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# E-LEARNING FOR THE WORKPLACE

*Creating Canada's Lifelong Learners*

326-01 Detailed Findings • By Debbie Murray

## HIGHLIGHTS

- E-learning has the potential to transform how and when employees learn.
- Learning will become more integrated with work and will use shorter, more modular, just-in-time delivery systems.
- By improving Canada's skills, innovation and knowledge base and by leveraging our capacity in information and communications technologies, e-learning will be a key to productivity, competitiveness and prosperity.
- This report includes a toolkit for developing an e-learning strategy.

Understanding the Strategic Environment  Economic Analysis  Business and Society  Policy Analysis

Organizational Response  Improving Organizational Effectiveness  Managing Human Resources  Managing Innovation and Technology



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The Education and Lifelong Learning Group is a part of the Conference Board's Policy, Business and Society Division. Its mission is to help business, government and education leaders work collaboratively to promote the development of a learning society that prepares Canada's people for a changing world. The Group conducts research on issues of strategic concern to business, government and education; facilitates dialogue among business, government, education, community and labour leaders; and recognizes excellence in partnerships and programs that develop people in workplaces, education institutions and communities.

### **Preface**

Information and communications technologies are changing how employees work and learn. At the same time, many employers recognize that their employees need to improve their knowledge and skills and that e-learning is a way to do so. This report shows why e-learning is important; provides examples of e-learning solutions; and contains a toolkit employers can use to develop their own e-learning strategy.

This study was completed with financial support from the Office of Learning Technologies, Human Resources Development Canada; however, responsibility for this report and its contents rests solely with The Conference Board of Canada.

James R. Nininger  
President and Chief Executive Officer  
The Conference Board of Canada  
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# E-LEARNING FOR THE WORKPLACE

## *Creating Canada's Lifelong Learners*

326-01 Detailed Findings • By Debbie Murray

*Building a skilled work force must be a national effort... Canada must see at least one million more adults pursue learning opportunities during the next five years.*

—Speech from the Throne, January 30, 2001

Forward-thinking Canadian employers are starting to embrace e-learning to become more productive and innovative, regardless of the size, resources or sector of their organization. At the same time, they are using e-learning to create self-directed, lifelong learners among their employees—and to save money.

E-learning delivers content through electronic information and communications technologies (ICTs). This delivery method increases the possibilities for how, where and when employees can engage in lifelong learning.

But like most new developments, e-learning is not without challenges. While Conference Board surveys, consultations and a literature review found e-learning may expand employee learning, organizations also face three main barriers to its use:

- the *cost* of developing and purchasing e-learning initially, and then the ongoing cost once an e-learning intervention is underway;
- *lack of time*—employees don't have enough time to devote to workplace learning, and employers don't have enough time to develop and maintain e-learning solutions; and
- *content* issues—employers either couldn't find the content they needed on the market, or had the content but found it was designed for traditional methods of delivery, and unsuited for e-learning.

Employers are finding ways to overcome these barriers.

They identified the following success factors:

- building an organizational learning culture;
- conducting extensive research and careful planning;

- partnering with other businesses and educators to save money and time and to share expertise;
- starting small and testing e-learning before scaling up to a broader audience;
- aligning e-learning solutions with core business processes and learning competencies;
- leveraging existing ICTs that employees are already familiar with;
- sourcing non-proprietary content externally;
- involving employees in proprietary or process-specific content development;
- ensuring teamwork and communication between information technology and human resources;
- training trainers and managers in how to use e-learning and support employees;
- clearly communicating the value of e-learning; and
- integrating e-learning with knowledge management, performance management and communication systems.

Employers are especially excited about the potential of e-learning for just-in-time learning delivery. By leveraging workplace technologies, e-learning is bridging the gap between learning and work. Workers can integrate learning into work more effectively because they use the same tools and technology for learning as they use for work.

Employers are not the only group excited by e-learning. Employees said they want to learn with e-learning—they agreed with employers that it is convenient and flexible and gives them more control over their learning.

As the education sector moves on-line and as technology-savvy young people embark on the school-to-work transition, they carry an expectation of e-learning with them into the workplace. Employers will use e-learning to recruit and retain the best and the brightest.

E-learning offers a unique opportunity. It combines the power of today's technology and global networks with the infinite economic potential that is unleashed when people acquire, create and apply knowledge and skills.



# Introduction

E-learning provides Canadian employers with an unprecedented opportunity. The information and communications technologies that characterize our age are redefining the future of learning in the workplace. Employers can use e-learning to advance the knowledge and skills of their employees and to create lifelong learners. Now employers can assess employees' learning needs, update content on a regular basis to fulfil those needs, track and recognize employees' learning and deliver it at work or at home through exciting e-learning applications.

Employers are most interested in the potential of e-learning for just-in-time, modular learning. By leveraging workplace technologies, e-learning can bridge the gap that has traditionally separated learning from work. Learning can be integrated into work more effectively because employees will use the same tools and technology for learning as they use for work. Both employers and employees recognize that e-learning will diminish the narrowing gap between work and home, and between work and learning.

The use of technology for learning transcends all types of work—it pervades the shop floors of the “old economy” as much as the cubicles of the “new economy.” In fact, lifelong learning and workplace education are as essential to Canadian competitiveness as both types of economies are. E-learning is an option to any organization looking to improve the skills and capacity of its employees.

This report presents the results of a Conference Board of Canada study on the use of e-learning in the workplace. The objectives of the study were to:

- show the links between e-learning and Canada's global economic prosperity;
- identify what technologies and solutions are being used, and why and how they are being used;
- examine the role that technologies play in learning and skills-training strategies;
- outline the obstacles preventing employers from using e-learning;
- highlight the innovative solutions of employers; and
- provide a reference guide for employers to use when considering how to use technology for learning.

Three assumptions guided the collection and analysis of the data:

- E-learning is not a replacement for traditional methods of learning delivery such as classroom, instructor-led delivery.
- There is no one right way to develop and use e-learning. Workplaces are not homogeneous, and neither are e-learning solutions.

- Employers and employees have specific needs related to competitiveness and productivity on the one hand, and personal and professional development on the other.

## **Research Study and Methodology**

The Conference Board study of employers' use of e-learning was undertaken for Human Resources Development Canada's Office of Learning Technologies. The purpose of the research was to identify both the issues faced by Canadian employers using e-learning in the workplace and successful e-learning solutions and practices. This report is only one of the products of the study. Also available are 10 case studies of Canadian e-learning organizations, a brochure outlining the key research findings, and a free Internet tool to help employers design an e-learning strategy for their organization. In addition, all of the research findings will be available free of charge on the Conference Board's Web site ([www.conferenceboard.ca](http://www.conferenceboard.ca)).

The research methodology consisted of a review of the literature on e-learning in the workplace, a mail survey of employers and employees, cross-country consultations, and site visits to 10 Canadian employers. Employers selected represented a broad range of sectors (mining, manufacturing, financial services, forestry, oil, gas, information technology, and transportation) and small, medium-sized and large organizations from across the country.

## **Report Framework**

This report is divided into five chapters. Chapter 1 examines the e-learning context for Canada domestically and globally: the drivers of e-learning, the linkages among lifelong learning, literacy, the digital divide and connectivity, and the issues specific to small and medium-sized enterprises.

Chapter 2 looks at e-learning usage patterns, issues and challenges, and steps that are being taken to address the challenges from the perspective of Canadian employers.

Chapter 3 looks at the same subjects from the perspective of Canadian employees.

Chapter 4 examines employers' e-learning planning process. It contains the E-Learning Toolkit, a step-by-step decision-making technique created through consultation with employers and e-learning experts and through reference to the literature on e-learning. This toolkit features four phases that are designed to help employers understand and use e-learning for effective learning delivery.

Chapter 5 points to the next steps that stakeholders can consider to develop and support e-learning in Canada.

The report concludes with a glossary of terms related to e-learning and a bibliography.

## Using the Report

The employers we interviewed, surveyed and consulted for this study sense that information and communications technologies will change how employees work and learn. By and large, they also recognize that they are not equipped to deal with integrating e-learning into their training programs and work processes.

This report addresses this key need by providing:

- information on why e-learning is important to Canada and to its employers and employees;
- illustrative examples of e-learning solutions; and
- a toolkit employers can use to plan, build, integrate and improve their own e-learning interventions.

This report provides a benchmark so that employers, educators, lifelong learners and others can grasp e-learning and move it from being still somewhat peripheral to an established, seamless and common learning delivery method.

We anticipate that the following audiences will be interested in what the report has to say:

- private sector employers—for information on what e-learning is, how it will benefit them and how to develop an e-learning strategy linked to their business;
- employees—for information on new ways of pursuing lifelong learning and professional development;
- public sector policy makers—for information on the implications, direction and adoption of e-learning in Canada and the relationship of e-learning to innovation, productivity and lifelong learning; and
- unions—for information on innovative methods of workplace learning and professional development.

Lifelong learning, like many other processes, is in a period of transition in which it is being transformed by networked technology and global business imperatives. Canada's actions in the next few years to establish an e-learning continuum at home and at work—across all age, social and income groups—will lay the framework for future innovation, productivity and prosperity.

*In a global society based on expanding knowledge, Canada's health as a civil society and its economic competitiveness, as well as the success of individual Canadians, will hinge on having the best possible education and access to lifelong learning opportunities. Around the world, online learning—the use of digital networks to deliver and support learning opportunities—has emerged as a powerful and transformative means to meet these learning needs, as well as to extend and enrich traditional modes of instruction, at the post-secondary level.*

—Advisory Committee for Online Learning  
*The E-learning E-revolution in Colleges and Universities:  
A Pan-Canadian Challenge*, p. ix

“E-learning” and “learning technologies” are used interchangeably throughout this report and refer to the delivery of learning, skills and knowledge through information and communications technologies (ICTs).

“E-literacy” involves the ability to learn how to use ICTs and the ability to use ICTs to learn and transfer knowledge.



# Using E-Learning to Advance Canadian Productivity, Innovation and Skills Development

## Key Findings

- The global, knowledge-based economy places unprecedented demands on Canada's labour force.
- Globalization, human capital development and information and communications technologies are driving e-learning.
- Canada can significantly improve its performance in adult learning, education and training.
- Canada is the second most connected country in the world.
- E-learning may be an opportunity for small and medium-sized enterprises to capitalize on their innovative culture and their use of information and communications technologies to address skills shortages.
- Canada has a digital divide—some Canadians have access and some don't. Of those who don't, some are not able to afford it, and others are just not interested.
- E-learning can be used to improve Canada's poor literacy performance and to develop e-literacy.
- Involvement in e-business tends to be a driver of e-learning investment.

## Why E-Learning Now?

Despite a high standard of living, Canada is falling behind other countries because of its relatively poor innovation and productivity performance. E-learning is one answer to sweeping global changes and our own labour market and productivity issues. E-learning affords small and medium-sized enterprises (SMEs), as well as large organizations, an opportunity to provide workplace learning, and it gives Canada a chance to close its "digital divide" through the development of e-literacy.

E-learning is being spurred on in Canada by three broad drivers:

- the global economic context;
- the human capital context; and
- the information and communications technology context.

E-learning can be viewed as a means of delivering three key outcomes: improved and consistent rates of lifelong learning, improved productivity and improved innovation and competitiveness. Another desired outcome is increased equity. The issue of equity raises questions that need to be addressed now. Do Canadians currently have access to these learning technologies, is access to e-learning equally distributed by income, age and educational levels, and are barriers to e-learning such as cost and lack of information, time and content being addressed? E-learning, like all learning, should yield outcomes that benefit society and the economy. As Statistics Canada's most recent Adult Education and Training Survey report notes:

*It is not enough, though, to look only at economic factors—income, employability and firm productivity....*

*In assessing the appropriate level of adult learning in Canada, individual benefits extend beyond the market payoffs of higher wages or employment. It is now well documented that learning leads to better health and other favourable outcomes for family, community and country.<sup>1</sup>*

## What Is E-Learning?

E-learning uses information and communications technologies (ICTs) to deliver content (learning, knowledge and skills) on a one-way or two-way basis:

One-way (asynchronous) technologies: technologies that deliver content (learning, knowledge and skills) one way at one point in time. They include:

- Broadcast television that delivers learning content
- Audiovisual aids
- Film
- Video
- Digital video disk (DVD)
- Computers
- CD-ROMs
- E-mail
- Internet/intranet/extranet networks
- Wireless technologies

Two-way (synchronous) technologies: technologies that deliver content (learning, knowledge and skills) two ways or more at the same time.

They include:

- ICQ/IRC—interactive conferencing and chat rooms
- Teleconferencing
- Internet/intranet networks
- Web conferencing
- Wireless technologies

*...knowledge is a key determinant of sustained economic growth because knowledge, unlike other factors of production, is not subject to diminishing returns.<sup>2</sup>*

## Global Economic Context

Globalization—in the form of labour and capital mobility, international trade, global information and communications networks and technologies, and global transportation systems—has become a driver of Canadian economic prosperity. More and more people are crossing national borders and not working from one fixed location to get their work done. The effects of globalization, combined with the speed of change, impel organizations and employees to stay up-to-date with current knowledge and learning. Another impact of globalization for education and lifelong learning is that there will be growing pressure to establish international educational standards and accreditation processes.

E-learning has an important role in the supply of global learning and certification. Technical certification is paving the way, but colleges and universities are experimenting with broader offerings. For example, the Massachusetts Institute of Technology recently announced that it will put its course content on the Internet for free. This will allow students around the world to access premium university course content at no cost, albeit with no accreditation either.

Problems that characterize traditional international education, such as recognition of qualifications, also apply to e-learning. But because the very nature of e-learning includes distance and technological aspects, these issues may be more easily overcome. Learners don't have to go to school; instead, school comes to them.

## Canada's Human Capital Context

Canada is not the only country to have identified lifelong learning and human capital development as a critical issue. Countries like the United Kingdom, and economic bodies such as the European Union and the Organization for Economic Co-operation and Development (OECD), are focusing many of their policy initiatives on human capital and lifelong learning and see these as keys to economic prosperity and innovation.<sup>3</sup>

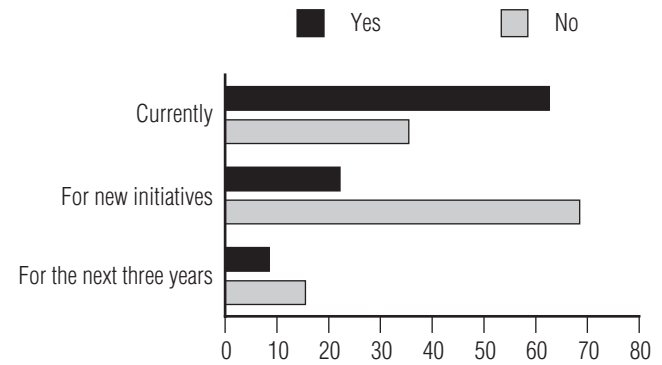
## Labour Market Situation

Canada faces shortages in the skills needed to compete globally. In the Conference Board's survey of employers, more than 30 per cent of respondents said their employees don't have the skills they need now (Chart 1). Many of these shortages are related to information and communications technologies (ICTs), but others stem from underlying demographics and the impending large-scale retirement of

Chart 1

**Employers Rate Whether Employees Have the Skills They Need Now, for New Initiatives, and for the Next Three Years**

(per cent, n=107)



Source: The Conference Board of Canada.

