This means embedding simulations in courses or modules of studies, rather than making them stand independently.

Several conclusions or implications for vocational and trades training in British Columbia can be drawn from this experience:

- o because of the high initial cost, animations and simulations should be developed on a province wide or trade-wide basis, to ensure multiple use
- o simulations, in particular, require a team approach to design, involving experienced and imaginative instructors, instructional designers and web developers
- o the division between the use of simulations and hands-on experience needs both careful research and course design. Employers need to be involved at the design stage where possible, so that they are satisfied that skills development is at least as high if not better than solely hands-on training. Thus a particular approach to design is required to exploit fully the benefits of animations and simulations including a business plan that assesses potential revenues as well as costs. Project management through earmarked funding is one possible mechanism for promoting the use of simulations
- o because simulations need to be integrated with broader course design, and because of the high cost and the need for a team approach, the ITA should focus on one or two trades areas for the development of simulations, and should carefully evaluate the success before broadening the approach
- o British Columbia could establish itself as a leader in the use of simulations for trades training, generating a possible simulation software business segment through partnership between industry and the colleges.

BEST PRACTICES IN FLEXIBLE DELIVERY, continued

Remote hands-on training

Although simulations may replace a large amount of current hands-on training using 'real' equipment or machinery, for the foreseeable future hands-on training will still be essential, even or especially for flexible delivery. Until appropriate simulation software is available, how can remote hands-on training be provided to part-time or distant learners? We believe this can be provided in a variety of ways:

- o employers: employers often have better or more up-to-date equipment than the colleges. For part-time or lifelong learners already employed, employers could provide local hands-on training, using equipment in 'downtime' and a skilled journeyman or woman as a local mentor or supervisor. The employer would be paid by the college offering the program for the time of the supervisor from tuition fees. The local supervisor would receive an online training kit provided by the college, setting out learning objectives, training tasks, and instructions on how to assess the student's hands-on skills
- o partnership with a local college. It is possible to foresee some programs being developed by a single college but delivered throughout the province in partnership with local colleges (and employers). Where there is a local college (or even school) with appropriate equipment for training, the providing college will enter into an agreement for the use of facilities and the supervision of a local instructor, paid for from tuition fees
- o summer camps: the provider college may offer intensive hands-on training in the summer months, either at its own campus (meaning that students would need to travel to the provider college) or at different points around the province using employers or college facilities, but its own instructors.

For these models to work, partnerships and agreements between the ITA, colleges and employers will be necessary. The funding model proposed later in this Report encourages such partnerships and agreements.

The role of the instructor

The move to flexible learning and the use of e-learning has its biggest impact on the college instructor. Their role will have to change dramatically if flexible learning is to be successful. At the same time, the instructor becomes even more important than before for high quality learning. The role changes can be described as follows:

- o no longer the main transmitter of information but a selector and manager of information, and a guide and mentor of learning. Often materials will have been developed elsewhere (bought-in or developed by another college, or already available online). These materials will need to be adapted to local contexts and to the needs of individual learners by the instructor. Much of the communication with students will be online or by telephone. The instructor

may be working some of the time for another college as well as for his or her own college.

- o the instructor will need to work with employers and other colleges (or schools) to provide appropriate hands-on training, and to brief and monitor the local supervisor
- o where digital materials are being created from scratch, the instructor will need to work in a team as an equal with other professionals such as instructional designers and web developers, as well as possibly an employer's representative
- o instructors will still control student assessment, following provincial guidelines and standards. However, assessment may take new forms, such as e-portfolios (digital representations of students' work) or remotely crafted materials demonstrating hands-on skills

This provides a major challenge for instructors and in particular the colleges' administrations. Most instructors in the vocational and trades area are drawn from the trades themselves and have little or no prior educational training. Their teaching model is an apprenticeship model - doing what their own instructors did before. The biggest impediment to the introduction of e-learning in colleges has been lack of appropriate training in teaching methods and course design. Furthermore, in many colleges, instructors have a very heavy class teaching load, especially in the fall and winter spring semesters. There is no time for professional development in these periods, and even less time for the development of digital learning materials.

College administrations will need to look carefully at instructor workload, the organization of teaching (in particular the use of the spring and summer semesters), the reduction of face-to-face classroom time to free up instructors' time for the development of material, and the development of a college-wide, systematic faculty development program, if flexible learning is to be successfully implemented. This is where the real costs of flexible learning will be felt (and why it is so hard to measure). The potential benefits are considerable, but will not be achieved without major changes within the colleges and strong support, both financially and professionally, from the province.

BENEFITS AND COSTS

SUMMARY:
It would be a mistake to believe that a move to flexible learning will save money for employers, government or institutions. All the evidence to date (and there is not much) suggests that e-learning requires just as much investment as other forms of training.

However the main reason why companies invest in IT is not to reduce costs but to increase competitive advantage. There is strong evidence that, when well designed and properly funded, e-learning and flexible delivery of vocational and trades training could bring clearly measurable benefits to the workforce of a state or province.

This section provides an analysis of the advantages and disadvantages of flexible learning, a discussion of costs and suggestions for measuring benefits, mitigating disadvantages and measuring costs, based on the research and literature review.

There has been a long tradition of flexible delivery in the vocational and trades area, particularly in Australia, the United Kingdom, and Scandinavia. The Open College of B.C., operated through the former Open Learning Agency, was a Canadian example, until it was closed down in 2001. The benefits of flexible delivery have been clearly identified, in terms of employers, students and institutions, and these will be discussed further below. However, this tradition has been based on a mix of specially designed, printed, audio and video materials, combined with workplace training or use of local training centres remote from the 'managing' institution.

E-learning, on the other hand, has had a shorter existence and more of a mixed ride. The first fully online programs started to appear in the mid-90s, and e-learning has followed the typical cycle of a new computer technology, of rapid expansion, over-selling, and then collapse, followed by a more steady and gentle increase as its 'niche' is better identified and exploited (see diagram on following page).

From hype to sustainability

Extrapolated from Gartner

1996   1999   2004   2012

Take-up of e-learning
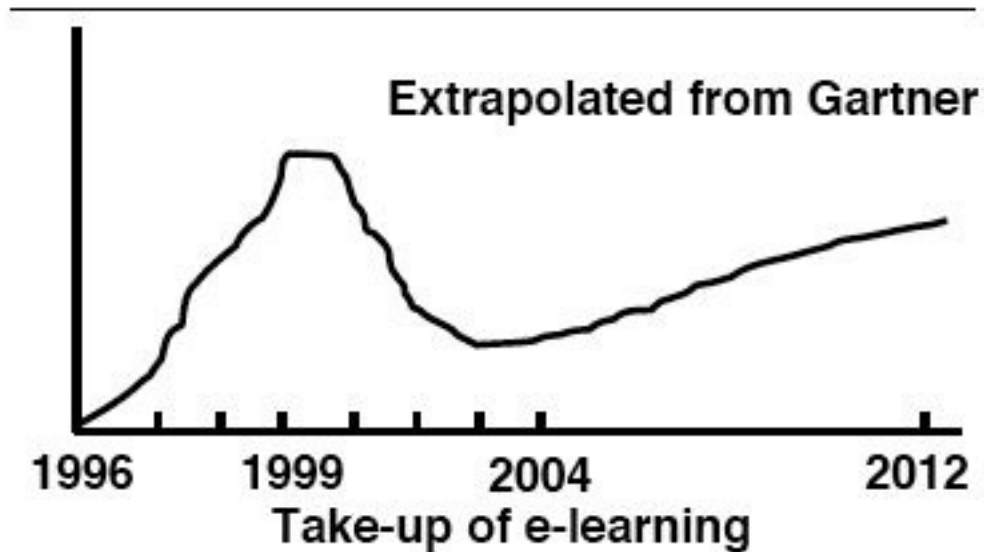
It is important then to be realistic about the benefits and limitations of e-learning. E-learning is both a tool, which can be used well or badly, to support learning, and is also a means of delivery. Thus e-learning can merely be added to classroom instruction, thus changing nothing in terms of delivery, or it can completely replace classroom instruction. It is believed that e-learning will be most useful for vocational and trades education where its unique presentational and interactive features are exploited, and where it is used to reduce, but not replace entirely, traditional classroom teaching and, possibly, some lab teaching. However, merely adding e-learning to traditional classroom teaching (still by far the most common use), will not fully exploit the benefits of e-learning, and will merely add cost, particularly in terms of instructor workload.

BENEFITS AND POSSIBLE LIMITATIONS OF FLEXIBLE LEARNING

Benefits can be classified in terms of the key beneficiaries of flexible learning. We have identified the following key stakeholders likely to benefit from a province-wide strategy for flexible learning for training in the trades area: trainees, employers, colleges, the Province/ITA and others.

Any cost-benefit analysis of flexible learning in the vocational and trades area will be complex, given the different benefits to different stakeholders, and the difficulties of costing e-learning as a separate activity.

BENEFITS AND COSTS, continued

A quantitative cost-benefit analysis can often be useful in a purely commercial context, but it has proved in the past extremely difficult or questionable in areas such as education where values rather than profit are concerned. Thus a highly quantitative cost-benefit analysis is likely to be meaningless or at best misleading in the case of flexible learning in vocational and trades training. For instance, how does one price access or equity or increased time with family?

In an ideal world, the benefits and costs would fall within a single organization so that one would be able to add all the benefits, subtract the costs and be left with a single figure to represent the net impact on the organization. In fact, in the case of flexible learning in the trades, benefits are spread across a number of stakeholders and costs are unlikely to be directly matched to benefits as some stakeholders will receive significant benefits while incurring limited or no costs while other stakeholders may receive relatively fewer benefits while incurring significant costs.

Also, there is a lack of reliable data about the costs of flexible learning compared with traditional learning in the vocational and trades area. Even where costs have been measured in other educational sectors, costs can vary significantly depending on a number of factors. Thus a cost-benefit analysis in this sector will depend very much on the particular context and conditions in which flexible learning is used. Lastly, a cost-benefit analysis based on prediction is much more likely to be inaccurate compared with a cost-benefit analysis based on experience. However, experience of flexible learning in vocational and trades training in British Columbia is limited to isolated pockets of individual initiatives which do not achieve the economies of scale that might be possible through a system-wide strategy.

It may also be argued that the decision to pursue flexible learning has already been made for us: by students who choose to pursue their learning, at least partially, in this way; by employers, the vast majority of whom use flexible learning for their own internal training purposes; by postsecondary institutions who, almost without exception, use some aspect of flexible learning in much of their programming; by governments in other countries (Britain, much of the European Community, New Zealand and Australia to name a few) which have provided substantial amounts of funding in the pursuit of flexible learning.

Nevertheless the issue of a cost/benefit analysis needs to be addressed. At least at the macro political and societal levels, there must be seen to be a net gain to the "system" or the question might well be asked, "Why bother to pursue this option at all?".

The most reasonable way to approach a cost-benefit analysis in this area is qualitatively. This means looking at the unpriced possible advantages and disadvantages of moving more aggressively to flexible learning, looking at possible ways to fund an expansion of flexible learning, describing the factors that influence or control costs, leaving politicians to decide on the appropriate level of funding within this framework, and finally providing suggestions as to how to make the initiative accountable.

BENEFITS AND COSTS, continued

The following charts identify the major benefits and possible limitations/disadvantages associated with flexible learning, by stakeholder, a rough approximation of how the benefits might be measured, so that a more systematic evaluation might be done in the future, and to ensure that the goals of the initiative are being met, and some suggestions how the limitations or disadvantages of flexible learning might be mitigated.

POTENTIAL BENEFITS OF A PROVINCIAL STRATEGY FOR E-LEARNING/FLEXIBLE LEARNING FOR VOCATIONAL AND TRADES TRAINING

Stakeholders	Description	Possible measures of success
TRAINEES	1. Increase in overall number of trainees	Enrolment statistics, broken down by mode of study
	2. Reduced travel costs and living costs while away from home	Survey of trainees taking flexible learning options
	3. Reduced stress on family and self by reducing time away from home	Survey of trainees taking flexible learning options
	4. Higher completion rates	Analysis of completion rates by mode of study
	5. Improved productivity associated with increased IT skills	Survey of employers
	6. Increased access by marginalized groups, lifelong learners, part-time workers	Survey of trainees taking flexible learning options compared with 'traditional' enrolments
	7. Higher level of employment, more job satisfaction, especially for marginalized groups, following training	Employment statistics + survey of trainees
EMPLOYERS	1. More highly skilled employees, trained to provincial standards	Survey of employers
	2. Increased pool of trained trades people, better use of existing workforce (e.g. re-training on the job)	Survey of employers
	3. Less time of employees away from work, better use of 'down' time while at work	Survey of employers
COLLEGES	1. Extra funding to support development of high quality e-learning materials	Budget analysis (ITA and college)

Colleges, cont'd	2. Improved quality of teaching	Exam results, survey of employers, survey of teachers
	3. Updated, modernized curriculum, with IT literacy integrated	Survey of employers, survey of instructors
	4. Increased income through sales/licensing of e-learning materials/ contracts with industry for e-learning development/delivery	College budget analyses
	5. Opportunities for institutional renewal and reform, new teaching methods, etc	Survey of colleges
PROVINCE/ITA	1. Better integration between employers'/ITOs and institutions	Survey of employers and colleges
	2. Provide economic boost to economy by increasing quality and number of trainees	Survey of employers + employment statistics + economic analysis
	3. Ability to champion lifelong learning, re-training, up-grading of workforce, and priority for e-learning	Survey of employers/ college attitudes to flexible learning
	4. Promote change, more effective methods in vocational and trades training, through earmarked funding	Monitor growth of flexible learning through college statistics
	5. Establish BC as international leader in vocational and skills training	Analysis of references to BC in training literature; invitations to speak at conferences
	6. Better co-ordination of flexible learning	Analysis of duplication in courses, survey of employers and colleges
	7. Management and operation of flexible learning devolved to colleges/ employers	Increased number of e-learning courses/ partnerships between colleges and industry
GENERAL	EI costs will be reduced to the extent that trainees are able to continue working in their regular jobs	Employment statistics

POTENTIAL DISADVANTAGES/COSTS OF PROVINCIAL STRATEGY FOR E-LEARNING/FLEXIBLE LEARNING FOR VOCATIONAL AND TRADES TRAINING

Stakeholders	Description	Possible ways to mitigate disadvantages/contain costs
TRAINEES	1. Will need access to computers/high speed Internet	1. Provide provincial network of Internet study centres (libraries, etc.) 2. Persuade employers to provide on-site learning facilities
	2. Will need to take more responsibility for self-managing their learning	1. Provide gradual introduction to/training in flexible learning on campus 2. Provide strong instructor support online 3. Provide initial course on how to study online 4. Build into course design opportunities for self-learning under controlled conditions
	3. Will have to combine work, family and study	1. Persuade employers to provide time for online training 2. Careful course design to prevent overloading 3. Spread online training over longer period (but no more work in total)
	4. Will need to ensure that hands-on training is locally available, where necessary	1. Agreements between colleges, and between colleges and employers, to provide local hands-on training 2. Persuade employers to supervise hands-on training 3. Establish local learning centres (labs in schools, satellite campuses, employers, etc.) that are shared
EMPLOYERS	1. Will need to ensure staff have adequate time for training	1. Agreed individual training plans 2. Split training between time at work and time at home (collective agreement issues?) 3. Integrate training with work by providing local supervision

Employers, Cont'd	2. Additional support costs, e.g. local supervisors	1. ITA/colleges to provide training in supervision of flexible learning 2. tax breaks for supporting provincial standard flexible learning for employees
	3. Need to understand strengths/ limitations of flexible learning/e-learning	1. Communication strategy via ITA/ITOs 2. Provincial conference on flexible learning for employers 3. Increased partnership with colleges on programming
COLLEGES	1. Investment needed in instructional design, web programmers, IT support OR purchase of program materials from elsewhere	1. ITA to provide development funds to kick-start initiatives 2. Central agency to provide training in project management of e-learning projects 3. Colleges to train instructors on benefits of working in a team 4. Business plan to offset costs with increased revenues/partnerships with industry
	2. Maintenance of e-learning courses/ materials to ensure currency (e.g. changing curriculum, new developments in industry, etc.)	1. Project management 2. Include maintenance as well as development/ delivery costs in budget
	3. Institutional re-organization to support a variety of modes of delivery (fully on-campus, mixed mode, fully online)	1. Development of strategic plan for flexible learning, including resource re-allocation and market analysis 2. Faculty development focused on flexible delivery/e-learning 3. Identification of faculty champions of e-learning
	4. Delivery costs	1. Include in instructors' workload, offset by reduced time in class 2. For large courses, hire additional instructors, possibly from other colleges where one college is 'main' source of program

Colleges, Cont'd	5. Investment in servers and administrative systems to support off-site learners	1. Once-only funds from ITA, linked to an appropriate college strategic plan for e-learning 2. College strategic plan for flexible learning, involving IT and admin staff as well as instructors
	6. Faculty development to prepare instructors for the design and delivery of flexible learning	1. Use a central agency, working with colleges, to provide online, province wide training in flexible learning 2. Build time for faculty development within earmarked grants for flexible learning 3. Require colleges to have a faculty development plan that includes training for flexible delivery to qualify for earmarked funding
PROVINCE/ITA	1. Increased investment in development of flexible learning	1. Use matching funds for development (50%): college/employers find rest 2. Delivery costs covered by institutional budgets/ tuition fees 3. Tuition fees go to delivering college 4. Earmarked funding years

BENEFITS AND COSTS, continued

COSTS

With regard to costs, the position is even more complex than that of benefits. The costs of fully on-line learning (i.e. online distance education) are now well understood. Detailed studies have been made of the costs of fully online courses in the university sector (see for instance, Rumble, 2001; Bates, 2005). However, while there is much anecdotal evidence about the increased costs of adding e-learning to traditional classroom teaching, there is almost no information about the costs of mixed mode teaching, where face-to-face/hands-on teaching is reduced but not eliminated, simply because this method has been so little used.

Furthermore, there is in fact almost no systematic research on costs of e-learning in the vocational and trades area (indeed little research on costs at all in this sector). One organization interviewed as part of this project reported that the development of an e-learning course (mid-level sophistication in terms of supporting resources) equivalent to 700 hours of in-class instruction would cost about $250,000 in current dollars (roughly $360 per hour). Many institutions report increased faculty work-load for blended learning (ITC, 2007), which is not surprising if web-based learning is just added to face-to-face teaching, rather than using it to reduce but not eliminate face-to-face time. Again, while hard data was not provided, most institutions involved in delivering e-learning report that delivery costs are similar in a face-to-face or entirely distance mode; it was also reported that, while teacher involvement is different, the overall hourly requirements from teachers is not significantly different in the e-learning and face-to-face environments. This reflects similar results from research on comparative costs in the university sector (Bates, 2005).

Costs of e-learning in the university sector (as elsewhere) are influenced by a number of factors that are discussed below, but for primarily text based fully online courses with a 30:1 student-instructor ratio, full costs (including overheads, design and delivery) can be as low as $2-$3 per hour per learner (Bates, 2005). However, given the need for more visuals and interactivity for virtual training in the trades, one would expect the costs of e-learning to be significantly higher than in the university sector. More research into costs of e-learning - or rather, careful tracking of e-learning costs - in the vocational and trades sector is urgently needed.

Nevertheless, the research into e-learning and flexible delivery in other sectors does identify factors that will influence costs in the vocational and trades areas, despite the unique requirements. These are listed below.

Economies of scale

Once digital materials are created, they are permanent and therefore can be accessed in theory by unlimited numbers. Thus while the fixed costs of development may be high, the average unit cost (cost per learner) may be low, if large numbers of learners use the materials. This explains the interest in 'learning objects' (single digital items such as a diagram, animation, simulation, test or teaching module).

BENEFITS AND COSTS, continued

Once created, 'tagged' with digital identifiers, and posted on the web, learning objects can be made available to very large numbers of users.

However, the research also shows that economies of scale are often not achieved in e-learning, for a variety of reasons. One is quality. Materials produced by instructors working on their own are often idiosyncratic, have poor graphics, and are not attractive to other instructors. A second reason is that course enrolments are not large enough to justify the cost of creating expensive digital materials, because the teaching 'unit' is based on a traditional classroom model of one instructor to 20-30 students. A third reason is that 'objects', on their own, lack an educational context. To be used well, they have to be embedded in a wider educational environment that provides learner support, links to assessment and learning objectives, and timing within a sequence of learning. This adds to the cost/time of an instructor wishing to apply a learning object.