Canada faces shortages in the skills needed to compete globally.

baby boomers. Already, the Canadian Federation of Independent Business reports, 46 per cent of small businesses are having difficulty finding qualified labour and there are 250,000 to 300,000 vacant jobs among this country's million or so small and medium-sized employers.<sup>4</sup>

Canada's labour shortage is expected to reach 950,000 workers by 2020, which would have major productivity and competitiveness implications.<sup>5</sup> The Conference Board has identified this impending labour deficit as a critical issue and states that labour productivity could be increased, and skills shortages met, by investments in education, skills and knowledge, especially among underemployed or unemployed segments of the workforce. E-learning may be an effective target for this investment.

Given skills shortages and international labour mobility, recruiting and retention of skilled employees is vitally important for employers and the nation. Many of these workers are already experienced e-learners and expect to have access to this type of learning in the workplace. Employers that provide e-learning opportunities will improve their success at recruiting and retaining such employees.

## Lifelong Learning Situation

Although Canadians have a high rate of educational attainment relative to citizens of other OECD nations, this pattern does not hold as Canadians get older and progress through the labour market. Indeed, Statistics Canada found that adult education and training levels have dropped since the early 1990s.<sup>6</sup> The Conference Board's *Performance and Potential 2000* report notes that Canada

is not performing well in educating and training its workforce. We provide less workplace training than the United States, our biggest economic partner (Chart 2).

Canada could use more support for workplace learning. Recent research found that 70 per cent of firms undertook some training (40 per cent of it formal and the remainder informal).<sup>7</sup> But employees don't perceive a high level of support from employers; only 19 per cent indicated they took part in employer-supported training.<sup>8</sup>

On an international level, the *World Competitiveness Yearbook* ranks Canada 23rd out of 46 countries for rates of employer-supported learning.<sup>9</sup> E-learning has the potential to increase the level and breadth of support by employers and the participation in workplace learning by employees.

In Canada, opportunities for learning are shaped by how much money you make, whether you are permanent or temporary, full-time or part-time, the level of responsibility you occupy, the sector of the economy you work in, and the size of your organization.<sup>10</sup> In short, those who are already in a good position in the labour market benefit the most from current modes of workplace learning such as on-site or off-site courses, classroom instruction and conferences.<sup>11</sup> E-learning provides an opportunity to level the learning field. It can foster learning activity across the entire organization, even among those who are not in the best position to access the more traditional means of workplace learning.

In addition, there is a strong tendency for those who receive on-site formal workplace education to already be the most educated group in the workplace. In other words, those employees who need lifelong learning the most are

the least likely to receive it. This tendency can establish and perpetuate gaps between those who are able to participate fully in the labour market and those who are not.

### Adult Literacy Situation

Literacy is perhaps the most significant measure of a country's educational achievements. Regardless of the levels of educational attainment and participation in workplace learning, Canada's literacy outcomes still need improvement. According to the International Adult Literacy Survey (IALS), 43 per cent of Canadians scored in the two lowest levels of document literacy, including 57 per cent of employees in manufacturing.<sup>12</sup> E-learning, especially through graphically based multimedia, may be a way to improve literacy levels.

The IALS report points out that literacy will become even more critical as our economies increasingly depend on ICTs: employees who don't have the literacy skills required to use ICTs will not be able to contribute to the economy. The OECD continues to support research in this area and is leading an Adult Literacy and Life Skills Study, to be completed in December 2003. This study will indirectly look at access to and use of information and communications technologies for learning.<sup>13</sup>

### Information and Communications Technology Context

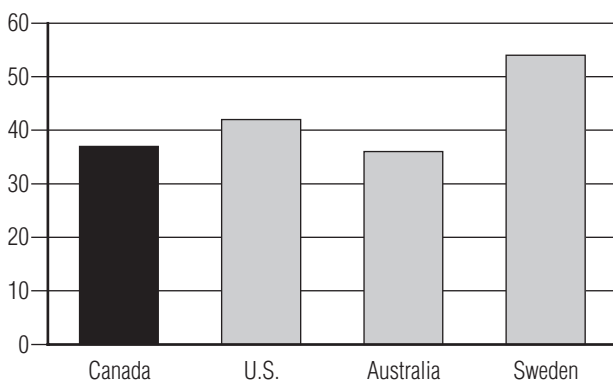
#### IT in the Workplace

There is a positive relationship among information and communications technologies, labour productivity and total factor productivity.<sup>14</sup> Studies have also demonstrated a relation between the prevalence of ICTs at work and the rate of workplace learning. Statistics Canada's 1999 workplace and employee survey found a relationship between rates of computer technology adoption and higher levels of computer-related training. Upgrades to technology drove computer-related training: 51 per cent of workplaces that adopted computer technology also provided formal or informal computer-related training.

In addition, there was a relationship between the rate of technology-received training and the per capita hardware and software implementation costs. Thirty-two per cent of employees in establishments that paid an average of \$2,500 or more per employee for this new technology received training, some of it delivered through e-learning, compared with 19 per cent of employees in workplaces that spent up to \$699.<sup>15</sup> This indicates that firms that spend more on technology also spend more on training to support it, including e-learning.

E-learning provides an opportunity to level the learning field.

**Chart 2**  
**Participation in Education and Training, Workers Aged 25-54, 1994-95**  
(per cent)



Source: The Conference Board of Canada.

## Connectedness

It is not well known that Canada is a global leader in connectedness...we must continue to build and use our ICT infrastructure and networks in the broadest sense if we are to maintain our global-best standard of living.<sup>16</sup>

Canada is the second most connected country in the world, behind only the United States, our most important economic partner.<sup>17</sup> Not only do we have a well-developed ICT infrastructure, we use it.

Rates of Internet penetration in homes have increased from 23 per cent in 1996 to 57 per cent in 2000. In 1999, 53 per cent of private sector firms and 94 per cent of public sector firms were connected to the Internet.<sup>18</sup>

Sixty-nine per cent of small and medium-sized enterprises (firms with fewer than 500 employees) were connected to the Internet, a higher level of Internet connectedness than reported by larger enterprises.<sup>19</sup> The connectedness of small and medium-sized enterprises (SMEs) is also manifested through high rates of e-mail usage (88 per cent for firms with 100–499 employees) and Web site development—49 per cent of firms with 100 to 499 employees operate a Web site.<sup>20</sup> Indeed, the proportion of SMEs with Web sites is higher than the Canadian business aggregate of 25.7 per cent. This suggests that SMEs may be cultivating a culture of using the Internet for work that could prove useful for e-learning.

**Connectedness:** the availability and use of information and communications technologies (ICTs) and associated services to facilitate the entire range of communications, interactions and transactions.

## Addressing Lifelong Learning, Innovation and Productivity

*To secure our continued success in the 21st century, Canadians must be among the first to generate new knowledge and put it to use.*

—Speech from the Throne, January 2001

Knowledge and innovation are the keys to Canada's productivity, and e-learning is one of the most effective ways to share the knowledge developed through innovation. Given that Canada doesn't perform as well as its main economic partner, the United States, on productivity and workplace education,<sup>21</sup> e-learning is one way to give Canada a stronger global position.

In particular, e-learning offers small and medium-sized enterprises an unprecedented opportunity to improve

their economic performance and is a potential solution to Canada's digital divide.

## Small and Medium-Sized Enterprises

SMEs employ 6 out of 10 working Canadians<sup>22</sup> and have a huge overall impact on the economy. Yet current research on e-learning for SMEs is limited.<sup>23</sup>

As noted earlier, SMEs face a skills shortage. Because of limited resources, they often find it hard to recruit and retain labour, especially skilled labour. SMEs are often not able to compete with larger companies in terms of compensation, benefits or workplace training. This skills shortage affects their innovation and productivity performance. The Canadian Federation of Independent Business argues that "lack of action to address today's labour shortages will limit the success of tomorrow's entrepreneurs."<sup>24</sup>

According to the Federation, good employee relations, which are key to employee retention, rely on formal or informal employee support. And the most frequent form of support is formal or informal training. Both formal and informal training support are important to satisfying employees.<sup>25</sup>

Given the costs of traditional forms of training, and the lower rates of formal training and workplace learning enjoyed by employees of SMEs, e-learning may be a way of filling the gap. SMEs can explore partnerships with other SMEs for non-proprietary skills-based or safety and compliance training. Another option is Web-based training, which enables an SME to purchase externally managed e-learning for its employees. In fact, SMEs may be a prime testing ground for adopting and applying the possibilities of affordable e-learning.

E-learning is a component of e-business, and companies that are more involved in e-business are more likely to be involved in e-learning. The top four barriers to e-business uptake and use by Canadian SMEs that could influence their ability to adopt e-learning are:

1. Lack of information and education
2. Uncertainty surrounding the costs and benefits of e-business
3. Access to and the availability of strategic e-business resources
4. Security concerns<sup>26</sup>

## The Digital Divide

*Education and training systems also must play an important role in promoting equity. Even though overall education levels have improved steadily over the past few decades, educational opportunities*



*continue to be unevenly distributed. And there are new risks. As jobs expand in high-skilled occupations, new skills-based inequalities may emerge. Unequal access to, and use of, ICT [information and communications technologies] may be reinforcing existing inequities through a new “digital divide”.*

—Daniel J. Johnston, Secretary-General, OECD  
*Education Policy Analysis, 2001 Edition*  
OECD, p. 7

*Canadians have experienced the burgeoning growth of the Information Highway and the Internet over the past few years. However, the levels of awareness and the use of these new technologies and services are highly polarized along social class and generational lines, creating the digital divide. From 1997 through 1999, higher-income households were three times more likely than lower-income households to have home access. By 1999, about two-thirds of upper-income households had access from home, as compared to about one in four low-income Canadians.*

—Reddick, Boucher and Groseilliers  
*The Dual Digital Divide:*  
*The Information Highway in Canada, 2000, p. 1*

Concerns abound that a gap is being created between those with access to and knowledge of information and communications technologies and those without. This digital divide has repercussions both for the “e-literacy” and “social literacy” of Canada’s population and for the country’s place in the global economy. Indeed, evidence points to a dual digital divide in Canada, which breaks the “have nots” into two sub-categories, those who are challenged by access and affordability, and those who are not interested and not motivated to use information and communications technologies.<sup>27</sup>

E-learning can be a way of widening the digital divide or closing it. If access to e-learning is not broadly available, the digital divide will be perpetuated. But e-learning may also help close the digital divide by increasing familiarity and access to ICTs and by developing e-literacy competency or skill.

Employers that develop e-learning systems in the workplace will help drive this process. Employers can also work with educators, government and others to ensure that Canada’s population has the capacity to use information and communications technology for learning and work.

E-literacy involves the ability to use information and communications technologies to learn skills and transfer knowledge, and the ability to learn how to use information and communications technologies.

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Social literacy involves individuals’ abilities to understand and to use information in ways that are beneficial and meaningful to their everyday lives.

Reddick, Boucher and Groseilliers,  
*The Dual Digital Divide, p. 4*

### **Advisory Committee for Online Learning**

Canadian educational institutions recognize the importance of e-learning and are moving toward integrating it into learning delivery. The Advisory Committee for Online Learning was established by Industry Canada to advise the Council of Ministers of Education, Canada, on a co-ordinated approach for governments, universities, colleges and the private sector to integrate on-line learning into Canadian universities and colleges. The following recommendations were made in the Advisory Committee’s final report:

- Make state-of-the-art broadband access widely available and affordable for all learners across the country.
- Develop high-quality Canadian on-line educational content.
- Create a pan-Canadian on-line learning service to help learners, faculty and institutions develop a more integrated on-line learning community.
- Review current copyright and intellectual property laws.
- Create educational programs that foster e-learning skills necessary for a strong Canadian knowledge-based society.
- Increase professional development for faculty members.
- Direct more investment to theoretical and applied learning research and development, both traditional and on-line.
- Ensure on-line materials meet the needs of persons with disabilities.
- Increase the development of learnware applications.
- Ensure that funding for the challenge at hand is adequate and sustained.

Source: Advisory Committee for Online Learning, *The E-learning Evolution in Colleges and Universities: A Pan-Canadian Challenge*, February 8, 2001.

Access and equity depend on a base level of e-literacy, social literacy and ICT ubiquity and infrastructure. Employers’ efforts can make a difference, beyond the workplace, to Canada’s overall digital economy. Effective partnerships with private sector and public organizations can help facilitate this process. Indeed, the OECD stresses that “Lifelong learning implies above all a systemic view, building strong linkages between learning at different stages of life and in a wide range of settings and partnerships rather than just looking at various forms of education and training provision in isolation from each other.”<sup>28</sup>

Canada is poised to use e-learning as a method of delivering lifelong learning to improve Canada’s productivity, innovation and competitiveness.