Thus an expensive simulation can be justified in business terms if it can be used to train very large numbers or can be sold for use by third parties, but for it to be used extensively, it needs to be embedded within a broader educational environment that supports e-learning. Thus partnership with industry and good marketing and market research are essential to achieve economies of scale and to justify the necessary upfront investment in developing high quality e-learning materials. Therefore it is possible to achieve economies of scale in e-learning, but not without major changes in organization and working methods.

Design methods

One of the largest influences on cost (and quality) is the method of design - how courses are designed. What appears to be the lowest cost - an instructor working on their own - is in fact not so. Instructors working in isolation tend to spend more of their time developing materials, and because quality and design is not high, much more time supporting students. For instance, because the materials are not clear or well designed, an instructor may be overwhelmed by a constant stream of e-mails from students requiring help or clarification.

In contrast, instructors working in a team with instructional designers and web designers can focus primarily on content and overall teaching approach. Instructional designers can ensure that materials are clear and support defined learning outcomes, and that students are able to work independently on the material or work together online, reducing (but not eliminating) the need for interaction with the instructor. Web programmers can take material in Word or pdf format and re-design it for use on the screen, can load and maintain web pages, and ensure the pages are well organized. They and the instructional designers can suggest appropriate web tools to support the learning, manage the LMS component, and provide creative advice on interaction and design.

If this team approach is combined with project management, costs can not only be

BENEFITS AND COSTS, continued

clearly identified but also controlled. For instance, Bates (2005) reported that at UBC, project managers allocated a fixed time for instructors for development and delivery of online courses, equivalent overall - over a five year period - to the time they would spend on traditional classroom teaching. The online courses then had to be designed within this constraint, but the results were just as good if not better than similar courses delivered face-to-face by the same professors.

Maintenance

Even though, once created, digital materials are 'permanent', courses need continual maintenance. URLs go dead, new items are added or removed from course material, new equipment and hence new instructions become available, etc. Bates (2005) reported that at UBC, 25% of the original development budget was set aside each year to maintain online courses. This meant that every course could be completely renewed over a five year period. If not, very large sums needed to be found to replace 'old' courses all at once.

Delivery

The main cost of delivery is instructor time supporting and assessing students. Most online courses will need some ongoing instructor support, although good design can make sure this time is focused on monitoring student work, assessment, and feedback, rather than on repeating or adding new information already available through the web.

Unlike the development of digital materials, delivery costs are related to the number of students, although even this can be influenced by the design of materials. For instance a well-designed course focused primarily on information transmission, with learning measured by recall, and tested using computer-marked assignments, will need far less instructor-student interaction than a course focused on developing decision-making skills in complex environments. Thus the former type of course may well operate efficiently with an instructor-student ratio of 1:100, while the latter may not be manageable with a ratio higher than 1:20. In each case, another instructor will need to be hired if student numbers increase beyond 100 or 20 respectively, or quality will decline. Thus, within each of these contexts, an increase in student numbers will result in an increase in delivery costs. This will be particularly true in a mixed mode/blended learning context, where students need hands-on time. Good design, however, should result in a reduction of hands-on/face-to-face time, thus leading to some savings on delivery, which will be needed to offset some of the higher costs of development.

Licensing of Learning Management Systems

Learning management systems such as WebCT, Blackboard and Moodle provide an online digital framework for course development and delivery and increasingly online

BENEFITS AND COSTS, continued

student administration. Since the take-over of WebCT by Blackboard Inc., and Blackboard Inc.'s very aggressive patenting of all commercial LMS development, LMS licensing costs are becoming a substantial cost to institutions. As a result, more institutions are turning to open source learning management systems such as Moodle or Sakai. However, while the costs of commercial systems are direct and obvious, open source solutions are not free of cost either, as they need constant maintenance and development.

There are economies of scale to be achieved in licence fees as well as in maintenance and development. There are, therefore, advantages in taking a province-wide approach to the choice and maintenance of LMSs and other technical standards (e.g. SCORM/IMS for learning objects), although there will always be colleges and instructors that will want to experiment or deviate from a standard approach. The Virtual Network, recommended in a latter part of this Report is well placed to provide this leadership and support in LMS and technical standards for e-learning.

CONCLUSIONS

It can be seen then that the issue of costs is complex. Nevertheless, enough has been learned from both good and bad practice in other educational areas to provide at least guidelines for good practice in the use of blended learning in the vocational and trades area. What is clear is that if costs are to be controlled, and quality to be maintained or even enhanced, major changes in working practices for instructors, students and administrators will be needed, to justify a major investment in e-learning for flexible delivery.

FUTURE TRENDS

SUMMARY:

Against a warning from at least one study that the future will see a slow adoption of flexible learning, future trends can be summarized under two main orientations: process/content and technological. From a Process/Content perspective:
- o A shift from the E to the Learning
- o Flexible learning will be embedded in lifelong learning and competence development processes
- o Quality oriented
- o Continuous improvement
- o Collaborative
- o Need for a co-ordinated (national, provincial) strategy
- o Need for empirical and longitudinal research on E-learning

From a technological perspective
- o Greater use/appearance of new technologies:
- o Social computing (the application of computer technology to facilitate interaction and collaboration)
- o Personal broadcasting (e.g. video blogs)
- o Educational Gaming
- o Augmented Reality
- o Enhanced Visualizations
- o Context-aware Environments
- o Edutainment
- o M-learning (use of personal, mobile devices)

The comments and quotations below regarding future trends have been drawn from literature within Canada and abroad. The trends are organized under the following categories: technological, market trends, learning trends,

TECHNOLOGICAL

- o Social Computing (the application of computer technology to facilitate interaction and collaboration) and Personal Broadcasting (e.g. vlogs or video blogs) are currently available and rapidly being adopted; Educational Gaming is a growing field with serious implications for adult learning and will have full deployment within a year or two; within 3-4 years, augmented reality, enhanced visualization and context-aware environments and devices are likely to become common applications (HELIOS, 2006, pp's. 107-8)

FUTURE TRENDS, continued

PROCESS/CONTENT

- o "…there is a need for relevant empirical and longitudinal research on e-learning. Although issues of effectiveness will always be present, the difficulties of determining meaningful quantitative measure are substantial." (Rossiter, 2006, p. 4)
- o "Canada is clearly lacking a national strategy in e-learning, and appears to be falling behind other countries…Canada could benefit by having some kind of focal point for bringing together its various jurisdictions and institutions…" (Ibid, p. 4)
- o "VET (Vocational Education and Training) adoption of e-Learning remains very slow…sustainable sources of finance for continuing purchases to meet computer/student ratios, upgrades and maintain equipment remains a major issue in every country". (HELIOS, 2006, p. 110)
- o CEDEFOP, E-Learning in Europe (2006, Summary of the Main Findings) identifies the following future trends as articulated by the teacher, trainer and learner respondents to a survey; The future of e-learning:
  - blended learning
  - embedded in the lifelong learning and competence development process
  - shift from the E to the Learning
  - quality oriented
  - collaborative learning
  - m-learning; learning anytime anywhere
- o "Teachers report that, in 12 months time, more than a quarter of (them) said that 25-50% of their teaching would be supported by technology and 23% said they would use it in over 50% of teaching"
- o "…one overarching issue is the very disappearance of the "e" in e-Learning to put more emphasis on the learning process….Learning will be seen as less of an event and more of a subscription to a continuous stream of content delivery and performance support…learning resources are going to be increasingly available and updated thanks to the web. This implies that e-Learning will increasingly be an activity of knowledge management." (HELIOS, 2006, p. 110)
- o The same study (HELIOs, 2006, p. 115) identifies the following trends:
  - increased use of open source/open content software
  - products becoming more "pedagogical" (they will teach you how to use them)
  - increasing rule of Edutainment
- o The quality of DE instruction is trending towards continuous improvement as more institutional resources are redirected to DE. Programs are focusing on quality, consistency, assessment and retention to address latent concerns. Survey data reported two years ago indicated that an overwhelming majority of campus administrators already felt that the quality of an online class was equivalent to that of its traditional counterpart. That same majority anticipated that within three years (i.e. by 2008), the quality of an online class would exceed that of a traditional class. (Instructional Technology Council, 2007)

MAIN FINDINGS THAT ARGUE FOR THE DEVELOPMENT OF A STRATEGY FOR THE DEVELOPMENT OF FLEXIBLE LEARNING IN THE TRADES IN BC

Drawing on the extensive research and interviews that were carried out, there are several key themes or findings that argue for the development of a Strategy for a Provincially-driven effort to expand the development of flexible learning in the trades in BC:

- o Flexible Learning is growing at a steady, sustainable rate in all areas of education including the trades; this growth is evident in Canada and throughout the world, particularly Australia, U.K, Europe, New Zealand, United States
- o New technologies are being continually developed, opening up opportunities for new applications in trades training that were previously unavailable
- o Employers make extensive use of flexible learning modes for the ongoing development of their employees; they expect new employees to be ready and able to learn using these new modes
- o When all conditions are taken into account, flexible delivery can be at least as effective as face-to-face teaching and has the added advantage of providing access to trainees who would otherwise have difficulty accessing learning resources
- o Many of BC's training institutions have a long and successful record in developing flexible learning materials; building on this history and reputation, the Province can become a leader in this field

It is recognized, at the same time, that the main application for flexible learning in trades training will involve a combination of delivery formats including face-to-face and hands-on training.