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- 1 Gilles Bérubé, Wendy Salmon and Albert Tuijnman, *A Report on Adult Education and Training in Canada: Learning a Living*, 81-586-XIE (Ottawa: Statistics Canada and Human Resources Development Canada, 2001), p. 5.
  - 2 Applied Research Branch, Strategic Policy, Human Resources Development Canada, *Technological and Organizational Change and Labour Demand: The Canadian Situation*, R-97-1E (Ottawa, October 1996).
  - 3 The European Union, the United Kingdom, the OECD and others all have policies that support lifelong learning through training and adult education. Human capital is defined by the OECD as "the knowledge, skills, competences [sic] and other attributes embodied in individuals that are relevant to economic activity." *Human Capital Investment: An International Comparison* (Paris: OECD, 1998), p. 9; Noah M. Meltz, *Human Capital and Infrastructure*, QPIR 1993-14 (Queen's Papers in Industrial Relations, 1993). The United States has the Technology Literacy Challenge, and the Department of Labor sponsors America's Training and Education Network (ATEN), which provides Web-based information on where companies can find training technologies. The United Kingdom has the National Grid for Learning, and Germany has the Schulen am Netz. The OECD is investigating e-learning, in the form of information and communications technology (ICT), through its "ICT and the Quality of Learning" initiatives. The U.K. enjoys the highest level of e-learning penetration in the educational system, while the U.S. has the highest spending per capita. OECD, *Education Policy Analysis*, 1999 Edition (Paris: OECD, 1999), p. 49. The 1997 OECD Council meeting at the ministerial level agreed "on the urgent need to implement effective strategies for lifelong learning for all, to strengthen the capacity of individuals to adapt and acquire new skills and competences [sic]." *Human Capital Investment*, p. 9. *Adult Education and Training in Canada* (Ottawa: Human Resources Development Canada and Statistics Canada, 1994) illustrates the "lifelong learning paradigm" through the Traditional Education and Training Model and the Modern Education and Training Model, p. 9.
  - 4 Doug Bruce and Andreea Dulipovici, *Help Wanted: Results of CFIB Surveys on the Shortage of Qualified Labour* (Ottawa: Canadian Federation of Independent Business, February 2001).
  - 5 *Performance and Potential 2000* (Ottawa: The Conference Board of Canada, 2000), p. 63.
  - 6 Bérubé et al., *Adult Education and Training in Canada*.
  - 7 Gordon Betcherman, Norm Leckie and Kathryn McMullen, *Barriers to Employer-Sponsored Training in Canada* (Ottawa: Canadian Policy Research Networks, July 1998), p. 45.
  - 8 *Ibid.*, p. 37.
  - 9 International Institute for Management Development, *World Competitiveness Yearbook* (Lausanne: June 2000), p. 481.
  - 10 Stephanie Harris-Lalonde, *Training and Development Outlook 1999* (Ottawa: The Conference Board of Canada, 1999), p. 11; Bérubé et al., *Adult Education and Training in Canada*, pp. 34 and 41.
  - 11 Philip Jennings, *Employer-Sponsored Training in Canada: Evidence from the Education and Training Survey*, W-96-E (Ottawa: Applied Research Branch, Strategic Policy, Human Resources Development Canada, June 1996).
  - 12 OECD and Statistics Canada, *Literacy in the Information Age: Final Report of the International Adult Literacy Survey*, 2000, pp. 137 and 171.
  - 13 <[www.cede.it/ricerche/progetti-descrizioni/ocse-all.htm](http://www.cede.it/ricerche/progetti-descrizioni/ocse-all.htm)>.
  - 14 *IT and the New Economy: The Impact of Information Technology on Labour Productivity and Growth* (Ottawa: The Conference Board of Canada, November 2000).
  - 15 "Workplace and Employee Survey," *The Daily*, Statistics Canada, February 19, 2001.
  - 16 Brian Guthrie, Natalie Gagnon and Andrew Shea, *Canada Wins Silver in the Race for Connectedness*, Members' Briefing 308-01 (Ottawa: The Conference Board of Canada, January 2001).
  - 17 *Ibid.*
  - 18 *Canadian Internet Commerce Statistics, Summary Sheet*, March 2, 2001, Industry Canada.
  - 19 *Ibid.*
  - 20 *Ibid.*
  - 21 *Performance and Potential 2000*, The Conference Board of Canada.
  - 22 Canadian Federation of Independent Business ([www.cfib.ca/primer/primer\\_e/sld004.htm](http://www.cfib.ca/primer/primer_e/sld004.htm)).
  - 23 One study is by Matthew Ivis: *Analysis of Barriers Impeding E-Business Adoption Among Canadian SMEs*, Canadian E-Business Opportunities Roundtable E-Business Acceleration Team, SME Adoption Initiative.
  - 24 Bruce and Dulipovici, *Help Wanted*, p. 7.
  - 25 Corinne Pohlmann, Canadian Federation of Independent Business, "Informal Offerings: Employer–Employee Relations within SMEs." Submission to the Canadian Council for Small Business and Entrepreneurship 16th Annual Conference, November 11–13, 1999 ([www.cfib.ca/research/reports/offerings.asp](http://www.cfib.ca/research/reports/offerings.asp)).
  - 26 Ivis, *Analysis of Barriers*, p. 3.
  - 27 Andrew Reddick, Christian Boucher and Manon Grosseilliers, *The Dual Digital Divide: The Information Highway in Canada* (Ottawa: The Public Interest Advocacy Centre, 2000), p. 8.
  - 28 OECD, *Education Policy Analysis*, 2001 Edition, p. 7.

## Employers Ramp Up with E-Learning

### Key Findings

- Employers are building strategies for e-learning adoption and implementation.
- Cost, time and content issues are the main barriers to adoption.
- Just-in-time learning, cost-effectiveness and increased employee control over learning are the drivers of e-learning.
- E-learning is more likely to succeed when it is used within a learning organization that already uses technology for work.

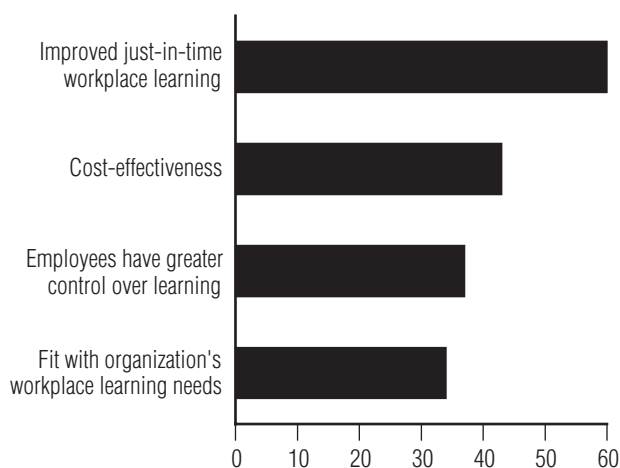
International Data Corporation (IDC) estimates the value of the Canadian e-learning market at \$250 million and predicts that it will increase at a cumulative annual growth rate of 57 per cent to \$900 million by 2004.<sup>1</sup>

Just as the Web is changing business processes such as procurement and marketing, so too is it changing the delivery of learning in the workplace. Canadian employers told the Conference Board that they are using e-learning but are doing so cautiously.<sup>2</sup> Employers identify three main reasons to use e-learning:<sup>3</sup>

1. just-in-time learning;
2. cost-effectiveness; and
3. improved employee control over learning (Chart 3).

It seems employers around the world agree. In a recent study of the 29 most advanced economies in the world, the OECD found the key benefits of e-learning to be reduced costs and increased flexibility.<sup>4</sup>

**Chart 3**  
**Top Reasons for Employers to Use Learning Technologies**  
(per cent, n=82)



Source: The Conference Board of Canada.

### Driver 1: Just-in-Time Learning

Employers emphasized just-in-time training as one of the premium value-added features of e-learning.

E-learning is flexible. Employers can integrate individual learning with organizational needs and provide employees with the knowledge and skills they need when they need them. Employees don't have to take entire courses; instead, they can receive the modules of information and learning that fit their current needs.

E-learning is especially effective at linking learning with work. Employers can design training systems that use equipment and technologies that are already part of organizational processes. In addition, e-learning allows employers to build a learning component into their employees' work. Learning "in the work" is increasingly seen as an effective and valuable way of delivering just-in-time learning. "Employer-sponsored training [linked with work] has important advantages, including financial support, accommodation of time demands, and the productivity benefits of applying training in a real work situation."<sup>5</sup>

Content design and delivery can be customized to meet learning needs immediately.<sup>6</sup> With e-learning, customization may also be easier and faster, and the quality of the content and instruction may be improved, due to increased access to experts, multiple program choices and the availability of different learning delivery methods.

In short, e-learning provides the opportunity for learning on the job what is needed, when it is needed, through the information and communications technologies that are part of the work. While providing seamless just-in-time learning "in the work" may be challenging, employers indicate that this is the most valuable feature of e-learning.

### Driver 2: Cost-Effectiveness

Cost-effectiveness was cited as another top reason to use e-learning, especially for organizations that are already using information and communications technologies in their work processes.

Significant savings stem from reduced travel expenses. Traditional classroom and off-site training involves moving people to and from the training location, as well as providing time off work. The other aspect of cost-effectiveness is the value-added realized by using ICTs for both work and learning.

Recently, the OECD suggested that while there is no evidence to prove that e-learning saves money, "if efficient exploitation of [e-learning] can be achieved, bringing in educational content, some studies show there are good opportunities for cost benefits results from a more effective delivery of education." Indeed, the OECD suggests that "more adequate levels of recurring expenditure on [e-learning] may need to go hand in hand with savings elsewhere."<sup>7</sup>

The other major cost saving is in terms of time; some have noted that more focused content reduces learning time because employees are able to focus on the knowledge they really need, when they need it. Others noted the gains in terms of improved learning outcomes and productivity, and reduced safety and compliance accidents and infringements.

### Driver 3: Employee Control over Learning

Employers are also attracted to e-learning for the increased control over learning it provides employees. Today's workplace is increasingly defined by a new employer-employee relationship. The employer provides the tools, such as e-learning, to employees. Employees, for their part, manage and develop their skills and employability and ultimately are responsible for maintaining the value they add to the company. Employers expect that employees will be responsible for their own training if they are provided with the necessary tools, support and time. Some employers felt that e-learning can provide improved access to learning opportunities and a safe, non-judgemental learning environment.

E-learning, whether it is one-way or two-way, encourages information sharing, collaboration and interaction. For example, employees can e-mail one another while participating in an on-line learning program, or listen to and see each other through live video and audio. Instructors, too, often find it easier to interact with employee-students when they are using e-learning.

E-learning solutions enable facilitators to link to participants in multiple locations simultaneously. Such decentralized training is especially valuable where operations are spread out, a common situation given Canadian

geography and a global workforce. Some researchers also argue that e-learning provides tireless delivery of training, but this claim must be viewed with caution because of the role that people (who do tire) play in training.<sup>8</sup>

E-learning can also improve employees' retention of knowledge, which benefits job performance. Some employees find they retain more because e-learning particularly suits their personal learning style. Others retain more because the learning is built into the work itself and so is obviously relevant to job performance. For them, seamless and timely learning "in the work"—learning that is directly tied to job tasks and responsibilities—stimulates them to retain more than do traditional learning processes.

E-learning can motivate employees to invest more time and energy in workplace learning. The key is that the alternative and flexible learning environments allowed by technology can reduce psychological obstacles as well as the practical difficulties of scheduling learning activities around work periods. The result is more personal commitment to and control over learning.

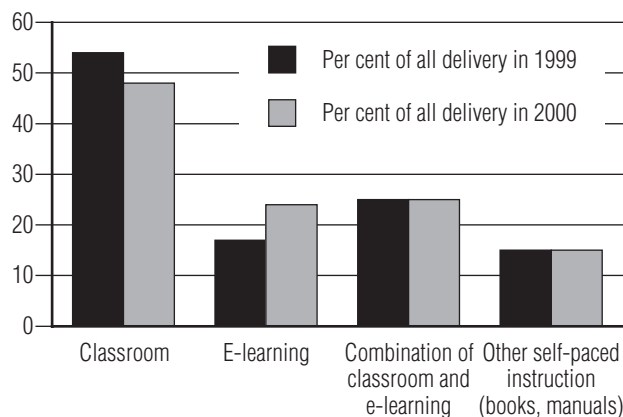
Employers, then, see just-in-time learning, cost-effectiveness and increased employee control as the main drivers for adopting e-learning.

### To What Extent Is E-Learning Used?

Employers think there are benefits to e-learning, but are they actually using it? We found that employers are increasing their use, especially of Web-based and intranet delivery methods.

Employers planned to increase their use of e-learning from 17 per cent of all learning delivery to 24 per cent (Chart 4). (The findings of a survey by the American

**Chart 4**  
**Workplace Learning by Delivery Method**  
(per cent, n=110)



Source: The Conference Board of Canada.



Society for Training & Development were very similar: learning technologies were expected to grow to 19.8 per cent of all delivery.<sup>9)</sup> Traditional methods, such as chalk-board and overhead projector, still prevail as the dominant delivery mechanism. But the slight decrease in their use, from 54 per cent to 48 per cent, is perhaps a reflection of the increase in e-learning.

The hybrid or blended approach to learning is common and will continue to be popular. Employers used a combination of e-learning and traditional learning methods for 25 per cent of all delivery. This means either that e-learning and traditional technologies are used at the same time, or that one precedes the other. Some organizations used e-learning as a means of preparing learners before a classroom session or as a means of providing ongoing support and reinforcement to classroom learning.

While the use of e-learning will increase as a proportion of training delivery, not all modes of e-learning will have the same growth rates (Chart 5). Current and planned usage trends show maturity in the use of television and video, for example, and growth in others.

Employers plan to increase their use of Web/Internet and intranet learning delivery. While 47 per cent currently use Internet/Web-based training, 82 per cent indicated that they plan to use it. Use of intranet-based training is expected to grow to 93 per cent of employers from 58 per cent. Sixty-five per cent said that they currently have intranet sites that provide workplace learning materials or on-line learning. The American Society for Training & Development projected that employers would

be using intranets for 77.1 per cent and the Internet for 61.2 per cent of learning delivery by 2001.<sup>10)</sup>

Many organizations that have invested heavily in human resource information systems (HRIS) and enterprise resource planning (ERP) systems are facing a difficult choice between using these systems, and the e-learning solutions available with them, or using a Web-enabled solution. HRIS and ERP providers are developing e-learning solutions that work with their systems and in a sense provide a linked learner management system. The choice is difficult because HRIS e-learning solutions are limited by that platform. Web-enabled systems allow broader access and distribution and have a larger market for content, technology and services.

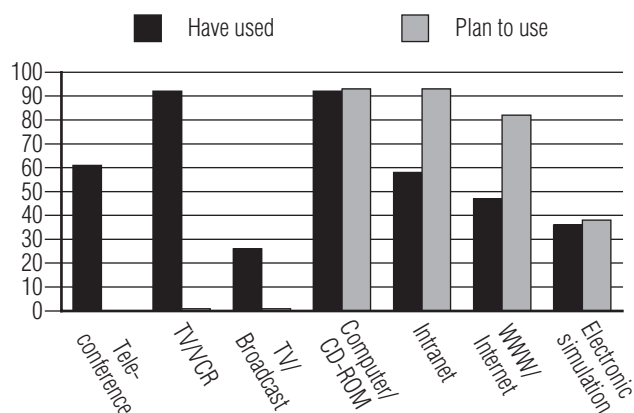
Since much of the growth in e-learning is through Internet and intranet-based technologies, the reasons cited for using these technologies are especially significant. The top three benefits of Internet/Web-based e-learning were employee control over learning, the ability to reach more employees in different locations, and just-in-time learning (Table 1). The top three benefits of intranet-

based learning were the same, but were ranked in a different order: reach to more employees in different locations, employee control over learning and just-in-time learning. These reasons, like the drivers of e-learning generally, tend to relate to access and flexibility. Internet and intranet delivery methods encourage just-in-time learning and access anywhere, 24 hours a day, seven days a week.

When broadband technology becomes more common in Canadian homes and workplaces, e-learning delivery will likely surge, especially those solutions that involve live video and audio, and multimedia applications.

Solutions range from external, off-the-shelf vendor solutions to custom solutions developed in-house.

**Chart 5**  
**Past and Planned Use of Learning Technologies**  
(per cent, n=110)



Source: The Conference Board of Canada.

### What Does E-Learning Look Like?

An e-learning solution or strategy is composed of content, technology and services. *Content* includes courses, curriculum, and knowledge or skills development modules. *Technology* is the method used to deliver the content, including the Internet and teleconferencing. *Services* relate to maintenance, content upgrades and technical upgrades to both delivery and content. Understanding these components is an important first step to understanding what e-learning is and how it is delivered, to evaluating external vendors, and to planning your e-learning strategy and interventions.

Where employers get their solutions can be viewed in terms of a continuum that ranges from external, off-the-shelf vendor solutions to custom solutions developed in-house (Exhibit 1). Survey respondents revealed an almost 50/50 split in where they got their solutions (Chart 6).

**Table 1**  
**Top Three Benefits by Type of Learning Technology**

	<b>Type of Learning Technology</b>						
	<b>Internet/Web</b>	<b>Intranet</b>	<b>Computer/ CD-ROM</b>	<b>Electronic simulation</b>	<b>Teleconference</b>	<b>Television/ broadcast</b>	<b>Television/ videotape</b>
<b>1.</b>	Employee control of learning	Can reach more employees in different locations	Employee control of learning	Good learning retention	Can reach more employees in different locations	Can reach more employees in different locations	Easy to implement
<b>2.</b>	Can reach more employees in different locations	Employee control of learning	Consistent delivery	Just-in-time learning	Consistent delivery	Consistent delivery	Consistent delivery
<b>3.</b>	Just-in-time learning	Just-in-time learning	Just-in-time learning	Consistent delivery	Affordability	Compatible with existing technologies	Affordability

Source: The Conference Board of Canada.

However, this split will probably become more uneven as employers become more knowledgeable about and comfortable with content, technology and service options.

Organizations will have to make a decision as to whether they want to develop and maintain the capacity in-house to design and build e-learning solutions. Some employers will choose to use external technology and services and build the content internally. Many employers will employ vendors for non-proprietary content such as sales and soft skills, and create proprietary content in-house. Others will purchase entire e-learning solutions externally, especially when there are many vendors on the market. (In that case, market research is key: picking a vendor that will survive consolidation in the e-learning market is a critical component of vendor selection.) The main trend will be toward an approach that blends in-house and external suppliers for the provision of content, technology and services.<sup>11</sup>

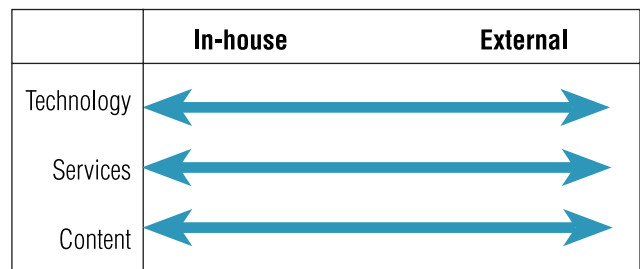
### Barriers

Given the potential benefits of e-learning, how can employers best take advantage of opportunities for themselves and their employees? What challenges will they need to overcome?<sup>12</sup>

Employers often resist providing workplace learning opportunities to employees because they fear that employees will leave or be “poached” by other employers. But human capital theorists argue that most employer-provided training is job-specific and non-transferable. Research shows that other training barriers, including cost, limited resources and lost time, are more significant than fears of labour mobility or poaching.<sup>13</sup>

What barriers are slowing adoption of e-learning? Cost and time were the main barriers to both start-up and

**Exhibit 1**  
**E-Learning Solutions Continuum**



Source: The Conference Board of Canada.

implementation, while content was more critical in the initial development stages (Table 2).

### Cost

The cost of developing and purchasing e-learning initially, and then the ongoing cost once an e-learning intervention is underway, were the top barriers identified by employers.

Money issues pose a fundamental challenge to implementing e-learning solutions. Technology has a reputation for being expensive and unpredictable. While e-learning might be a cost-effective solution, the common worry is that it will be more costly than traditional training solutions, especially in the early implementation stages when efficiencies and benefits to productivity have not yet been realized. Cost is frequently named in the literature as a major barrier to e-learning.<sup>14</sup>

Percent of total expenditures in 1998:

- on learning technologies—4 per cent;
- on other training—14 per cent.<sup>15</sup>

In addition, the financial benefits of e-learning may be reduced by the high costs of some technologies and by poor planning and implementation. As well, travel and accommodation savings are usually accrued only in the first year, because they are not budgeted for in successive years.

E-learning, like any business innovation, requires research, planning, support through communications and adequate time for adoption. The benefits of improved productivity, decreased error rates and lower accident rates must also be factored against cost.

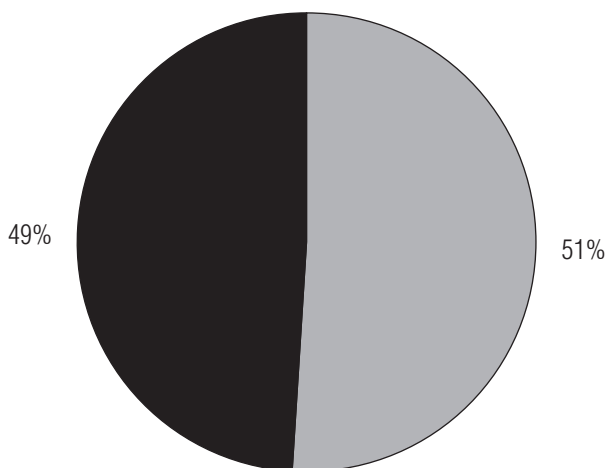
### Time

Our research revealed that time is also a barrier with e-learning. The second and third top barriers to implementing e-learning related to time. First, employees don't have enough time specifically devoted to workplace learning, a problem that would hinder even the best e-learning or traditional delivery model. Second, there was inadequate time to develop and maintain e-learning.

The Adult Education and Training Survey (AETS) also found that lack of time was an important challenge for those with training needs, preventing almost half the survey respondents from taking part in training. The AETS

**Chart 6**  
**Where Employers Get Their E-Learning Solution**  
(n=111)

- Off-the-shelf solution (modified in-house if necessary)
- Custom solution developed in-house



Source: The Conference Board of Canada.

**Table 2**  
**Barriers to Starting and Implementing E-Learning**

Top Three Starting Barriers	Top Three Implementing Barriers
1. Cost of developing and purchasing learning technologies	1. Cost of learning technologies
2. Time required to develop learning technology programs	2. Lack of devoted workplace learning time
3. Lack of appropriate learning content available in learning technology formats	3. Time required to develop learning technology programs

Source: The Conference Board of Canada.

found that of those employees who couldn't participate in training, 55 per cent were too busy, and 29 per cent found the timing or location inconvenient.<sup>16</sup> The AETS noted that employer support is crucial and recommended that employers allow more time for employee learning. "Time compression," according to the report authors, "rather than price resistance, is a major constraint." In light of this, instruction must be more flexible so that learning can fit more seamlessly with other activities. E-learning, due to just-in-time delivery, may be one answer to the problem of getting enough time to learn.

### Content

Employers ranked the lack of appropriate content as another top barrier to starting e-learning.

Employers either couldn't find the content they needed on the market, or had the content but found it was designed for traditional methods of delivery. "Repurposing"—or reusing content—is one of the fundamental issues in e-learning. Employers have content from traditional methods but don't know whether it can be used, or how best to use it.

In addition to the problem of repurposing content is the difficulty of finding content related to specific proprietary or product-related needs, regulatory or compliance needs or needs specific to the Canadian market, such as language. Employers noted that they often had to alter purchased content to fit their requirements.

Organizations that want to get into e-learning have to address these barriers first, especially time and cost issues. But there are other barriers that deserve attention, too. Although they did not emerge as the top barriers in our survey, they are important considerations to any e-learning solution.

## Technological and Systemic Limitations

Organizations fight a constant uphill battle to use information and communications technologies most effectively for their business processes, and many see e-learning as posing unwanted technological demands on their already stressed systems. The issues include software and hardware compatibility and low bandwidth.<sup>17</sup>

Cost and time  
were the main  
barriers to both  
start-up and  
implementation.

Organizations need to integrate e-learning with their current systems and so must keep in mind software and hardware compatibilities and capabilities. When turnkey, off-the-shelf e-learning systems are used, organizations not only have to ensure that they have the

technological capacity to run them, they also have to iron out licensing agreements, train staff on how to use them, and customize them where necessary. As well, much e-learning software, like off-the-shelf software in general, has a short life cycle that requires continuous upgrade or replacement. Proprietary systems, on the other hand, are customized to in-house needs and are often more robust, but they are more difficult to price and can run into unforeseen delays.

Organizations may also view e-learning as an unnecessary load on current ICT capacity. Learning technologies may be prone to system crashes; and, for networked learning, low bandwidth and “brownouts” are a possibility—systems slow down and don’t have the capacity to deliver some e-learning solutions.

Another challenge is the issue of technical support, especially for proprietary e-learning. If there is a problem, employers want to know that they can obtain help, and some suppliers may not offer any technical support to users. This frightens some employers away from using e-learning as a training solution.

### E-Learning Too Difficult to Use

Some employees don’t know how to use personal computers or do not yet enjoy access to one. As the Conference Board notes, “the higher the level of technology used, the more skilled the employee needs to be in order to access the training.” This may be a barrier to training to “employees in lower paid, lower skilled occupations who may have less know-how to access training via e-learning.”<sup>18</sup> Without appropriate e-literacy and computer skills programs, these employees will remain on the far side of the digital divide.

The design of e-learning can also be a barrier to employee use. If an e-learning solution is too complex in design, requiring relatively advanced technical knowledge to operate it, or relatively advanced language and number skills to understand directions or complete learning activities, it won’t work.

One of the most important cultural characteristics of an organization is its general ability to utilize technology. One analyst labels the degree of sophistication of an organization’s technical capacity, and the application of this to training, as *organizational technology capability*.<sup>19</sup> As organizations become more sophisticated, they move from offering disorganized, sporadic training to developing policies for using e-learning, to institutionalizing their policies through action. E-literacy programs to develop the ability of employees to use information and communications technologies and to learn through them are a key means of improving access and learning.

### Outcomes Not Evaluated

E-learning may enable highly effective training and skills development, but if the learning gains go unmeasured, employers and employees will be less inclined to participate or to believe that e-learning works. Measuring the effectiveness of e-learning can be difficult, but it is a design challenge shared by other types of training and workplace strategies.

### Resistance to Change

While cost, time, content, technology, access and design barriers can hobble an e-learning solution before it begins, internal resistance within the organization can impede solutions that get past these hurdles. An American Society for Training & Development survey found that 82 per cent of chief executives and 92 per cent of human resource executives

Internal resistance within organizations can stop e-learning solutions.

agreed that investing in e-learning was important, but only 26 per cent of the former thought it was very important, as opposed to 70 per cent of the latter.<sup>20</sup>

Resistance from managers is a critical barrier to successfully implementing e-learning. No matter how well planned and well aligned an e-learning solution may be, if managers resist it, it is likely to fail. Managers may resist e-learning if they feel it creates more problems than it is designed to remedy or if they simply don’t know how to use it.<sup>21</sup> Often,

employees will not feel comfortable using something their managers disapprove of.

A further issue that hinders organizations is what the Rand Corporation calls the “Rand rule.” It argues that if a technology is used to transform learning processes and products, 75 per cent of the total time doing so will be spent attending to non-technical, often complex and frequently invisible changes in institutional practice and structure.<sup>22</sup>

### **Lack of Planning**

A lack of alignment between the human resources and training staff and the technical and information technology staff can also hinder e-learning. A successful e-learning solution relies on strong ties with the IT function.<sup>23</sup> If these organizational functions are not working in tandem, the e-learning solution can become mired in confusion, delays and breakdowns.

A lack of strategic planning and direction results in questioning of the value of e-learning to the organization and non-alignment with the organization’s goals. Organizations that do not assess their strategic training needs before implementing e-learning solutions are not well equipped to derive the most value from these solutions, and fail to achieve training outcomes that fit both employees and the firm.<sup>24</sup> As one AT&T manager noted about using networked e-learning, “This may be the first real technology that encourages true organizational learning. It opens a business and creates a knowledge-sharing, rather than a knowledge-hoarding culture. There is resistance, as there would be for anything new, but it will fade over time.”<sup>25</sup>

### **Lack of Communication**

Poor communication of the e-learning solution to managers and employees will also throw the best planning off track and create confusion. Managers and employees must clearly understand how to use e-learning, why it is being used and how it fits with the organization’s strategy and operations.

### **Lack of Leadership**

A lack of leadership, especially from senior staff, can also present a barrier to using e-learning effectively. If there is no e-learning champion or leader, other initiatives will gain more attention and be more successful. Executive championing and expectations of implementation will demonstrate the importance of e-learning to the organization.

### **Learner Resistance**

Finally, adult employees may resist learning anything new or using new methods, and may view e-learning as a threat to their jobs or knowledge base.

Resistance to learning can result from a conflict between the learner and trainer, or from a fear of failure. Learners may simply be resisting possible inconvenience or alteration of their jobs.<sup>26</sup> Employees may view e-learning with suspicion because they haven’t been given adequate information about what is being taught and why they should learn it.

A University of British Columbia study found some resistance to e-learning, specifically telelearning.<sup>27</sup> The participants found that the time commitment was extensive and learning inhibited by having to post their comments to a listserv. They were afraid of having their comments scrutinized and appearing unintelligent. They were also afraid of being misunderstood because of the lack of face-to-face interaction. However, a Conference Board survey of employees found little resistance to e-learning (see the next chapter for details).

Training and HR staff need help to adjust to this new method of training delivery.

### **Solutions for Employers**

The evidence shows that employers recognize the benefits of e-learning, but they also recognize the barriers. So what would help employers’ e-learning efforts the most?

Given that employers listed cost as the top barrier, it follows that the top two most helpful factors they identified also relate to cost (Chart 7). More funds within organizations was rated the top most helpful factor to e-learning, while cost-effectiveness was rated second most helpful.