A STRATEGIC APPROACH TO FLEXIBLE LEARNING IN THE TRADES IN BRITISH COLUMBIA

GOALS FOR THE EXPANSION OF FLEXIBLE LEARNING IN BC

The Board of the Industry Training Authority has identified the goals for flexible learning in the trades that led to the development of this Strategy document:

- A recognized need to increase the percentage of apprentices who complete their programs
- A desire to increase the satisfaction rates of trainees with their training programs
- A desire to attract more people into trades training and a perception that alternative modes of delivery will make the trades more attractive to prospective apprentices
- A recognition that many apprentices live at a considerable distance from traditional delivery sites, such as colleges, and the practical difficulties that apprentices face in commuting; this is particularly true for certain target groups such as prospective Aboriginal students
- A recognition that block placements cause a financial hardship for apprentices who may need to move and find rental housing during their training period and live for a period on employment insurance benefits rather than their normal employment income
- A recognition that block placements cause a scheduling and business interruption hardship for those businesses hiring apprentices as they lose the services of key employees for, typically, 8 to 12 weeks each year during their apprenticeship period

Additional factors have been identified by others:
- The ability to develop flexible learning products that can be marketed nationally and internationally
- The opportunity that flexible learning provides in improving competitiveness by ensuring that the workforce is continually learning and updating itself; the worker will have a far higher level of comfort if they were exposed to flexible learning in previous learning experiences
- IT already permeates most aspects of the workplace
- While implied in earlier statements, flexible learning removes barriers to access; barriers include physical, social and financial issues

PRINCIPLES TO GUIDE THE DEVELOPMENT AND DELIVERY OF E-LEARNING IN THE TRADES IN BC

The following principles have been developed to guide the development and delivery of E-learning in the trades in BC:

(1)   Although the purpose of this Strategy is to provide alternative modes of learning for trades trainees, it is the intent of ITA to continue to offer face-to-face learning as an alternative for those trainees who prefer this option

(2)   It is intended that, wherever possible, a range of alternative learning modes be developed to suit the learning styles of individual trainees from low-tech, paper-based modes to higher-tech, primarily e-based learning

(3)   Alternative modes of learning will be offered in those curriculum areas that best lend themselves to flexible learning through the use of audio, video and web-based resources

(4)   Ensure the maximum use of scarce financial and human resources by concentrating development of alternative flexible learning materials in those trades that will have the maximum benefit for students and employers, using a province-wide, transparent selection process

(5)   Ensure that trainees have equitable access to alternative modes of learning that do not put them at a disadvantage with trainees pursuing traditional modes of learning

(6)   Ensure that investments in flexible learning are pursued based on a Business Plan approach including a thorough analysis of the benefits and costs

(7)   Develop a model for the development and delivery of flexible training that capitalizes on the skills and resources that reside within the Province; however, use materials that originate outside BC if these add value to and complement the strategy being pursued by the Province

(8)   Flexible learning modes should, in the long run, be funded through the normal funding channels that are available to all delivery institutions; however, incentives are required over, say a 3-5 year period, that will encourage institutions to modify their delivery modes (as well as their underlying organizational structures) to include flexible learning

(9)   Development of flexible learning materials should be pursued only if they are expected to be of a high quality and conform to Provincial standards

(10) Use Provincial standards to guide the development and delivery of flexible learning using best practices from other jurisdictions across the world

(11) Ensure that development within particular trades is undertaken only if there is clear and strong support from employers/ITOs

(12) Ensure that the entire development, delivery and monitoring process around the Provincial strategy engages all stakeholders on a continuing basis

(13) Ensure that potential risks are identified and processes are put in place to contain and minimize those risks

ENSURING MAXIMUM IMPACT

The desire to provide and promote flexible training and the opportunities this provides to learners and their employers will be driven by a number of economic and other factors. The following represents a set of criteria that can be used to rank the prioritization of the development, delivery and funding of flexible training in particular trades:

- o Trades for which completion rates are low and where the availability of appropriate flexible learning materials could increase the completion rate
- o Trades for which achievement levels are lower than expected ant the availability of flexible learning materials could address this
- o Trades that represent the largest number of active apprentices; for example, in the chart on p. 16, the 15 largest trades represented 26,077 workers, over 76% of the total number of 34,053 active apprentices (April / 07); the other 115 trades accounted for 7,976 workers; clearly, focusing the development of flexible learning on the larger trades will have a greater impact on trainees, their employers and the economy than if development was focused on the trades with a lower number of workers
- o Trades for which there is a significant skill shortage; focusing flexible learning development on these trades will provide relief on the supply side that should have a significant economic impact
- o Trades for which high quality flexible learning materials is already available; the development of flexible learning material is expensive; all other things being equal, it will be more efficient to focus on trades where materials can be purchased at a reasonable cost (or even acquired at no cost); this Report identifies a number of readily available resources within Canada; many of the larger trades and Red Seal and other trades have cross-provincial standards which makes it more practical to adopt curriculum developed in other provinces
- o Trades in which the preponderance of trainees reside/work in remote areas and for whom flexible learning would reduce a major burden in travel, accommodation and other time and cost-related issues
- o Trades which, by their nature, lend themselves readily to flexible learning modes
- o Trades which have the support of employers/ITOs for alternative modes of delivery

Clearly, trainees, employers, ITOs and the ITA need to be involved in the prioritization of the development of flexible learning materials. This may involve an analysis initiated by each of the ITOs using a pre-approved research, survey and other methodology and a resulting recommendation to a central body.

ENSURING EQUITABLE ACCESS BY ALL TRAINEES

Bates addresses the 'access' issue in his book, "Technology, E-Learning and Distance Education" (Bates, 2005, pp's 50-52). Bates identifies a number of delivery alternatives, dependent on the characteristics of the target group:

- o On campus, through computer labs with internet access
- o At home
- o At a local centre dedicated to open learning
- o At a local public education institution, with shared facilities for campus-based and distance students
- o At work – which could be either at an individual workstation or in a company learning centre
- o At a commercial centre, such as an Internet café

Most of these options would require an outlay of funds, either by the college offering the program, by the student, by the employer or other supporting agency such as ITA or the ITO involved in a specific trade.

Equitable access implies that the student, at the very least, is not financially disadvantaged by their choice of learning modes which means, if there is agreement on this, that the cost will need to be nominal or borne by the offering institution or one of the supporting agencies involved in the training.

ASSESSING THE UPTAKE FOR FLEXIBLE TRAINING BY TRAINEES

The demand for Flexible Learning by trainees will be influenced by a number of factors including:

- The number of trainees involved in a particular trade
- The number of trainees whose home location is beyond commuting distance and who are, therefore, motivated by the desire to avoid the expense of losing wages and paying for the cost of board and room
- The quality of the program and the degree to which it meets the expectations of learners; word of mouth advertising will work for and against a program in this regard
- The degree to which the trainee is supported in their decision by an employer
- The extent to which there is an additional cost, if any, to the trainee

The literature is not very helpful in that there do not appear to be any comparative studies outlining the impact on student enrolment/uptake as a result of expanding a trainee's options through flexible learning. A survey of trainees is unlikely to be satisfactory as this would involve asking them to make judgments about an issue that they are unlikely to have much experience with.

However, there are a number of secondary indicators that might assist in addressing the elusive issue of student interest and uptake:

- In other education sectors (higher education, schools), online distance education programs have seen a steady increase in enrolments of over 10 per cent per annum over the last five years; the same trend is also seen in the American two-year college sector (AACC, 2007)

- Generally, the literature indicates that participants in e-learning are at least as satisfied with their flexible learning experiences as with their more traditional face-to-face learning experiences

- Where flexible learning has been introduced (at least in the postsecondary area), the uptake has often been dramatic: for example Ontario Learn has, annually, expanded its enrolment in the double digits to the point where enrolment now stands at 45,000 student enrolments per year; George Brown College enrolls hundreds of students each year in its diploma-level, distance education electronics programs; many universities in North America offer their entire range of programming through flexible learning modes

While a substantial number of learners will still prefer traditional class-based vocational and trades training, the growing market of lifelong and part-time learners, as well as trends in other sectors, suggest that the take-up of flexible learning opportunities in the vocational and trades areas is likely to be significant in British Columbia.

ASSESSING THE UPTAKE FOR FLEXIBLE TRAINING BY TRAINEES, continued

Nevertheless, several of the BC institutions interviewed for this Report cautioned that trainees in the trades may be less familiar with computers, more hands-on oriented and, therefore, less likely to opt for learning in a flexible mode.

This argues for a cautious approach to the introduction of flexible learning. Chances of success (from a number of perspectives) would be heightened under the following conditions:

- o Use a gradual approach, initially, by carefully selecting a limited number of trades where flexible learning offers the highest potential for success
- o Focus initially on the trades with substantial numbers of trainees
- o Flexible learning will be most useful for those trades where the unique features and capabilities of e-based and other tools can be exploited to improve the quality of training
- o Select flexible learning options for trades where there is already an inventory of high quality and proven flexible learning materials
- o Ensure that employers/ITOs have a strong hand in the decisions around the development of flexible learning material to ensure their participation and support as well as that of their trainees

MODELS FOR THE DEVELOPMENT AND DELIVERY OF FLEXIBLE LEARNING IN THE TRADES

There is an argument for suggesting that trades training is currently already well served within the Province:

- There are a number of colleges that are active in the development of flexible learning materials with clear intentions to increase their efforts
- Flexible learning modes have, in fact, been developed for a number of trades
- There are no overt signs of dissatisfaction with the current system either on the part of trainees or employers

However, changes are needed, driven by the following:

- Current development of e-learning material is propelled either by the priorities of individual institutions or the interest and enthusiasm of particular instructors rather than by Provincial priorities
- While development is occurring, it is happening at a slow rate
- Provincial standards for the development of flexible learning material do not exist in BC with the result that there is a broad-ranging quality of programming
- There is the potential for duplication and overlap in the development of material and no organized mechanism for addressing gaps in flexible training
- The current environment is competitive rather than collaborative with a resulting potential waste of resources
- The expectations of learners and employers are changing, driven by the ubiquitous use of the Web for virtually every aspect of daily life
- The Province is suffering from a shortage of skilled workers with a resulting negative impact on the potential for economic growth
- The strong BC economy would benefit from a reduction in trainee time away from work

Thus the current system, while there are some positive developments, needs to be seriously strengthened.

The expansion of flexible training in the trades will require some significant changes in the way initiatives are funded, in the relationships between the various parties (trainees, employers/ITOs, delivery institutions, ITA) and in the way the institutions are organized for the delivery of flexible learning. A successful Provincial strategy will require a collaborative effort on the part of all the stakeholders. A strong message of support from government, industry and college leaders will be essential to recognize that significant change is about to happen.

A formal collaborative relationship between a number of partners (Government/ITA, Industry/ITOs, Colleges, an organization with a Provincial mandate such as BCcampus or Thompson Rivers University) is likely the best way to lead the changes that are required. The chart below suggests the roles that each of these entities could play.

Partners	Roles
Government / ITA	* Contributes to overall vision * Sets policy (e.g. intellectual property) * Approves Provincial quality standards for flexible learning * Provides earmarked funding * Monitors activities
Virtual Network	* Develops Provincial standards * Establishes priority-setting process re selection of trades for development * Co-ordinates province-wide delivery * Provides technical support/advice/training * Supports marketing of programs outside province * Negotiates services from other organizations * Provides secretariat for Board
ITOs	* Set priorities for flexible learning within ITO trade responsibilities * Liaise, communicate and provide rational for the expansion of flexible learning * Negotiate development projects with delivery institutions
Colleges	* Develop flexible learning materials * Deliver flexible learning * Market programs
Individual Employers	* Provide curriculum advice * Provide workplace training

There are at least two collaborative models that should be considered:

(A) Create a Virtual College for Flexible Skills Training

This would be a new, Provincial organization with a mandate to develop and deliver flexible learning for the skills area. This organization would be managed through a Board with representation from all of the stakeholder groups. It would have its own CEO and staff.

The main advantage of this structure is that it would result in a dedicated, professional organization, with its own funding sources, focused solely on the development of quality, flexible learning for the trades.

However, the disadvantages of such a structure far outweigh the advantages:

- o It would be a relatively high cost organization with the need for dedicated staff (technical, support and administrative), physical facilities including space and equipment
- o There would be a duplication of services with existing institutions such as BCcampus and the Open Learning function at Thompson Rivers University
- o It would establish a competitive relationship with many of the delivery institutions

MODELS FOR THE DEVELOPMENT AND DELIVERY OF FLEXIBLE LEARNING
IN THE TRADES, continued

- There is some danger that the increased level of autonomy would decrease the link with stakeholders
- Relying on one source for all flexible learning material might lead to a lower level of innovation

A second model is suggested which avoids many of the disadvantages outlined above

(B) Virtual Network for Vocational and Trades Training

This model combines the notion of centralized co-ordination with decentralized development and delivery of flexible learning. The Virtual Network would have its own steering body (a committee or board) and dedicated staff (CEO, Director) to provide the necessary co-ordination and support services. It would make sense to consider partnering the Network with an existing body with a Provincial mandate (such as BCcampus or TRU) to take advantage of the technical support that the partner organization could provide.

The Virtual Network (VN) organization would become a major funding source for the development of quality, flexible learning materials for the trades. Development partners could be chosen either through a Request for Proposal (RFP) process or through the selection of specific colleges based on certain criteria such as: institutional commitment, available expertise, relevant experience in certain trades, availability of suitable flexible learning materials, willingness of institution to fulfill certain criteria such as adapting provincial quality standards, etc.

The VN would develop Provincial standards for the development and delivery of flexible learning materials, at least for those that are developed through the VN. Individual institutions would be responsible for the implementation of these standards.

The VN could become a resource for flexible learning materials from other jurisdictions as well as a learning object repository. As materials are developed in BC and elsewhere, it should become possible to provide trainees with a range of flexible learning options for many of the trades from low-tech, essentially text material to higher-tech e-based material rich in simulations and other video-based material.

The VN could provide workshops and conferences (virtual and face-to-face) focused on specific areas of flexible learning and technical training, as required
The VN could also co-ordinate the marketing of materials developed through the Network to the rest of Canada and the world.

The advantages of the Virtual Network include:

- Capitalizes on the strengths of existing organizations

MODELS FOR THE DEVELOPMENT AND DELIVERY OF FLEXIBLE LEARNING
IN THE TRADES, continued

- o Offers trainees more choice through the pooling of a range of training programs and resources than can be accessed through a single portal
- o Encourages a Provincial perspective on priorities whether these be economic (maximize impact on the economy) or social (access and opportunities for completion) or both
- o Ensures Province-wide standards of quality, at least insofar as provincially-funded projects are concerned
- o A single body would be able to provide advice to the Province regarding policies and priorities with respect to flexible training
- o Overheads would be lower than the alternative model
- o Innovation at the institutional level can continue, allowing for diversity and innovation at the grass roots level

Disadvantages:

- o Some institutions may object to the fact that some (if not all) provincial funding for flexible learning will be prioritized centrally
- o Concurrent with the above will be the feeling on the part of some institutions that individual institutional initiative will be hampered through reduced funding
- o Potential for the central body to get caught up in bureaucracy
- o While the VN will provide a Provincial perspective on funding and development of flexible learning materials, there will be a reduced sensitivity to the training requirements of particular areas of the Province (perhaps more readily recognized by local delivery institutions)
- o There are not many examples of consortia arrangements such as that proposed in this Report which suggests that successful models of this sort may be difficult to operationalize

Under this model, ITA would contribute to the overall vision contemplated by this strategy, in consultation with its many stakeholders. In addition, ITA would set policy over matters such as ownership of intellectual property, approve major issues such as Provincial standards governing the development of Flexible Learning material, act as a conduit for funding and, generally, monitor the activities of the initiative.

The ITOs (or other trade associations where ITOs don't exist) would liaise and promote flexible learning among their members, set priorities for the development of flexible learning material in the trades within their area and negotiate development projects with delivery institutions to ensure that their needs are met.

Delivery institutions, primarily colleges, would develop and deliver flexible learning material and market the programs they have developed outside the Province.

Individual employers would continue to provide curriculum advice and assistance to development/delivery institutions and, of course, provide workplace training.

MODELS FOR THE DEVELOPMENT AND DELIVERY OF FLEXIBLE LEARNING IN THE TRADES, continued

While these recommendations outline specific roles for each of the stakeholders, there are other variations which may work equally well. These roles will have to be reviewed and negotiated among the stakeholders as part of the implementation process.

One of the key issues to be resolved is the delivery of flexible learning material and whether this is managed by one or several colleges or whether every college will take an active role. Decisions over such matters will be dependent on a number of factors including economies of scale and will need to be resolved as part of the implementation phase of the Strategy.

FUNDING THE COSTS

In an ideal world, the costs of developing and delivering flexible learning materials would be equivalent to the costs for more traditional teaching/learning modes. In the end, flexible learning has to become financially sustainable (within the traditional funding system) although there may be some tolerance for costs that are slightly higher than traditional costs because of the other benefits that flexible learning generates.

However, for flexible learning to succeed, major changes are needed in how colleges organize themselves, the role of teachers and in the relationship between employers, colleges and the provincial government. In particular, what is needed are funding mechanisms that will encourage change and collaboration, avoid duplication and control costs.

One thing is clear. Because of the large changes needed in the system, strong incentives will be required to encourage change. Funding can be a primary motivator for change. It is, therefore, suggested that for an initial period (say 3-5 years), the Province will need to allocate development funds for the purpose of expanding flexible learning. Funding should also be provided for the annual maintenance and updating of flexible learning materials that is estimated, annually, at 25% of the original development costs. However, this needs to be done within a context that the costs of flexible learning will ultimately become part of the normal funding mechanism for delivery institutions.

It should also be recognized that there will be opportunities for revenue generation through the sales or licensing of materials to industry or other jurisdictions and through partnerships with industry. There appears to be a growing interest in the development of short upgrading and/or updating programs for journeypersons and a realization that much, if not all, of the required material can be delivered and learned in a flexible learning mode.

It is, therefore, recommended that a Business Plan model be used for the development and delivery of flexible learning projects whereby all revenue sources are considered as well as all costs of development and delivery.

Colleges already possess many of the resources that are needed to support flexible learning. Flexible learning should not be seen as just an add-on to traditional teaching. There is an expectation that there will be a reduction in face-to-face time as some of the learning/teaching activities move to a flexible mode and this, in turn, should free up resources, particularly the time of teachers. The savings thus generated may need to be reallocated to areas such as faculty development, instructional design, web programming and IT support. It is recognized that some colleges may choose not to participate in new flexible learning projects because of other, higher-level priorities. However, other colleges will see flexible learning as an opportunity and will be willing to adjust resources to make it successful. Flexible learning projects can vary greatly in cost, from very low ($2-3 per student hour)

FUNDING THE COSTS, continued

for largely text-based materials to over $100,000 per student hour for flight simulator training. It is important to permit flexibility in costing various flexible learning projects to allow for the type of training materials that institutions are developing and the markets they are trying to serve. The larger projects may well demand funding mechanisms that go beyond single institutions and so funding mechanisms that allow for multiple sources of funding should be encouraged.

With this as background, the following guidelines for funding should be considered:

1. Proposals for the development of flexible learning materials should be based on a detailed Business Plan reflecting full revenues and full costs over a period of 3-5 years. Revenues could include contributions from the delivery institution's own resources, industry contributions as well as Provincial grants. The primary principle is that every flexible learning proposal should have a fully-costed Business Plan that demonstrates the long-term financial viability of the project.

2. The Province should provide grants to encourage innovative project development to be administered through a third party, such as the Virtual Network for Vocational and Trades Training discussed in more detail in a separate section. Funding in the order of $2-$4 million per year for a minimum period of three years will provide a substantial boost to the development of flexible learning materials.

3. Funding will be allocated on the basis of the priorities identified in an earlier section of this Report including focusing on trades with low completion and or success rates, trades with large numbers of active apprentices, trades with significant skill shortages, trades where some high quality flexible learning materials are already available, trades with a preponderance of trainees in remote areas and so on.

4. Provincial/ITA grants will provide a maximum of 50% of the development costs of a project with the remaining costs to be provided by the proposing organizations either out of their own resources or through partnerships with others.

5. The intellectual property of any materials developed through the projects will be vested with the Province, so that materials can be used by BC institutions without additional charge. Revenues generated outside the Province will accrue to the developing institutions.

6. Funding will be required for the Virtual Learning organization including staffing (likely 4-5 full-time staff: a director, a technical expert and one or several support staff), office space, office equipment and supply costs as well as charges for centralized support services which might be supplied by the Virtual Organization directly or contracted to a partner organization. This funding should be provided by the Province through ITA.

7. Tuition fees for flexible learning programs should be equivalent to tuition fees for traditional programs.

FUNDING THE COSTS, continued

In addition, the VN will be able to facilitate opportunities for collaboration between colleges and between colleges and employer organizations to develop their own self-funded flexible learning programs.

OTHER SOURCES OF FUNDING

While ITA and BCcampus have a history of funding E-learning, a number of other organizations were contacted, as part of this Report, in order to determine their interest/ability to provide funding toward the development of E-learning. These organizations included Telus, Cisco, HRDC and Partnerships BC. For a variety of reasons, none expressed an interest in funding E-learning at this point in time. However, research should continue to identify other organizations interested in supporting the development of alternative modes of delivery.