And since time was a primary barrier to e-learning, it makes sense that employers rated having more time as the third most helpful factor. Considering the technology-intensive nature of e-learning, it is interesting that the five bottom most helpful factors to using e-learning relate to technology.

### **Organizational Response**

How are organizations handling e-learning? What are they doing to ensure success? The response involves having the appropriate staff and skills to understand, build and manage an e-learning strategy and then ensuring that e-learning is tracked, recognized and rewarded.

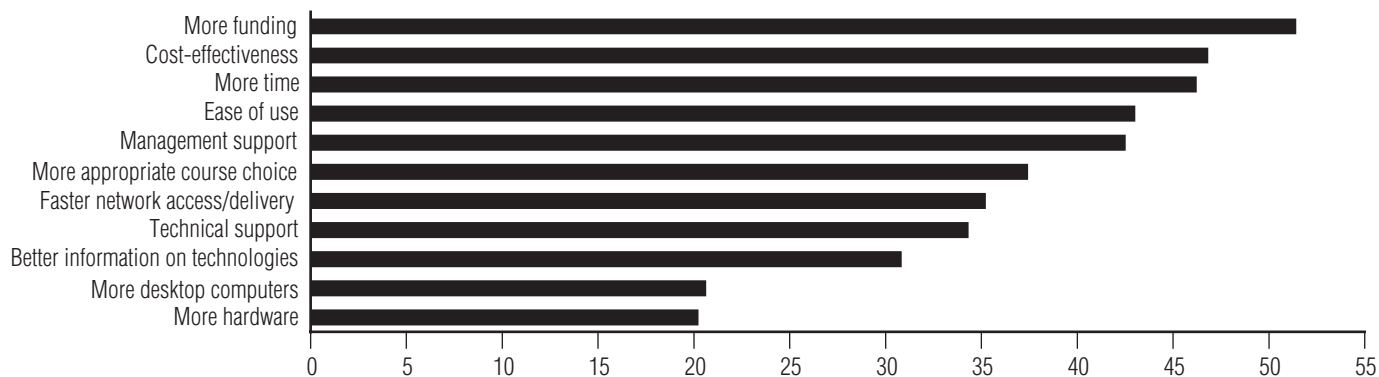
Employers will have to help their training and human resources staff adjust to this new method of learning delivery. While 23 per cent of employers said that their HR professionals and trainers are sometimes resistant to



**Chart 7**

**What Would Most Help Employers Use E-Learning**

(per cent, n=107)



Source: The Conference Board of Canada.

e-learning, 71 per cent said they were not resistant. This suggests a strong level of support for e-learning and perhaps a pool of talent for getting e-learning underway.

Employers indicated that most of their training staff have some ability with e-learning: 50 per cent of employers said yes, 39 per cent said sometimes and only 4 per cent said no. Despite the confidence of employers in their staff's ability, 76 per cent of employers think that their training staff needs help with computer, software and technical e-learning knowledge (Table 3).

The specific demands of e-learning delivery require distinctive competencies on the part of the organization. Individuals with knowledge of instructional design, technology, human resources and adult education—combined with an understanding of business needs—are in high demand. Organizations find the market competitive for e-learning experts. By outsourcing certain aspects of delivery, or developing partnerships or teams, organizations can gain the competencies they need.

**Table 3**  
**Skills Human Resource Staff and Trainers Need for E-Learning**

(n=85)

Skill	Per cent
Computer, software and technical knowledge .....	76
Content management knowledge and skills .....	62
Facilitation skills .....	54
Knowledge of employee skills and knowledge needs.....	51

Source: The Conference Board of Canada.

**Measurement**

In addition to ensuring that human resources and training staff have the skills they need to support e-learning, employers are also making some effort to measure learning outcomes. Measurement is critical to e-learning's success. It will provide data to demonstrate the value of e-learning and indicate the direction for continuous improvement.

Linking learning interventions with improved levels of customer service, for example, can provide evidence of the value of e-learning. Proof of return on investment (ROI) and a sound business case are the key needs for organizations that want to use e-learning. Proving its value and determining the best fit and best technologies require convincing numbers. There is a need to research effective ROI methodologies for e-learning and perhaps link these with other business measures in a balanced scorecard format.

Employers surveyed use a variety of measures within their e-learning solutions. Of the 38 per cent of employers who measure e-learning outcomes, 96 per cent measure employee satisfaction, 84 per cent measure employee learning retention, and 63 per cent measure employee behaviour change. Seventy-three per cent of employers were very confident or confident in the evaluation information, and 27 per cent were not. Forty-six per cent tie these evaluations into long-term planning.

**Incentives**

Finally, employers may have the e-learning systems and employees may be using them, but how are those employees rewarded? Incentives encourage adoption and signal the importance of e-learning to employees. Fifty-four per cent of employers said they reward employees for

workplace education, with 40 per cent rewarded through certification and 40 per cent rewarded through increased responsibility.

One key incentive and a critical component of e-learning is accreditation. Employees want their learning recognized, and e-learning can provide a record of successful learning by employees. Tracked through a learning management system, successfully completed learning modules can be used to certify employees in specific skills.

### A New Paradigm?

Employers are especially excited about the value and potential of e-learning for just-in-time modular learning. Now, more than ever, e-learning, by leveraging workplace technologies, is bridging the gap that has separated learning from work. Workers will be able to integrate learning into work more effectively because they will use the same tools and technology for learning as they use for work.

The use of e-learning is considered by some to represent a new paradigm in how knowledge is acquired and human capital is developed.<sup>28</sup> Employers are in business to generate profits and to compete; skilled employees are key to this. Canadian employers can lead this shift in how employees learn and ultimately contribute to profits and productivity.

Organizations are still developing their capacity to use and manage e-learning effectively. While this process will involve overcoming barriers of cost and time, much of it will involve education about what e-learning is and how it works. This will affect human resource and training staffs, managers and employees.

The benefits of just-in-time learning, cost-effectiveness and improved employee control can be realized by organizations that give e-learning a try. Although the barriers are real, there is a set of critical success factors (see box) and solutions that can help employers get over these barriers. Chapter 4 will outline an e-learning planning process that can provide these solutions.

### ***Critical Success Factors for E-Learning Organizations***

E-learning organizations are ultimately learning organizations. Employers are finding ways to overcome the e-learning barriers, and our research determined the following success factors:

- Building on an organizational learning culture
- Doing extensive research and planning
- Partnering with other businesses and educators to save money and time and to share expertise
- Starting small and testing before scaling e-learning to a broader audience
- Developing e-learning solutions for mandatory workplace learning such as for safety and regulatory compliance
- Aligning e-learning solutions with core business processes and learning competencies
- Leveraging existing workplace information and communications technologies that employees are familiar with and use on a regular basis
- Sourcing non-proprietary content externally, such as communications and technical skills
- Involving employees in proprietary or process-specific content development
- Encouraging teamwork and communication from the beginning between information technology and human resources
- Training trainers and managers in how to use e-learning and support employees
- Ensuring clear communication of and support for the value and role of e-learning to the individual employee by senior and middle managers
- Integrating e-learning with knowledge management, performance management and communication systems
- Providing time to learn at work, during work, and viewing this as a necessity

- 
- 1 IDC Canada, 2001.
  - 2 The employer respondents were mainly human resources and training professionals and managers with Canadian organizations. The results are an aggregate of organizations with a mean size of 600 employees. The sample of 830 organizations was pulled from a universe consisting of 6,827 Canadian organizations of 100 employees or more proportionally representing Canada's population. The following sectors were represented in the universe: forestry; mining; utilities; primary metal industries; fabricated metal products; chemicals; manufacturing; machinery and electrical equipment manufacturing; perishable and non-perishable consumer goods; construction; trade contracting; retail trade; transportation and warehousing; entertainment; publishing, information and cultural industries; finance and insurance; professional, scientific and technical services; management of companies and enterprises; educational services; information technology; computer hardware and software development and consulting; health care; pharmaceuticals and biotechnology; accommodation and food services; and public administration. Members of The Conference Board of Canada were included in the universe. Results could not be disaggregated on the basis of organizational size or sector. Ninety-three per cent of the respondents provide structured training. Responding organizations spent an average of 3 per cent of their budgets on organizational learning and training.
  - 3 Respondents were asked to rank the top three reasons their organization uses e-learning; they could use the list of reasons provided or create their own list.
  - 4 OECD, *Education Policy Analysis*, 1999 Edition, p. 25.
  - 5 Betcherman et al., *Barriers*, p. 60.
  - 6 Donna Abernathy, "A Start-up Guide to Distance Learning," *T+D Magazine*, December 1997, pp. 39-47.
  - 7 OECD, *Education Policy Analysis*, 1999 Edition, p. 61.
  - 8 Laurie J. Bassi, Scott Cheney and Mark Van Buren, "Training Industry Trends 1997," *T+D Magazine*, November 1997.
  - 9 Daniel P. McMurrer, Mark E. Van Buren and William H. Woodwell, Jr., *The 2000 ASTD State of the Industry Report* (Alexandria, Virginia: American Society for Training & Development), p. 15.
  - 10 *Ibid.*, p. 43.
  - 11 Documents that provide useful background on industry trends and suppliers include: Brian W. Rutenbur, Ginger Spickler and Sebastien Lurie, *E-Learning: The Engine of the Knowledge Economy* (New York: Morgan Keegan and Company, Inc. 2000); Michael T. Moe and Henry Blodget, *The Knowledge Web* (New York: Merrill Lynch & Co., 2000); *Internet: E-Learning, United States* (New York: Goldman Sachs, 2000); John P. Dalton et al., *Online Training Needs a New Course* (Cambridge: Forrester, 2000); Trace A. Urdan and Cornelia C. Weggen, *Corporate E-Learning: Exploring a New Frontier* (San Francisco: W.R. Hambrecht, 2000); Richard C. Closs, Rob Humphreys and Brian W. Rutenbur, *E-Learning and Knowledge Technology: Technology and the Internet Are Changing the Way We Learn* (Sun Trust Equitable Securities, 2000).
  - 12 Betcherman et al., *Barriers*, p. 2. The Canadian Policy Research Networks' analysis of barriers to employer-sponsored training in Canada categorizes the disincentives as externalities, information barriers, employee-based obstacles and a miscellaneous group. For an overview of the barriers and solutions cited in e-learning literature, see Debbie Murray and Michael Bloom, *Solutions for Employers: Knowledge Review Report* (Ottawa: The Conference Board of Canada, March 2000) <[www.conferenceboard.ca/nbec/pdf/solutions1.pdf](http://www.conferenceboard.ca/nbec/pdf/solutions1.pdf)>.
  - 13 Betcherman et al., *Barriers*, p. 5.
  - 14 Mark Van Buren, *Mainstreaming Learning Technologies*, American Society for Training & Development ([www.astd.org/CMS/templates/template\\_1.html?articleid=11599](http://www.astd.org/CMS/templates/template_1.html?articleid=11599)); Judith O. Wagner, "The World Wide Web and Vocational Education," *ERIC Digest*, 1997 (<http://ericacve.org/docgen.asp?tbl=digests&ID=39>).
  - 15 McMurrer, Van Buren and Woodwell, *The 2000 ASTD State of the Industry Report*, p. 39.
  - 16 Bérubé et al., *Adult Education and Training Survey*, p. 90.
  - 17 Judith Wagner (see note 14) argues that the barriers are limited bandwidth, a shortage of up-to-date equipment, the newness of authoring systems, unreliable links and a lack of Internet skills.
  - 18 Harris-Lalonde, *Training and Development Outlook 1999*, p. 2.
  - 19 Deborah Schreiber, "Organizational Technology and Its Impact on Distance Training," in *Distance Training: How Innovative Organizations Are Using Technology to Maximize Learning and Meet Business Objectives*, Deborah A. Schreiber and Zane L. Berge, eds. (San Francisco: Jossey-Bass Publishers, 1998), p. 12.
  - 20 Van Buren, *Mainstreaming Learning Technologies*, ASTD.
  - 21 Jean-Pascal Souque, *Focus on Competencies: Training and Development Practices, Expenditures and Trends*, Report 177-96 (Ottawa: The Conference Board of Canada, 1996).
  - 22 David J. McArthur and Matthew W. Lewis, *Untangling the Web: Applications of the Internet and Other Information Technologies to Higher Learning* (Santa Monica: Rand Corporation, 1998), p. 37.
  - 23 Tom Barron, "APQC Study: Technology-Based Training Pays Off" ([www.astd.org](http://www.astd.org)).
  - 24 Van Buren, *Mainstreaming Learning Technologies*, ASTD.
  - 25 Sacha Cohen, "Knowledge Management's Killer App," *T+D Magazine*, vol. 52, no. 1 (January 1998), p. 50.
  - 26 Elliott Masie, "Seizing Your Intranet," *T+D Magazine*, vol. 51, no. 2 (February 1997), p. 41.
  - 27 Silvia Bartolic-Zlomislic, "The Costs & Benefits of Telelearning: Two Case Studies," *Distance Education and Technology* (Vancouver: The University of British Columbia, 1998), p. 23.
  - 28 Bassi, Cheney and Van Buren, "Training Industry Trends 1997." See also Richard Koonce, "Where Technology and Training Meet," American Society for Training & Development ([www.astd.org](http://www.astd.org)); Alexander J. Romiszowski, "What Works; What Makes Sense? New Technologies for Human Resource Development" ([www.TechKnowLogia.org](http://www.TechKnowLogia.org)), September/October, 1999.



## Employees Eager to E-Learn

### Key Findings

- E-learning gives employees more control over their personal and professional development.
- E-learning makes employees more confident and more productive.
- E-learning is providing learning that would not otherwise occur.
- Lack of time to learn and lack of recognition and reward for learning are disincentives.
- Relevant content and access are key.

Employees share the same views of e-learning as their employers. They value the flexibility, the increased control and the opportunity to develop themselves and increase their value to the organization that e-learning can provide. Employees understand the value of e-learning for personal and professional growth. The Conference Board survey of employees (Table 4) found them eager to use e-learning.<sup>1</sup>

**Table 4**  
**Employee Respondents' Profile**  
(n=91)

Position	Per cent
Clerical .....	8.8
Production, manufacturing .....	4.4
Technical, support, programming, business systems .....	9.9
Analyst, professional.....	8.8
Human resources, accounting .....	33.0
Communications, marketing, sales .....	5.5
Management .....	11.0
Other, no response .....	18.7
<b>Education level</b>	
Completed secondary school .....	13.2
Some post-secondary education.....	18.7
Trade certificate .....	4.4
College diploma .....	13.2
University degree .....	36.3
Master's degree.....	11.0
No response .....	3.3
<b>Gender</b>	
Male .....	38.6
Female .....	61.4

Source: The Conference Board of Canada.