PROVINCIAL STANDARDS FOR FLEXIBLE LEARNING / QUALITY ASSURANCE

…"both institutions and the governments that fund them have increasingly relied on the development and operation of quality assurance practices to ensure that the services they provide to students are of the highest possible quality…" (Commonwealth of Learning, 2006)

While the initial thrust to developing quality assurance standards in distance education came from individual institutions, a number of countries have developed national quality assurance standards. Chief among these are the United Kingdom, Australia, the U.S. and Canada. The Nova Scotia Community College has also developed standards that address all flexible learning initiatives within the trades in that province.

In the United Kingdom, the Open and Distance Learning Quality Council (ODLQC) is the UK guardian of quality in open and distance learning. The agency was established by government in 1968 and is now independent. Interested providers of e-learning apply for recognition through a process of accreditation and they are required to provide evidence that each of the standards has been met.

Using the UK as an example, ODLQC standards are divided into six areas: Outcomes, Resources, Support, Selling, Providers, Collaborative Provision. The standards comprise 14 pages with anywhere from 5 to 10 standards for each area and detailed explanatory material is provided for each standard. For example, under the "Support" area, standard G states: "Learners are encouraged to complete their courses. Progress is monitored, and learners are provided with prompt and helpful comments on their progress in relation to learning expectations and goals." The section goes on to say, "In particular:
1. Early contact with a learner is initiated by the provider whenever difficulties occur arising from the non-submission of assignments by the appropriate deadline, or the submission of unsatisfactory work…
2. Care is taken to support and encourage learners who submit unsatisfactory work; learning support is only withdrawn after all reasonable efforts have been made to overcome their problems."

The Australian Flexible Learning Framework provides "E-standards for Training" to "support the developing national infrastructure for managing electronic learning resources in the training system" (Australia Department of Education). Standards have been developed for technical services, information formats and intellectual property management.

In Canada, a comprehensive set of "Canadian Recommended E-learning Guidelines" were prepared by Dr. K. Baker in 2002 for the Community Association for Community Education (CACE) and the Office of Learning Technologies (OLT) of Human Resources Development Canada. The guidelines are recommended by a number of important national and international agencies including: Alberta Online

PROVINCIAL STANDARDS FOR FLEXIBLE LEARNING / QUALITY
ASSURANCE, continued

Consortium, Association for Media and Technology in Education in Canada,
Canadian Association for Distance

Education, Commonwealth of Learning, Office of Learning Technologies, HRDC,
SchoolNet, Industry Canada. The Guidelines cover 9 pages and are organized
under three key themes: Quality Outcomes, Quality Processes and Practices,
Quality Inputs and Resources for E-learning Products and Services

In Nova Scotia, the Nova Scotia Community College "Accreditation Policies and
Procedures" have been created; these institute a means of systematic quality control
and management. This structure is expected to reduce administrative costs and
promote a culture of voluntary compliance to provincial standards among the
apprenticeship partners. The Province has initiated a process of accreditation
through which accredited employers and training providers will be recognized to a
predetermined standard by the Apprenticeship Training Division.

In the United States, the "Western Cooperative for Educational Telecommunications
project" developed a set of principles in 1995 that speak to Curriculum and
Instruction, Institutional Context and Commitment, Evaluation and Assessment.

It would seem that, in the context of a Provincial initiative, the argument for the
establishment and monitoring of standards for the development and delivery of
flexible learning is self-evident. A lack of standards, particularly for initiatives that
are at least partially funded by the Province, would result in an unsatisfactory
situation: uneven student outcomes, the potential for dissatisfied trainees and
employers and so on. One poorly designed flexible learning experience could colour
the entire Provincial initiative.

The advantages of Provincial standards include:

- o Provide clear expectations for all stakeholders: trainees, employers,
  deliverers of training
- o Expectations of high quality will help to raise flexible learning deliverables and
  ensure success
- o Research has identified best practices and the province should be
  encouraging developers to follow these
- o Enhance credibility for the E-learning in the Trades initiative
- o Will help to overcome the concern about flexible learning material developed
  in the past that has not been well designed and/or implemented

ENGAGING TRAINEES, EMPLOYERS/ITO'S, TEACHERS AND INSTITUTIONS AND SHARING THE IMPLICATIONS OF EXPANDED FLEXIBLE LEARNING OPPORTUNITIES

In order to engage trainees and their employers/ITOs, teachers and their institutions in the advancement of flexible learning, it will not be enough to simply enter into the process of developing high quality learning materials. It is important for the major stakeholders to feel consulted, informed and engaged.

The starting point for this engagement is to ensure that a broad and thorough consultation process is undertaken both before a new strategy is put in place as well as during the implementation phase. The Steering Committee for this project is, itself, an important part of this consultation process and, through individual members of the Steering Committee, the various stakeholder groups that they are part of and report to: Presidents, Vice-Presidents, Academic, Deans and Directors of programs likely to be involved, etc.

Initial meetings have been held with the Chief Executive Officers of each of the Industry Training Organizations. Continuing dialogue needs to be maintained, particularly with the Boards and, through the Boards, individual employers and trainees.

Once the Strategy is accepted, it will be important to engage in a promotional campaign to assure broad awareness. The promotional campaign will vary, depending on the audience, but should include:

- o A general press conference accompanied by a media release
- o A short, attractive brochure outlining the new strategy with a mailing to all trade/apprentice employers and trade/apprentice trainees
- o Letters to interested agencies and organizations with copies of the Press Release and brochure
- o Meetings with key stakeholder groups: ITO staff, ITO Boards, College Presidents, College V-P's, College Deans and Directors, major industry associations (particularly where ITOs don't exist)
- o Ongoing press releases, information sessions, etc. as the project progresses
- o A separate section of the ITA web-site should be devoted to the new initiative

As the strategy unfolds, it will be important to provide more detailed information and resources to those who are most likely to be involved in implementation. The proposed new section of the web-site can be an important resource for links to best practices and related material. It will also be important to offer, either through a third party agency or through one or more of the colleges, practical workshops, seminars and courses on all aspects of flexible learning.

ENGAGING TRAINEES, EMPLOYERS/ITO'S, TEACHERS AND INSTITUTIONS AND SHARING THE IMPLICATIONS OF EXPANDED FLEXIBLE LEARNING OPPORTUNITIES, continued

It will be important to "weave" into the consultation/communication process, the implications of what the expansion of flexible learning opportunities means to each of the stakeholders. While ITA has taken the position that face-to-face opportunities for learning will continue to be available for all those who prefer this mode, trainees and other stakeholders who are interested in pursuing flexible training should be clear about the consequences for their own activities.

For Trainees:
- o Resources should be provided to help trainees assess their own learning styles and, therefore, the learning modes that best suit them
- o Trainees need to understand what it means to be a flexible learner and the self-discipline that this entails

For Employers:
- o Employers may need to provide trainees with some assistance with learning materials
- o Employers will need to be sensitive to the fact that trainees are using more of their own "free time" to pursue learning

For Colleges:
- o Colleges will be required to provide development and infrastructure support to their teachers
- o Colleges will need to develop new workload arrangements with their teachers to recognize new, different modes of delivery

For Teachers:
- o Teachers will need to rethink their approach to teaching and be prepared to move from a 'teacher-directed' and 'student-dependent' approach to an approach that reflects a higher degree of learner autonomy and control.

EVALUATING SUCCESS

It is likely that success for this project will ultimately be measured on the basis of a net increase in trainee uptake, driven by the availability of flexible learning, accompanied by an increase in completion rates, success rates and overall satisfaction with the flexible learning material.

However, there are a number of milestones that need to be addressed towards this end and each generates its own measure of "success" (timeframes will be addressed in the implementation schedule provided at the end of this Report):

- o ITOs or, where not available, other employer organizations, approve the Flexible Learning Strategy (FLS)
- o Colleges and other delivery institutions approve the FLS
- o A Business Plan is developed to implement the FLS
- o The Province approves the FLS
- o The Province approves funding for the FLS
- o ITA identifies a central body to co-ordinate the development of the FLS
- o Central Body develops a protocol to develop and deliver flexible training in selected trades including a funding formula to share costs
- o Central Body develops Provincial standards for the development and delivery of flexible training
- o Central Body co-ordinates a process to identify top x number of trades to be considered for the development of flexible learning
- o Central Body co-ordinates the negotiation of agreements with delivery agencies to develop flexible training in x trades
- o Flexible learning materials are developed in x trades within xx months of signing agreements
- o Delivery agencies offer training in x trades within x months of flexible learning materials being available
- o Increase in uptake by trainees; measured as xxx students pursuing flexible training and representing an overall increase of x% in enrolment (combined flexible and face to face) over the average enrolment levels over the past x years
- o Completion rates increase by x% for trainees studying in a flexible learning mode compared to students in a face to face mode
- o Grades increase by x% for trainees studying in a flexible learning mode compared to students in a face to face mode
- o Satisfaction rates are x% higher for trainees studying in a flexible learning mode compared to students in a face to face mode

Specific targets have not been specified in this Report as it is more appropriate for the Steering Committee to provide specific targets.

RISKS AND MANAGEMENT OF RISKS

RISKS

While Flexible forms of learning exist in the trades throughout the world, while many jurisdictions claim to have pursued this field successfully, a number of these are in the early stages of development. Moreover, each jurisdiction is motivated by differing factors with the result that delivery varies greatly from one to another. In New Zealand, for example, flexible delivery is driven, at least partially, by the fact that the population is thinly scattered across the country with few having ready access to a delivery institution. In the United States, the delivery of flexible learning has largely been assumed by large, national, private organizations. BC's aspirations in the expansion of flexible learning are unique and need to be driven by a model that serves its own purposes.

Just as BC will pursue a development and delivery model that will serve its own unique purposes, so will it face unique challenges and risks. Many of these risks revolve around institutional responsiveness, employer/ITO interest and support, quality of learning material, costs and the degree of uptake on the part of trainees. Expanding on each of these:

- o INSTITUTIONAL RESPONSIVENESS: Delivery institutions in BC have been pursuing flexible learning largely on their own, according to their own assessment of the market and driven, at least partially, by the enthusiasm and expertise of individual teachers. The consortium approach contemplated in this Strategy may not be appealing to BC's institutions in that it will require some measure of compromise: willingness to follow a Provincial assessment of priorities, adherence to Provincial standards, sharing of responsibility for support with a centralized agency; in other words, being part of a collective effort rather than autonomous action may be less than appealing to some institutions
- o EMPLOYER/ITO INTEREST AND SUPPORT: Employers/ITOs may be unwilling to support an investment in learning modes that are not well understood by them and that may divert some portion of Provincial funding away from direct support for training through traditional modes of delivery.
- o QUALITY OF LEARNING MATERIAL: The quality of learning material varies across the Province and elsewhere and there has not been a long history of successful flexible learning, at least at the caliber contemplated by this Strategy. There is a risk that the quality of the learning material developed under this initiative will be not be sufficient to move the Province forward in a significant way.
- o COSTS: There has not been a successful history of tracking of costs in the development of flexible learning material. The literature is filled with the reasons for this lack of cost accountability but the fact remains that few institutions are able (or perhaps willing) to provide a complete accounting of their costs and so there is some uncertainty about the full cost implications of developing quality, flexible learning materials.

RISKS AND MANAGEMENT OF RISKS, continued

- o TRAINEE UPTAKE: There is an expectation that the major benefits of the advancement of flexible learning accrues to trainees: more flexibility in pursuing their studies, less time away from work and the like; employers will enjoy the benefit of having their employees on the job longer. These benefits will only be realized if a sufficient number of trainees choose to pursue a portion of their studies in this way and there are no studies available (at least that have come to light to date) that project the degree to which trainees will take advantage of new forms of training.

MANAGEMENT OF RISKS

It is believed that each of the risks noted above can be managed so as to minimize its impact.

- o INSTITUTIONAL RESPONSIVENESS: The VN approach contemplates identifying specific institutions to take the lead on developing flexible learning material in one or more trades. This is likely to prove attractive to institutions which will enjoy the status of being selected to provide leadership in a particular trade for the entire Province. It is likely to raise their profile and reputation in the area of flexible learning. Also, the institutions will benefit from exposure to provincial standards which should help to inform other flexible learning developments within their own organizations. Finally, it is important to select institutions which have shown a strong interest in flexible learning and a willingness to work in a collaborative environment.

- o EMPLOYER INTEREST AND SUPPORT: This Strategy contemplates a process whereby all stakeholders, including employers, will be consulted, informed and engaged as the Strategy unfolds. Employers, through the ITOs, or other employer organizations where ITOs do not exist, will be requested to provide feedback on the proposed Strategy. They will be kept informed through a series of meetings and other forms of communication. Once the Strategy is in place, employers will stay involved through the development phase as part of the Provincial standards for the development of learning materials. The initial focus for development should be with those industry clusters/ITOs that show the greatest amount of interest.

- o QUALITY OF LEARNING MATERIALS: The quality of learning materials is expected to be high and there are a number of control mechanisms that will be in place to ensure this happens: (1) the institutions chosen to lead the development and delivery of flexible learning materials will be selected on a number of criteria including their expertise and history of success in developing such material (2) Provincial standards will be in place to guide the selected institutions (3) Focus on those trades where the unique features of flexible learning can be best be exploited to improve the quality of training

RISKS AND MANAGEMENT OF RISKS, continued

- o COSTS: Costs can be contained by focusing initially on a limited number of trades and selecting those trades with substantial numbers of trainees. Budgets will be developed for each project based on a thorough analysis of benefits and costs using data from other projects within BC and from other jurisdictions. Contracts with successful bidding institutions will be clear on allowable costs and the deliverables associated with the project.

- o TRAINEE UPTAKE: Trainee uptake will be encouraged through a number of avenues: information will be sent directly to trainees and their employers, information will be provided through various media releases; consideration may be given to providing incentives for trainees willing to try alternative modes.

SUMMARY AND RECOMMENDATIONS:
KEY ELEMENTS OF A SUCCESSFUL STRATEGY

The previous sections have identified the elements of a strategic approach to the expansion of E-learning in the trades in BC. Each element is discussed and a variety of approaches is suggested. The Steering Committee that commissioned this Report contemplates a consultation process with a number of key stakeholders: Employers/ITOs, Delivery Institutions, Potential Partners, etc. and the results of these consultations will further inform the model that is eventually adopted by the Province.

The following summarizes the key elements of the Strategy that is being recommended:

(1) MODEL FOR THE DEVELOPMENT AND DELIVERY OF FLEXIBLE LEARNING

While there are few examples of successful collaboration in the development and delivery of flexible learning material (which suggests that successful arrangements of this sort are difficult to operationalize), there is sufficient evidence that a collaborative "Virtual Network" model can work and be successful (e.g. OntarioLearn, League of Innovation "SAIL" project).

The following outlines the potential role of each of the partners in such a collaborative approach:

Partners	Roles
Government / ITA	* Contributes to overall vision * Sets policy (e.g. intellectual property) * Approves Provincial quality standards for flexible learning * Provides earmarked funding * Monitors activities
Virtual Network	* Develops Provincial standards * Co-ordinates province-wide delivery * Provides technical support/advice/training * Supports marketing of programs outside province * Provides secretariat for co-coordinating committee
ITOs	* Set priorities for flexible learning within ITO trade responsibilities * Liaise, communicate and provide rational for the expansion of flexible learning * Negotiate development projects with delivery institutions
Colleges	* Develop flexible learning modes * Deliver flexible learning

Colleges, cont'd	* Market programs
Individual	* Provide curriculum advice
Employers	* Provide workplace training

A collaborative model brings a number of advantages to the Strategy being proposed: capitalizes on strengths of existing organizations, offers trainees more choice, encourages a Provincial perspective on priorities, ensures Provincial standards of quality. However, there are challenges with a Provincial approach: may reduce institutional access to development funds, potential for bureaucratization of decision-making, potential for reduced sensitivity to the training requirements of particular areas.

It is recommended that the Province pursue a collaborative approach to the expansion of flexible learning by establishing a Virtual Network model for the future development of flexible learning materials for the trades and with each of the partners, Province/ITA, Virtual Network, ITO's, Colleges and individual employers playing an active role.

(2) MAXIMIZE IMPACT:

Maximize the economic and social impact of the Strategy by selecting, for flexible learning development, trades that rank high using some weighted combination of the following criteria:
   o Significant number of apprentices in the trade(s)
   o Completion rates are below expectations
   o Achievement levels are below expectations
   o Skill shortages exist
   o Flexible learning material is already available within or outside the Province but needs to be modified/upgraded to suit the purposes of this Strategy
   o The learning material for the trade readily lends itself to a flexible learning mode
   o Trade has a high preponderance of remote learners

It is important that the selection process by seen as fair, equitable and open. It is, therefore, important to seek the input of major stakeholders and to ensure that the selection process is transparent.

SUMMARY AND RECOMMENDATIONS: KEY ELEMENTS OF A SUCCESSFUL
STRATEGY, continued

> It is recommended that a Provincial Steering Body develop a transparent program
> development selection process that has the input of major stakeholders. It may be that
> this Body will develop a selection process at two levels: trades clusters at the
> Provincial/ITA level (to ensure maximum economic impact) and then by trade at the
> ITO level to address more specific concerns around completion rates, skill shortages,
> etc.

(3) MAXIMIZE ACCESS:
Access to flexible learning is critical to ensure a high degree of enthusiasm and
participation on the part of trainees. This can be achieved in a number of ways
including:
- o Open access computer laboratories at the delivery institution
- o Assisting trainees with acquiring computer equipment; e.g. a lease/buyback
  program
- o Local libraries and other educational institutions
- o Through the workplace
- o Through commercial venues such as internet cafes

Critical to this is the degree to which the trainee will be inconvenienced (by having to
leave home or the work place) and the degree to which she/he is expected to bear
the financial burden of accessing flexible learning material.

> It is recommended that accessibility to flexible learning material be maximized using
> every reasonable venue and that the cost to the trainee be equal to the cost to a trainee
> taking a traditional, face-to-face program.

(4) MAXIMIZE TRAINEE UPTAKE
The previous two recommendations contain elements that will maximize trainee
uptake of flexible learning. There are several other factors that will help to ensure
maximum trainee interest and, therefore, uptake. The first is to ensure that the
learning materials that are developed and/or purchased are of high quality and fulfill
Provincial standards. The second is to ensure the full involvement of employers
through ITOs, where they exist, or other employer organizations.

> It is recommended that trainee uptake be maximized by ensuring that all flexible
> learning materials are of a high quality and that they follow Provincial standards; it is
> also recommended that employers (through ITO's or other employer organizations) be
> fully engaged in the development of flexible learning materials.

SUMMARY AND RECOMMENDATIONS: KEY ELEMENTS OF A SUCCESSFUL
STRATEGY, continued

(5) CARRY OUT A COST/BENEFIT ANALYSIS

An accurate and complete analysis of the benefits and costs of developing Flexible
Learning material has been identified in the literature as one of the more elusive
aspects of the development of this Strategy. While it is not difficult to identify the
categories of anticipated benefits and costs and, while some benefits and most of
the costs can readily be measured (within a disciplined record-keeping system),
many of the benefits are qualitative.

Nevertheless, a disciplined approach to the identification of benefits and costs is a
critical requirement to the credibility of expanding flexible learning initiatives. A
Business Plan Approach is suggested for this purpose.

> It is recommended that the development of flexible learning materials for a particular
> trade be undertaken only after an assessment of the costs and benefits using a Business
> Plan approach.

(6) FUNDING THE COSTS

This Report takes the position that, in the long run, the costs of flexible learning
modes should equate to more traditional modes as organizations become more
experienced, as uptake increases and as investments in the development and
support of Flexible Learning become part of the ongoing costs of a delivery
institution's operations.

However, alternative modes of delivery are not growing at a sufficient rate to satisfy
the needs of trainees and their employers, nor the Provincial economy. Action is
required to "kick-start" development at a more active pace through a matching grant
system provided through the Province/ITA to cover both initial development costs as
well as annual maintenance/updating costs. Development institutions would match
the grants through their own internal resources, contributions from industry, revenue
anticipated from the developed material and other sources.

> It is recommended that the Province provide an annual matching grant fund for the
> development of flexible learning in the amount of $2-4 million per year for 3-5 years.

(7) IMPLEMENT PROVINCIAL STANDARDS

Provincial and/or national standards for the development of flexible learning have become very common (in particular the U.K., Australia, U.S., Canada, Nova Scotia). SUMMARY AND RECOMMENDATIONS: KEY ELEMENTS OF A SUCCESSFUL STRATEGY, continued

The advantages of establishing standards for flexible learning within BC include: provides clear expectations for all stakeholders, standards will help raise the quality of flexible learning deliverables and improve chances for success, standards will be based on best practices which developers should be following, enhances the credibility of this Provincial initiative, will help to overcome concerns about past experiences with some flexible learning materials.