Employee interest in e-learning is not surprising given the high incidence in Canada of employee-paid education and training.<sup>2</sup> Employees have a predisposition to learn workplace skills and will take responsibility for their own learning, a strong indicator of positive response to employer-supported learning.

With employees willing to learn, employers can feel confident about the payoff from their e-learning investment. Table 5 shows the types and levels of employer support for employee training and how employers are promoting employee goodwill.

### Benefits

Employees value the e-learning experience for three main reasons (Table 6). E-learning offers:

- flexibility—it can be used any time;
- relevant learning; and
- control over learning.

Seventy-three per cent of employees liked the convenience of e-learning and the fact that learning technologies can be used any time. Learning technologies offer employees autonomy over their professional development, learning and skills development.<sup>3</sup> Employees can fit training into

**Table 5**  
**Level of Employer Support for Workplace Learning**

Type of employer support	Per cent
Course paid for entirely by employer (n=87) .....	97
Course paid for in part by employer (n=90).....	33
Equipment, software or materials paid for entirely (n=90) .....	58
Equipment, software or materials paid for in part (n=90).....	17
Paid time off (n=90).....	66
Unpaid time off (n=90).....	26

Source: The Conference Board of Canada.

**Table 6**  
**Top Three E-Learning Benefits as Ranked by Employers and Employees**

Employers	Employees
1. Just-in-time learning	1. Can be used any time
2. Cost-effectiveness	2. Relevant learning
3. Improved employee control over learning	3. Control over learning

Source: The Conference Board of Canada.

their work schedules, determine the pace of their learning and spend time clarifying knowledge and skill areas without being bound to a group.

Two-thirds of employees highly value the relevance of e-learning and the control over learning it gives them (Table 7). Learning technologies allow employees to focus on content to match their individual learning needs. They can shape and choose the content they need to do their job better and decide how much time to spend on each component. Within integrated ICT, training and HR systems, such as a learning management system, successfully completed training modules can be tracked and linked with performance reviews, providing further incentive for employee training.

Almost all the employee respondents said that the most important outcome of e-learning was personal development (Table 8). E-learning may encourage learning by

Employees can focus on content that matches their learning needs when they need it.

reducing exposure and embarrassment over the pace or success of learning, with the ultimate reward of improved employee self-confidence.<sup>4</sup> E-learning can provide a sense of autonomy and independence to learners, and reassure those who do not want to admit a lack of knowledge that they can acquire it in a discreet manner.

E-learning, especially “in the work,” can heighten the capacity of employees to use technologies for job tasks. As they become more comfortable with using learning technologies, employees gain expertise and confidence in using technology in general. In other words, their e-literacy, and their ability to understand and use information and communications technologies to perform their jobs, is improved.

E-learning also increases productivity. Employees who have the skills to do their job properly will improve their performance. Indeed, employees who responded to our survey said that e-learning increased their productivity. Skills acquired through e-learning can also yield significant increases in pay. Research has confirmed “wage gains...in the order of 10 per cent” for those with improved training.<sup>5</sup>

More than 8 in 10 respondents noted that e-learning provided workplace learning they would not otherwise receive. This suggests that e-learning is filling a void that employers were not filling and may even have been unaware of.

Employees also have a high level of confidence in the value of e-learning. Four out of five employees think e-learning is an effective way for them to gain skills to do a better job, and three out of four said they would learn more if they could use e-learning more often. Eighty-eight per cent said that what they learned through e-learning is directly applicable to their job.

A key value of e-learning is that it can be delivered in ways that meet some learning needs better than traditional delivery methods (see Table 9). For learners who prefer to learn on their own, for example, e-learning can provide individual, self-directed learning. For those who prefer to learn with others, it can provide group-based learning on a synchronous basis. As Chart 8 shows, the range of delivery methods varies in the same way that learning preferences vary. Blended learning solutions enable employees to reap the benefits of various delivery methods for different types of learning.

A related issue is that employees, like employers, still prefer a hybrid

**Table 7**  
**Employees Rate Learning with Learning Technologies**  
(per cent)

n	“Learning technologies. . .”	Yes	No	Sometimes
58	Give me control over learning	66	0	35
59	Are easy to use	46	3	51
59	Are convenient	73	0	27
59	Are supported by management	64	5	31
59	Encourage learning in groups	20	49	31
59	Can be used any time	73	5	22
57	Provide me with relevant learning	68	0	32
58	Are an effective way to learn workplace knowledge and skills	62	2	36
59	Are the best way to learn	12	7	81

Source: The Conference Board of Canada.

delivery method combining traditional learning and e-learning.<sup>6</sup> The trend toward blended delivery is thus being fed by employee support. Two of the top three learning delivery methods preferred by employees were e-learning methods.<sup>7</sup>

The implication for employers is that they will gain the most value for their investment by providing e-learning options that cater to their employees' preferences for a combination of learning delivery methods.

### Barriers

Employees want to perform better and view e-learning as a way to do so. However, many still feel unable to use e-learning at work to improve their skills and performance. Employees ranked lack of relevant content, time, and no improvement to job performance as the top barriers to e-learning (Table 10).

Employees noted that they would use e-learning more if content were relevant; indeed, this was the strongest barrier employees mentioned. Employees want to engage in learning that matters and is related to their work (see Table 11). They want to know that the learning will improve their performance. Their frustration echoed the frustration of employers with finding appropriate learning content. Both groups agreed that content is more of a problem than technology or access.

No matter how relevant the content, if employees don't have the time, they won't be able to use e-learning or any other form of learning delivery. Employees stated that the second major barrier was not having enough time to use e-learning.

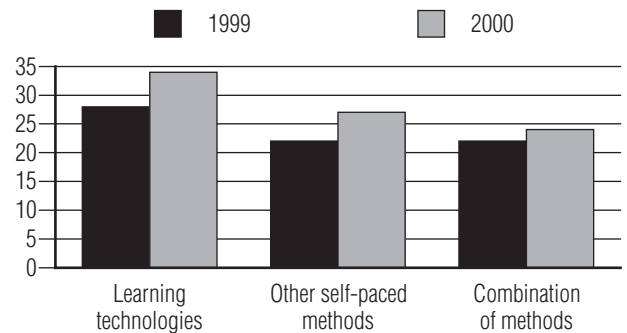
The third top barrier to employee use of e-learning is a perception that these technologies don't improve job performance. This notion may be due not so much to the actual e-learning solution as to a poor relationship

**Table 8**  
**Employees Explain How Learning Technologies Worked for Them**  
(per cent)

n	"Learning/training through learning technologies. . ."	Yes	No
57	Increased my job responsibilities	47	53
56	Contributed to a promotion	18	82
57	Increased my pay	16	84
57	Increased my productivity	83	18
55	Improved my job performance	82	18
57	Contributed to my personal development	98	2
54	Helped me keep my job/improved job security	37	63
58	Provided workplace learning I would not otherwise receive	83	17

Source: The Conference Board of Canada.

**Chart 8**  
**Learning Delivery Method as a Proportion of Employee Learning**  
(per cent)



Source: The Conference Board of Canada.

**Table 9**  
**Employees Compare Their Experiences with Learning Technologies and Classroom-Based Learning**  
(on scale of 1 to 10, from "no preference" to "highly prefer")

	n	Mean	Median	Mode
How <i>much</i> workplace learning needs were met by using learning technologies	58	5.4	5	5
How <i>much</i> workplace learning needs were met by using classroom methods	59	6.75	7	8
How <i>easily</i> employees met workplace learning needs through learning technologies	58	6.16	6	6
How <i>easily</i> employees met workplace learning needs through classroom methods	60	6.73	7	7
How well employees <i>retained</i> what they learned through learning technologies	58	6.69	7	8
How well employees <i>retained</i> what they learned through classroom methods	59	6.92	7	7

Source: The Conference Board of Canada.

### **Employees' Experience with Workplace Education and E-Learning**

- Ninety-six per cent of employee respondents said that their employers provided workplace learning opportunities.
- Sixty-five per cent had taken employer-supplied e-learning in the past.
- Twenty-eight per cent were using e-learning for workplace learning. For many workers this is an extension of the fact that most employees must use information and communications technologies for their job.
- Ninety-eight per cent said that they always or sometimes learn new things on the job.
- Fifty-four per cent said that their work is sometimes standard and routine, while 42 per cent said theirs never was.
- Eighty per cent were taking an on-site course paid for by their employer.
- Sixty-nine per cent were taking an off-site course paid for by their employer.
- Employees indicated that employers supported their workplace learning by paying costs such as course registration, equipment or time off work for learning.

Source: The Conference Board of Canada.

**Table 10**  
**Employee-Ranked Barriers to E-Learning**

<b>Barrier</b>	<b>Per cent</b>
Relevant content (n=57).....	95
Time (n=56).....	88
Didn't improve job performance (56).....	60

Source: The Conference Board of Canada.

**Table 11**  
**Content Employees Learned Through Learning Technologies**

<b>Content</b>	<b>Per cent</b>
New technology .....	82.3
Software training.....	57.1
Technical skills .....	25.3
Corporate orientation .....	17.6
Health and safety .....	16.5
Basic skills .....	14.4
Customer service training.....	8.9
Teamwork/problem solving.....	14.3
Management skills .....	13.2
Communication skills .....	12.1
New products .....	11.0
Marketing/sales .....	4.4
Language skills.....	3.3
Apprenticeship training.....	1.1

Source: The Conference Board of Canada.

between the content and the work. The explanation may also be poorly designed e-learning solutions or poor support. Whatever the explanation, this perception could encourage resistance to e-learning, which would further reduce return on the employer's e-learning investment.

Employees also want recognition and reward for their efforts. While they are motivated by a desire for personal development, they also want to know that their efforts are noticed and appreciated by their employers. Yet there is a gap here. Forty per cent of survey respondents did not receive recognition or reward for training through e-learning. Of those who did, increased job responsibility was the most frequent type (Table 12). Employers should be aware that reward and recognition are critical ways of reinforcing the importance of e-learning and lifelong learning and of motivating employees to continue learning.

### **Solutions for Employees**

What would most help employees start or increase their use of e-learning? Employees said employer support by paying the costs of e-learning would be very helpful (Chart 9). The second most helpful assistance was off-site accessibility of e-learning. Tied for third were the usefulness of the knowledge and skills learned and the use of a combined approach of e-learning and traditional methods.

There is a logical consistency between the top-ranked barriers and the solutions. Where content and no improved job performance from e-learning were rated as top barriers, increasing the usefulness of the knowledge was the preferred solution; and where time was a barrier, having more time was the solution. Employees want relevant content that will help them perform better. They also want their employers to support and recognize their efforts.

Despite their participation in training—both traditional and e-learning based—respondents were not completely satisfied. Only 64 per cent of employees got the level of workplace learning they felt they needed to do their job

**Table 12**  
**How Employees Were Recognized for Learning**

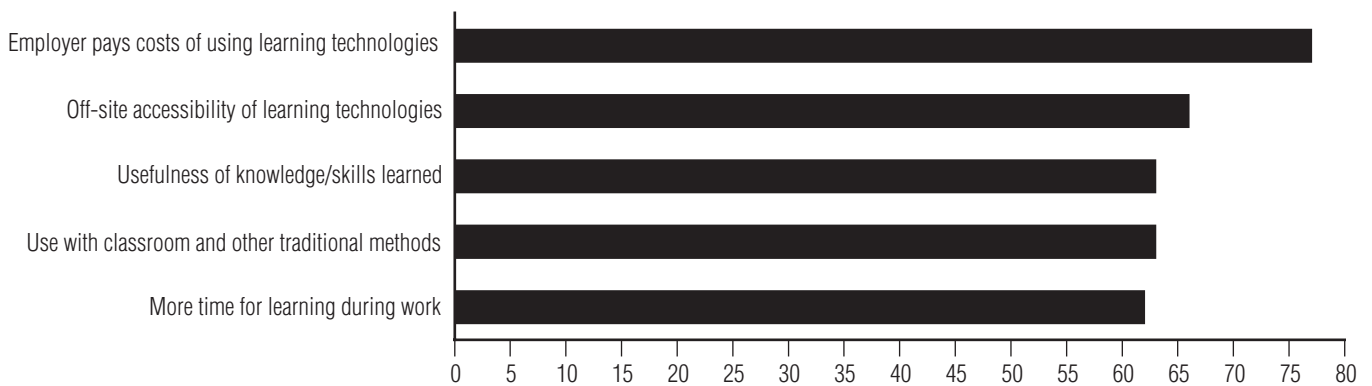
	Per cent
Increased responsibility .....	42
Pay increase/bonus .....	20
Certification .....	20
Job security .....	19
Promotion .....	15

Source: The Conference Board of Canada.

to their satisfaction. In other words, they figured they could do a better job and be more satisfied with their efforts if they received more training. Ninety-four per cent said they want to learn more in the workplace, and 76 per cent want to use e-learning to do so. This suggests a major opportunity for employers.

Often when new technologies or new ways of doing things are introduced, people resist. But this is not the case with e-learning. Canadian employees want to learn workplace skills and are willing to do so through e-learning. Employers and managers who are supportive and provide accessible, just-in-time e-learning with relevant work-related content will find employees ready to learn.

**Chart 9**  
**What Would Most Help Employees Use E-Learning**  
 (per cent)



Source: The Conference Board of Canada.

1 This chapter presents the results of a mail survey of 860 Canadian employees from the same organizations that responded to the employer survey. The mail survey was conducted in April and May 2000, and the aggregate response rate was 11 per cent.

2 Constantine Kapsalis, *Employee Training: An International Perspective*, no. 89-552 (Ottawa: Statistics Canada, 1997), p. 28.

3 See Manuel London and James W. Smither, "Empowered Self-Development and Continuous Learning," *Human Resource Management*, vol. 38, no. 1 (Spring 1999), pp. 3-15.

4 Linda Keegan and Sherri Rose, "The Good News about Desktop Learning," *T+D Magazine*, vol. 51, no. 6 (June 1997), p. 24.

5 Betcherman et al., *Barriers*, p. 49.

6 On a scale of 1 to 10, from no preference to highly prefer, the mean score for e-learning-based delivery was 6.08, for classroom/instructor based was 6.98 and for a combination of both approaches was 7.36.

7 1) Computer/CD-ROM, 25 per cent; 2) written materials, 24 per cent; 3) Internet, 13 per cent (n=142).





## Solutions for Employers: E-Learning Decision-Making Tool

So how does an organization get beyond the barriers to reap the benefits of e-learning? How can employers make plans to use e-learning and pick the right technologies to meet their needs? These are significant management issues that are increasingly preoccupying human resource managers.