> It is recommended that a set of Provincial standards should be adopted for the development and delivery of flexible learning materials in the trades in BC. A number of models exist both within and outside Canada that can form the basis for these standards.

(8) ESTABLISH A PROCESS TO ENSURE ENGAGEMENT OF KEY STAKEHOLDERS; ENSURE THAT IMPLICATIONS OF EXPANDING FLEXIBLE LEARNING ARE WELL UNDERSTOOD

It will be critical, as the Provincial flexible training strategy unfolds, to ensure the continuing engagement of key stakeholders: trainees, employers/ITOs, Teachers and Institutions. This can be accomplished through a process of broad consultation, widespread promotion and a serious attempt to ensure that all stakeholders understand the implications of the implementation of this strategy.

Consultation needs to be thorough and timely so that stakeholders feel involved and have the time to provide input. Promotional activities might include: press conference and media release, attractive brochure with a wide mailing, targeted correspondence with key organizations, meetings with stakeholder groups, ongoing press releases and information sessions as the strategy unfolds, web-based information.

It is also important that the implications of this strategy be understood by the stakeholders. Trainees will need to be helped in assessing their learning styles and, therefore the learning modes that best suit them as well as access to help in acquiring the skills to be a flexible learner. Employers need to be sensitized to the fact that trainees may need more flexibility in their work in order to pursue a flexible mode of learning. Colleges need to understand the importance of assisting their teachers in the development and delivery of flexible learning modes as well as the infrastructure support and workload arrangements that this entails. Teachers will need to rethink their approach to teaching away from a teacher-directed approach to an approach that reflects higher degrees of learner autonomy.

SUMMARY AND RECOMMENDATIONS: KEY ELEMENTS OF A SUCCESSFUL
STRATEGY, continued

It is recommended that the implementation of this Strategy include a thorough process of consultation, promotion and orientation to ensure that all stakeholders are involved, informed and engaged.

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(9) EVALUATING PROGRESS AND SUCCESS

Success will ultimately be measured on the basis of a net increase in trainee uptake as a result of the availability of flexible learning accompanied by an increase in completion rates, success rates and overall satisfaction with the flexible learning material.

In addition to this ultimate goal, various milestones are identified in this Report to measure progress including: approval of key stakeholders, Provincial approval of concept and funding, creation of central body to develop a protocol and standards, establishment of process to identify trades for development, negotiation of agreements with delivery agencies, development of flexible learning materials and offerings of new flexible trades training programs are begun.

It is recommended that specific milestone targets, with dates, be established and that results are monitored against targets to measure progress and success.

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(10) QUANTITATIVE RESEARCH AND IMPLMENTATION PATTERN

There is a dearth of information in the literature with respect to the measurement of, as well as actual costs of, developing and delivering trades programs in a flexible mode, particularly as these benefits and costs compare to more traditional, face-to-face modes.

It is recommended that the Virtual Network should initiate, as one of its key tasks, the development of quantitative and qualitative, longitudinal research to study the impact of flexible learning on student outcomes (participation, success, etc.) as well as benefits and costs, as it affects all stakeholders with comparative data for traditional face-to-face modes of learning.

While this Strategy is driven by a number of factors including the need to improve access and completion rates for students bolstered by the successes that have been SUMMARY AND RECOMMENDATIONS: KEY ELEMENTS OF A SUCCESSFUL STRATEGY, continued

experienced in many other jurisdictions, the implementation of the Strategy needs to be informed by the results of the quantitative and qualitative studies referred to above. This argues for a pace of implementation that is initially cautious involving, say, a few trades. As the results of the studies show appropriate levels of trainee success and acceptable benefit and cost patterns, the pace of implementation can be accelerated to include more trades.

It is recommended that the implementation Strategy be approached cautiously and then accelerate based on proven levels of benefits and revenue/cost patterns.

IMPLEMENTATION SCHEDULE

The following "Implementation Schedule" identifies the major Tasks that need to be completed to implement the Flexible Learning strategy, the Purpose of the Task, who is responsible for ensuring completion and the date by which the task is to be completed.

The Schedule is very ambitious, particularly with regards to the activities to be accomplished by the Virtual Network within the first few months of its existence. However, it is expected that this Schedule will be refined and modified as the implementation phase progresses.

Task	Purpose	Responsibility of	Date to be Completed
First Draft of Strategy, completed	Draft Strategy for consideration	Consultant	Sept 11/07
Review and comment on First Draft Strategy	Provide feedback to Consultant	Steering Committee (SC)	Sept 13/07
Presentations and mailings to stakeholder Groups: ITA Board & Staff, Employers, ITOs, Trainees, Delivery Inst's (Pres's, V-P's, Deans, Teachers)	Request comments Solicit support	SC / Consultant	Oct 10/07
Modify Strategy as required; produce Final Strategic Plan	Reflect feedback from stakeholder groups	Consultant	Oct 19/07
Develop Business Plan	Business Plan to incorporate: Operational Plan, Communications Plan, Funding Plan, Budget Plan, Action Plan and Timetable	Consultant	January 31/08
Preparation of Summary Document of Strategy (graphics, photos, etc.)	Provide a brief, informative, attractive overview of the Strategy	Consultant/Graphics Profess'l (VCC?)	Feb 15/08
Presentation to Province	Solicit support including funding	SC/ Consultant	Feb 28/08
Announce financial support	Financial support from the Province to support implementation of Strategy	Province	Mar 31/08
Create Virtual Network (partnered with an existing organization)	To provide structure to implement Strategy	SC/ITA	April 30/08

Hire staff for Virtual Network	Ensure appropriate level and number of staff are hired to initiate planning processes	SC/ITA	May 31/08
Develop Protocol for the development and delivery of flexible learning	To set process in place to facilitate the development and delivery of flexible learning	VN	Jun 30/08
Develop Provincial standards for the development and delivery of flexible learning	To ensure consistent, Province-wide standards are used in development and delivery of flexible learning	VN	Jun 30/08
Develop Process for the identification of First Round of trades to be considered for the development of flexible learning	Specific trades identified	VN	June 30/08
Negotiate agreements with delivery institutions to develop flexible learning materials in identified trades	Delivery institutions are identified	VN	July 31/08
Learning management software acquired Infrastructure to support flexible learning material in place	Infrastructure in place to support flexible learning	VN	April 30/09
Flexible learning materials developed in x trades	Timely preparation of flexible learning materials	Delivery Institutions	April 30/09
Flexible learning options are offered in identified trades	Timely offering of alternative modes of learning	Delivery Institutions	September 1/09
Second Round of trades to be considered for the development of flexible learning	Build on experience of first round to expand number of trades in flexible learning mode	VN	September 30/09 (or earlier)

TERMINOLOGY

The following is list of commonly used terms in the flexible learning field with appropriate explanations of the meaning of each of the terms.

Asynchronous	Asynchronous communication is interaction that does not occur in "real time".
Authorware	Sophisticated authoring tool for the creation of online education products
Bandwidth	The transmission capacity of a network connection or interface. The bandwidth determines the rate at which information can be sent – the greater the bandwidth, the more information that can be sent in a given amount of time.
Blended Learning	Learning that mixes various event-based activities, including face-to-face classrooms, live e-learning and self-paced learning.
Blogs	These are information and commentary sites set up by individuals or special interest groups to share ideas and information.
Broadband	A transmission facility having a bandwidth sufficient to carry multiple voice, video or data channels simultaneously.
Chat-room	A web tool to allow people to "chat" textually in real time.
Computer-Based Training (CBT)	A self-paced learning activity. Media rich content and learning activities are generally stored on a CD-Rom, DVD or memory stick.
Digital Learning Objects	Electronic "stand-alone" information and learning packages which can be combined to provide a variety of learning opportunities. The learning objects may be as simple as some pages of text or a virtual tour of a museum.
Digital Literacy	The ability to use digital technology, communication tools, and/or networks to locate, evaluate, use and create information.
Discussion Boards	These are asynchronous communication tools and can be compared with interactive notice boards.

Distance Learning   Education in which the majority of the instruction occurs when student and instructor are not in the same place. Distance education may employ correspondences study and/or audio, video or computer technologies.

Distributed Learning A student-centered approach to learning that incorporates the use of technology in the learning process.

E-Learning   Learning that is enabled or supported by the use of digital tools and content; typically involves some form of interactivity, which may include online interaction between the learner and their teacher or peers.

Flash   Animating software creating high level interactive resources.

Flexible Learning   The provision of a range of learning modes or methods, giving learners greater choice of when, where and how they learn.

Instructional Design The systematic process of translating principles of learning and instruction into plans for instructional materials and activities.

Information and   The study, design, development, implementation, support or
Communication   management of computer-based information systems,
Technology (ICT)   particularly software applications and computer hardware

Knowledge Society   A society in which creating, sharing and using knowledge are key factors in the prosperity and wellbeing of its people.

Learning   A software application or Web-based technology used to
Management   plan, implement and assess a specific learning process.
System (LMS)   Typically, a learning management system provides an instructor with a way to create and deliver content, monitor student participation and assess student performance in an electronic environment.

M-Learning   Refers to the use of electronic devices, generally small, portable and wearable, in formal and informal learning activities.

Moodle   Open source e-learning platform with rich functionality for course management, online communities, learning management and content management.

On-Line Learning | Learning occurring where education and training are delivered and supported by networks such as the internet or intranets. Learners are able to learn at any time and any place.

Open Source Software | Software which is available for people to download, use, modify and, within the terms of general public license, to distribute.

Portal | A network service that brings together content from diverse distributed resources acting as a "doorway" to the Internet or a portion of the Internet, matching a person's needs to available offerings.

SMART Board | Interactive whiteboard with a touch-sensitive display connecting to a computer and digital projector to show a computer image.

Streaming media | A technical term for digital audio or video transmissions via the Internet.

Synchronous | Synchronous communication is interaction and communication that occurs in real time.

Virtual Learning Environment (VLE) | A networked, computer-based environment supporting the delivery of Web-based, on-line learning.

Web-based Training (WBT) | A self-paced learning activity using the infrastructure of an intranet or the Internet. Medica rich content and learning activities are generally accessed through a web browser.

Wiki | A web application that allows users to add content, as on an internet forum but also allows anyone to edit the content

Wireless Technology | Computing without wires and phone lines.

RESOURCE MATERIAL

The following resource material was used in the development of this Report.

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