The American Management Association identified “adaptation to new technologies” as the second most pressing HR management issue today, after training. A recent report by the International Data Corporation found that many Canadian organizations are having trouble “keeping up with IT training demands and [are] beginning to recognize the advantages of anytime, Web-based training.”<sup>1</sup> Generally, the literature cautions that e-learning is not a panacea, and that it works best in conjunction with human-mediated training and other technologies.

The lack of conclusive evidence that any specific learning technology is “the best” is in line with the argument that learning technologies are specific to context and learning needs. In other words, effective use of e-learning must be premised on learning needs, desired outcomes and technological fit.

Employers don’t have a single answer to every e-learning situation. There is no magic bullet, and employers emphasize the importance of research, planning and informed decision making. Successful e-learning outcomes require a well-developed e-learning strategy that considers learning needs along with budgetary and technological limitations and business strategy. Aligning e-learning efforts, measures and outcomes with business need and value is key to success. The information and toolkit provided in this chapter will guide employers in the definition of their own e-learning strategy and help them link it with processes and outcomes.

The e-learning decision-making process highlighted here includes advice, examples and lessons from Canadian workplaces that can help employers get the results they seek. Geared toward employers who are new to e-learning or those who want a way to structure their e-learning efforts, each phase is a tool for building an e-learning plan and taking action.<sup>2</sup>

The e-learning process (Exhibit 2) consists of:

1. a planning phase, which involves the development of a team, an assessment of organizational, learner and technological needs and capacity, and the design of an e-learning model;
2. a building phase, which involves the building and programming of the e-learning solution, including the

delivery technology, content and services required to support the e-learning solution;

3. an integration phase, where the e-learning solution is communicated to the organization, established, used and measured; and
4. an improvement phase, where the e-learning model is evaluated and improved.

The e-learning planning process emphasizes continuous improvement and the alignment of action and outcome with organizational strategy and business needs.

Using e-learning makes sense. But there is a gap between what organizations need and what they have. To address this gap, employers have to understand the potential.<sup>3</sup> They have to examine their needs, and those of their employees, strategically and organizationally.<sup>4</sup> Once an e-learning solution is chosen, employers will want to constantly evaluate and improve it.<sup>5</sup>

### *How to Use the E-Learning Planning Process*

Within each phase is a series of key steps to consider. Read through the phases and then use the accompanying toolkit (page 33) to record your responses and chart your organization’s status and next steps.

The American Society for Training & Development found that many executives are ready to use e-learning but hesitate because they don’t know how to choose among the available technologies. The biggest challenge managers and executives face is keeping pace with change, yet information—including information about choosing an e-learning solution—is hard to find.<sup>6</sup>

### Phase 1: Planning

The first step in the planning phase is an assessment of organizational, learner and technological needs and capacity. Before time and money are spent on e-learning, your organization should figure out what it needs and what it can do. Don’t skip this first phase: it’s crucial to the success of e-learning in your organization.

### *Develop Your Team*

You can’t do it all yourself. The development of a team whose members have expertise in the processes, people and technologies involved is critical. Information technology, human resources, training and development and other employees and managers bring a range of knowledge to the table that ensures buy-in by key stakeholders as

## Exhibit 2

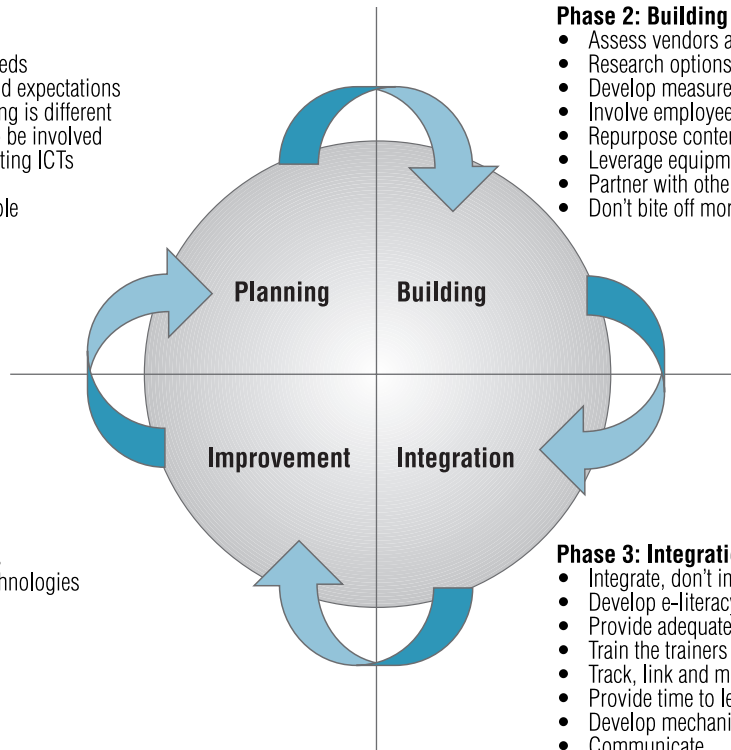
### E-Learning Planning Process

#### Phase 1: Planning

- Develop team
- Assess organizational needs
- Define learners' needs and expectations
- Understand how e-learning is different
- Define work processes to be involved
- Assess and leverage existing ICTs
- Define budget
- Get seat at IT systems table
- Define e-learning model

#### Phase 2: Building

- Assess vendors and products
- Research options by content, technology and service
- Develop measures
- Involve employees in content development
- Repurpose content with caution
- Leverage equipment supplier training
- Partner with other organizations
- Don't bite off more than you can chew



#### Phase 4: Improvement

- Check and evaluate
- Determine improvements
- Assess/integrate new technologies
- Scale up or out

#### Phase 3: Integration

- Integrate, don't implement
- Develop e-literacy
- Provide adequate ICTs
- Train the trainers
- Track, link and measure
- Provide time to learn
- Develop mechanisms for content management and updating
- Communicate
- Build communities

Source: The Conference Board of Canada.

well as sound decision making. Cross-functional teams will ensure that all the relevant questions are asked and that the answers are understood. Senior support is also important, but often this is gained only when success can be proven at the end of an intervention. Many organizations we researched felt that they'd had to establish success on a small scale before they found senior-level support.

#### Assess Organizational Needs

E-learning planners need to determine the level of management and executive support and the general state of the organization, as well as build a business case. What is the organizational imperative that would drive and benefit from e-learning? If your organization is going through a transition, such as a change in strategy, leadership, ownership or business line, employees will need help adjusting. Knowing where management and senior executives stand on e-learning may also help.

Your organization may also have knowledge management systems and processes that you can tap into. While knowledge management is not a form of training and learning delivery, it can offer a structure for understanding the work and knowledge needs of your organization,

identifying knowledge and skills gaps, as well as being a possible source of content for e-learning.

Finally, and perhaps most importantly, ask whether your organization is already doing e-learning. You might be surprised. Many organizations we researched had pockets of uncoordinated and unaligned e-learning in place. These need to be incorporated into your plans.

#### Define Your Learners' Needs and Expectations

Employers should define the needs of the learners, including computer literacy, language requirements, access to information and communications technologies, and skills gaps. For the ultimate definition of value, ask employees what skills they require to help the business compete, and then compare these benchmarks with their current capabilities. The gaps should be prioritized to guide strategy.

Successful delivery of programs depends as much on the recipient as on the method and the content. The American Society for Training & Development (ASTD) argues that firms need to "focus on how individuals learn, then use technology to provide a learning environment."<sup>7</sup> As the Office of Partnerships for Advanced Skills, a partnership of Ontario universities, advises, "effectiveness...is



dependent on the appropriateness of the technology to the content and to the learners' requirements."<sup>8</sup>

### ***Understand How the E-Learning Process Is Different from Other Learning Delivery Methods***

To understand when to use e-learning, we need to consider how technology influences the learning process. And apart from the technology, how is e-learning different from traditional, classroom-based, instructor-led training? Understanding how e-learning is different can help you determine whether it is the right solution for your organization.<sup>9</sup>

Some believe e-learning provides a safer place to learn, especially for learners who fear making a mistake. Employees who responded to the Conference Board's survey had varying comfort levels with e-learning. Thirty-four per cent said they are sometimes comfortable with using e-learning, and 65 per cent said they were comfortable. Helping people become more comfortable with e-learning is a critical first principle; potential actions include improving e-literacy, access and management support. Employees were ambivalent as to whether e-learning is the best way to learn—81 per cent said that sometimes it is. Despite this ambivalence, employees are still willing to try e-learning. Both employers and employees will gain comfort and confidence with usage of and familiarity to e-learning. This reflects the common wisdom that e-learning solutions don't fit every situation and have to be tailored to the learner, the context and the content.

So what is the best fit for your e-learning employees? Balance is the key. This was affirmed in the employer interviews. Joan MacKenzie of Rogers AT&T designed an initial instructor-facilitated e-learning class before learners moved on to using their just-in-time e-learning system on the job. The balance can be between traditional and e-learning methods, between self-directed and leader-led learning or between one-way and two-way learning. Indeed, employees voiced a strong preference for a combined approach, with 82 per cent preferring to learn both on their own and with others.

### ***Define the Work Processes to Be Involved in E-Learning***

For just-in-time learning or to take advantage of information and communications technologies on the job, employers need to determine which work processes e-learning would occur within and how ICTs are used in those processes. Can ICTs be used for learning "in the work"? For example, at KeySpan Energy, an oil-processing company based in Calgary, new ownership and unmet training goals provided a clean slate for it to reinvent its approach to work and training. By discarding job descriptions, and instead looking at what the work actually was and what skills people had, KeySpan rooted skills gaps in the business processes.

KeySpan then developed a comprehensive learning system. Employees can address their training gaps through on-line courses or access just-in-time e-learning including technical or equipment information wherever they are working.

### ***Assess and Leverage Existing Workplace Information and Communications Technologies***

Assessment of existing ICTs is a critical step. This may involve an overview of workplace information and communications technologies, operating systems and storage capacities, employees' computer literacy rates, bandwidth, networking and workstation capabilities (such as CD-ROM drives) and intellectual property and licensing issues. As a recent study by the American Productivity & Quality Center notes, the success of learning technologies relies on strong ties with the technology provider, and flexibility in developing and deploying technologies according to demand.<sup>10</sup> Involving your information technology colleagues is critical to this exercise.

A related and growing issue involves human resource information systems (HRIS) and Web-enabled e-learning solutions. Many organizations have invested heavily in HRIS. HRIS companies are now developing e-learning modules that fit with the HRIS systems already in place. The choice for some companies is whether to use Web-enabled e-learning or legacy HRIS. Web-enabled systems offer more flexibility and broader delivery beyond the company's network in a way that HRIS can't. But the investments already made in HRIS create a dilemma.

Employers also need to assess the types of technologies available, ranging from networks, servers and desktop computers to telephones and personal digital assistants (PDAs). Assessment includes asking:

- What type of network do you have? What is the speed and bandwidth capacity of your network? Is it broadband?
- What is the speed and memory of your computer terminals?
- Can your network handle multimedia or video streaming?
- Do your computers have sound cards?
- Which ICTs do employees have access to the most, and what is their capacity to deliver learning?
- How many computers are available, and how are they distributed?
- Are computers easily accessible to employees?
- What other demands are being placed on your ICTs, and how will e-learning rank against these?

For capital- and labour-intensive companies with a dispersed labour force—from forestry, oil and gas companies to service firms and financial institutions—ICTs are essential for getting the job done. Mobile, wireless work in remote locations is not unusual. Because of the proven

value of ICTs, leveraging existing technologies for e-learning is not a stretch. At CentraGas, for example, laptops, cellphones and PDAs are common in the field. Norske Skog was able to build its e-learning solution on a state-of-the-art fibre optic network at its pulp and paper plant in Crofton, British Columbia. The members of Bell Nexxia's mobile sales force e-learn through wireless Web-based applications on their PDAs and cellphones.

### *Define Your Budget*

Technology costs money, so knowing what your budget is and working within it is key. Not only do you have to determine how much you have to spend, but you also have to define where the budget will come from. Some organizations combine budgets and resources from IT and HR because e-learning is so much a combination of both. Fit the e-learning solution to your budget, not the other way around.

### *Get a Seat at the Information Technology Systems Table*

Malcolm Roberts, of the Bank of Montreal's Institute for Learning, emphasized that in addition to executive support, getting a seat at the table when the information and communications infrastructure was upgraded in the early 1990s was critical to BMO's implementation of e-learning. Through a consistent presence and ongoing working relationship with IT colleagues, the Institute for Learning was able to craft and develop an e-learning strategy throughout the 1990s and into this century.<sup>11</sup>

### *Build or Buy? Define Your Model of E-Learning*

Your e-learning model is a critical construct and is determined by a series of choices. Will you buy services, content and technology externally from vendors, will you build them internally, or will you apply some combination of these two options? (See the section "What Does E-Learning Look Like?" in Chapter 2.) Your model also involves consideration of employee e-literacy and computer access, and learner needs and preferences. Do your organization's employees prefer to work alone or in groups, to learn through e-learning only or through an approach that blends e-learning and traditional methods? How will you select technical e-learning standards and incorporate them into your e-learning model?

For example, Bell Canada's learner management system uses external vendors of courseware developed to fit its performance review and employee development needs.<sup>12</sup> Aliant follows a similar model that combines external course vendors with in-house development of content, technology and service.<sup>13</sup> The Norske Skog and KeySpan

models were created and are managed in-house; in both cases, content, technology and systems have been developed from scratch and they are now poised to sell them beyond their organizations.

Employers should recognize and build upon the capacity of current staff to support employee learning. The role of human mediation has changed but is still invaluable.<sup>14</sup> For instance, human mediation is important to ensuring that e-learning fits learners' needs. Roger Schank, an expert on using technology for employee learning, argues that learning facilitators must get involved in the design process so that designers and technical people understand the learning needs of those who will be using the technology.<sup>15</sup>

Human mediation is significant in the initial design of e-learning, and in the actual facilitation and application. One key to effective e-learning is finding technical people who can understand employees' learning needs, business needs and adult education principles and can work well with designers of workplace learning programs.<sup>16</sup>

While facilitators should be involved in design, they also need to be taught to use e-learning so well themselves that it becomes second nature. The need to "train the trainer" is a twist in the literature on this issue. There is evidence that facilitators will need additional competencies and must adapt current ones in order to be effective at facilitating the use of learning technologies by others. For example, the ASTD lists 31 competencies for trainers using learning technologies. These fall under the headings of general competencies, management competencies, distribution method competencies and presentation method competencies.<sup>17</sup> Employers we surveyed also noted that their training and human resources staff needed some help with their e-learning abilities.

Employers can select e-learning that is easy to use, increase its availability and promote its use. They can enhance access by making more hardware and software available, increasing bandwidth, improving technical support and providing dedicated time, equipment and space for e-learning to employees. Employers can provide more opportunities for employees to use e-learning during and outside normal working hours.

Employers can also look at industry standards currently being developed such as the Shareable Courseware Object Reference Model (SCORM) or Instructional Management System (IMS), or those from the Institute of Electrical and Electronics Engineers (IEEE) and Aviation Industry Computer Based Training Committee (AICC). But do this carefully, as these standards are still being defined and are inconsistently implemented.<sup>18</sup>

Once the model is selected, the e-learning team needs to develop a plan for building, integrating, maintaining and improving the solution. This includes timelines,

budgets and a governance model outlining specific roles and responsibilities for team members and other involved parties.

Having a corporate culture and management that encourage the use of e-learning is also important to its success. Initially, a champion from the executive ranks is sometimes necessary to overcome organizational barriers and resistance toward e-learning. But, as noted earlier, some organizations prefer to try for a small-scale success before arguing for senior support. A solid business case about the benefits of e-learning may be required for senior support.

Deborah Schreiber suggests that for e-learning to become a short- and long-term success, an organization “must evolve beyond individual championship. However, at start-up this focus is critical.”<sup>19</sup> Schreiber notes that effective use of e-learning “requires not only a new organizational chart but often a transformation of the corporate culture itself.”<sup>20</sup> Involving managers early in the planning process, as part of a cross-functional planning committee, is a good way to encourage broad management support for e-learning.<sup>21</sup>

Employers with smaller budgets can get around these limitations by partnering with other organizations or educational institutions. Roger Schank observes that partnerships are sometimes flawed because the wrong format is used for learning, such as classroom formats for workplace-related training.<sup>22</sup> But partnerships in general are an important solution to lack of know-how or funding and can bring all parties who wish to be involved in the lifelong learning process to the table.

## Phase 2: Building

Your team is in place, you know how much you have to spend, you know what the critical learning needs are, you know what the limitations of your ICTs are, and you have developed an e-learning model. The second phase is the building of your e-learning model, including the selection of various e-learning suppliers, the management of external vendors and suppliers, and the development of outcome measures that will allow you to assess the success of your model.

### Assess the Vendor Market and Products

Are you receiving endless phone calls, mailings and e-mails from vendors, suppliers and experts ready to tell you what your organization needs? If you are, you're not alone. Joan MacKenzie of Rogers AT&T took a step back to assess the market and possible products and vendors before picking an external provider to help her team build a custom e-learning application for call centre customer service representatives.<sup>23</sup> Manulife Financial developed a

vendor assessment to analyse offerings in the e-learning marketplace. Other employers we consulted decided to ignore the phone calls and cultivate their own sense of what their organizations needed and what e-learning involves.<sup>24</sup>

### Research E-Learning Options by Content, Technology and Service

There are content providers, technology providers and service providers. Some vendors offer all these services. Content is often the primary consideration in assessing vendor markets. If, for example, soft skills training or technical training content is required, external vendors are often used, since this content is generic and already exists. If training on proprietary processes or products is required, often organizations develop their own content, using technologies purchased externally or developed internally, or contract external custom content providers. Employers we consulted often mentioned feeling overwhelmed, unprepared and unsure of how to assess vendors. Given the nascent and fractured nature of the e-learning market, many employers want to go with a vendor that will survive consolidation of the market.

If you are going outside your organization for content, technology, services or expertise, a Request for Proposals (RFP) process is critical. Determine your specifications and either approach selected vendors or hold an open RFP. Once the bids are in, select viable candidates according to criteria that you have determined and weighted. Always insist on references and always check them. Too often, organizations look only at numbers and not at the candidate's track record. Make sure you see the product, and ask extensive questions about the company and how it delivers. Also ask about long-term costs, including maintenance and licensing.

### Develop Measures

To know whether your model was successful, you will need more than gut feeling—you'll need data. Measures should be defined, and methods for capturing data on these measures should be integrated into the e-learning model. Specific measures can include completion rates, learning retention, duration of learning time, and usage rates. Measures should be incorporated seamlessly into the model.

Despite increasing awareness among employers of the importance of measurement, “only one-third of organizations surveyed can put a precise figure on their training costs.”<sup>25</sup> Organizations need these data to assess effectiveness, productivity, employee retention rates, costs, and for continuous evaluation of technology solutions, just as they need data about all their learning and training methodologies.

Employers have no way of knowing that a learning technology works if they are not measuring it on a consistent

basis. Evaluating the financial and learning effectiveness of e-learning is key to modifying and improving its use. To measure e-learning effectiveness, employers should collect data and set clear indicators, including usage, training scores and learner evaluations of the technologies. These data can be used for continuous improvement of training and delivery.

### *Involve Employees in Content Development*

Employers can involve and engage employees in creating content through “authorware” programs. These software programs provide a template that employees can populate with their knowledge. Norske Skog uses an employee from each process area of its pulp and paper plant to develop content within technology and software it has developed on-site. Canadian Pacific uses an off-the-shelf authorware package to develop and deliver content to its switching support staff.<sup>26</sup>

### *Repurpose Content with Caution*

Perhaps one of the strongest cautions to emerge from the Conference Board consultations with employers was against “repurposing” of classroom content and curriculum. Repurposing is the e-learning vernacular for reusing what you already have. Since e-learning’s approach to information is modular, facilitated by technology and specific non-linear learning needs, many employers said repurposing of learning content designed for longer, linear learning interventions could be difficult. Many warned that repurposing often yields eye-glazing “page turners” and doesn’t capitalize on the interactive possibilities of e-learning.

### *Leverage Equipment Supplier Training*

You may not have to develop content—it may already be available. For instance, CentraGas and KeySpan have partnered with equipment suppliers to gain training content or e-learning modules.

### *Partner with Other Organizations on Non-Proprietary E-Learning*

Maybe what you need has already been done by others. With the advent of Web-based training and secure sites, more opportunities are available for partnership. Certain types of applications, perhaps regulatory and compliance training that your employees are required to have, or professional development and certification processes, invite partnerships and economies of scale. Partnerships can occur between similar organizations, with educational institutions, or through sector associations or non-profit associations.

### *Don’t Bite Off More than You Can Chew*

E-learning is occurring in pockets, with focused projects. Because of the newness of e-learning, many employers are starting with a single project, albeit one that is aligned with organizational and business needs and strategy. Scalability is important, and these employers prefer to hold back broad organizational roll-out until after small-scale success in e-learning is established. “Pick something you have to do,” said Owen Baker of KeySpan Energy. Indeed, for KeySpan, Norske Skog, CentraGas and the Bank of Montreal, compliance and regulatory training was the driver of e-learning and formed the basis of the e-learning business case.

### *Phase 3: Integration*

Your e-learning model may melt into thin air if your learners and your organization don’t embrace it. While accountability is important, an organic process of awareness, communication, involvement and play are often more effective, especially when introducing the unfamiliar. This step is about how you engage learners in e-learning. This involves effectively communicating the e-learning model to learners and managers, measuring and collecting data as e-learning occurs, training trainers and support staff, providing time to learn and ensuring basic e-literacy.

### *Integrate, Don’t Implement*

Brian Corbett of Air Canada prefers to view e-learning in terms of integration, not implementation. Corbett points out that implementation has a top-down connotation, while integration implies a more organic approach that relies on employees understanding, embracing and building his goal of an “e-learning community.” Working within a unionized environment, Air Canada involves the ramp workers responsible for loading and maintaining the fleet in defining work processes and training needs. Corbett’s view is that the value of e-learning is rooted in a key business process—ensuring the safety and maintenance of the capital Air Canada needs to deliver its core service through the continuous learning of the staff who work on the ramp.<sup>27</sup>

The concept of integration is also reflected in the Bank of Montreal’s e-learning continuum. For BMO, e-learning happens on a continuum that stretches from “away from work” to “at work” to ultimately “in-the-work.” The goal at BMO is to integrate e-learning, business processes and knowledge management into “metaskills” that employees will use in flexible work environments.



At KeySpan Energy, e-learning is a holistic endeavour rooted in regulatory compliance, new ownership and organizational transformation. At the centre of KeySpan's e-learning efforts was a fundamental assessment of the work process and consequent competencies required, not a rigid job definition. Employees and managers work together to improve skills gaps and business outcomes within the e-learning system. At Rogers AT&T, e-learning systems are available on-the-job to customer service representatives.

### ***Develop Computer Literacy or E-Literacy***

Some employees may not be familiar or comfortable with e-learning. Developing e-literacy programs and taking the time to enhance access to, and familiarity and confidence with ICTs can improve the comfort level of employees. At Bell Canada, an e-literacy program was initiated to improve the ability of employees to use computers for learning. The program was launched after Jean Monty, the CEO of parent company BCE, declared that BCE was to become an "Internet company." At Air Canada, employees were introduced to computers through computer games.

### ***Provide Adequate ICTs***

Employees will be frustrated and turned off any e-learning solution, no matter how great it is, if it isn't accessible or doesn't work well with current systems. Make sure you have enough workstations, and that they are within easy access for learners. If employees have their own workstations, design the e-learning solution so that it can be accessed by employees as they need it and while they work.

### ***Train the Trainers***

A new skill set is required from trainers, instruction designers, managers and human resource professionals who are involved in e-learning. While they don't need to be experts in programming, they do need to understand how the technology affects the training. As our survey results show, training the trainer in e-learning is a requirement. Seventy-five per cent of employers said that their trainers and human resource personnel need help using e-learning. A paradoxical outcome of the e-learning evolution is a shortage of qualified e-learning experts. Given the newness of and demand for this skill set, there is a shortage of experts in e-learning.

### ***Track, Link and Measure***

Linking e-learning to accountability and measurement is critical to success. You will need to gather data on the measures determined in Phase 2. At Norske Skog, managers are responsible for training targets that are

assessed monthly. Accountability for e-learning is held to the mill manager and to the Canadian CEO, who issued the e-learning directive. Organizations like KeySpan, CentraGas, Rogers AT&T and Bell Canada track gaps, learning sessions and test scores and then link all that to the broader performance management system. This way, employees and employers can track and reward learning, and employers can determine what works and what doesn't.

### ***Provide Time to Learn***

Because inadequate time is a barrier to e-learning success, providing time to learn is critical. Many organizations have identified this imperative. Norske Skog, whose workers are limited by shift schedules, opened up its training facilities to employees at night and on weekends. In the six months after it started its e-learning program, employees completed a total of 600 hours of learning, 40 per cent of the goal the organization had set.

### ***Develop Mechanisms for Content Management and Updating***

One of the main values of e-learning is how easy it is to update and roll out content to learners. But this doesn't just happen. Systems for managing and updating content, with clear lines of responsibility, need to be developed and incorporated into e-learning solutions, especially if the content is proprietary and driven by changes in products and business cycles. Content management systems can be purchased when needed or incorporated into e-learning solutions to automate the updating process.

### ***Communicate the E-Learning Solution to Managers and Employees***

The adoption and use of e-learning will be seriously hindered without clear communication as to what it is and why it is important. This message needs to be relayed to managers and employers, and is very effective when delivered by a senior executive. Consistency in the message and alignment between the purpose of e-learning and job-related needs also strengthen e-learning communication.

### ***Build E-Learning Communities***

One popular approach to e-learning is the development of communities devoted to specific knowledge or learning areas. Members of these communities work to solve problems, learn together, and build and share knowledge. Air Canada uses this approach as one of the foundations of its e-learning strategy.

## Phase 4: Improvement

All processes can be improved, and e-learning is no exception. This phase is also an opportunity to determine how to innovate processes and to research new technologies or approaches.

### *Check the Collected Data and Improve Key Processes*

Look at the data that were collected through the e-learning integration. What were the successes and failures? Is there a return on investment? Employers can also link their e-learning data with other measures such as employee satisfaction or performance measures, customer satisfaction and loyalty measures, and defect rates. Prioritize the problems or areas that need innovation, and assemble a team to tackle them. Improve the processes that will make the most difference to e-learning delivery and outcomes.

### *Assess and Integrate New Technologies*

Not only do employers have to check the data, but they also need to be prepared to integrate new technological iterations into current e-learning. Air Canada currently has kiosks located in ramp “ready room” areas, but it dreams of moving to wireless PDAs that ramp employees will wear on their sleeves to access just-in-time training.

Review technical standards such as SCORM and see how they fit into current and new e-learning solutions. Are standards starting to dominate, and how will this affect your current e-learning model?

### *Scale Up or Out!*

At this point, employers can broaden their efforts within the organization, or perhaps partner externally on non-proprietary content or technology. Some successful organizations we researched are selling their interventions externally on a cost-recovery basis.

### **A Necessity, Not a Burden**

Fundamental to the improvement phase is the understanding that once you have finished it, you start the e-learning planning process again. Assessing the success or failure of your first e-learning cycle will help you prepare to gain executive support, increased funding or improved technology, or to determine whether your e-learning experiment can be scaled up to more of the organization.

Despite the varying experiences of employers across the country, the e-learning process itself was similar. Employers emphasized the importance of linking the experiment with their business strategy and outcome. Using a continuous improvement cycle from the strategic level to the practice level was fundamental. Given that time and cost are the top barriers to e-learning, management methodologies and practices are still the best way to deal with the new and unknown.

E-learning has the potential to be seamless and “in the work.” When this happens, e-learning will take place as needed through workplace ICTs in a fashion that will make it seem not a burden on your time, but rather a necessity for making decisions and getting the job done. E-learning is not unlike other technologies, such as automated bank machines, that we develop an ability to use. We can absorb the ability to learn with technology. The Bank of Montreal regards this as a metaskill or e-competency: where problem solving and learning through technology in the work is a skill in and of itself.<sup>28</sup>

Many employers are combining e-learning and knowledge management. While definitions vary about what knowledge management is, for our purposes knowledge management is the definition, containment and use of data, knowledge and information. Because technology, business process and modular knowledge are aspects of both e-learning and some knowledge management, there is overlap between them.<sup>29</sup> But e-learning goes beyond knowledge management by actively using and engaging knowledge to develop skills.<sup>30</sup>

The application of knowledge and the practice of skills is what separates e-learning from knowledge management. Another way to understand the difference is to look at e-learning as a way of delivering learning and skills development, which knowledge management is not. Both, however, are important aspects of learning organizations and may use similar platforms and technologies.<sup>31</sup> For some employers, e-learning and knowledge management are converging; they complement each other as ways to capture, manage and disseminate organizational intellectual capital.

E-learning can challenge traditional, hierarchical ways of working, where knowledge and skills are sources of responsibility and authority. E-learning expands access to learning to all within the organization. Through e-learning, organizations empower people to improve their ability to do the work. While this is not risk-free, it can be a positive way of empowering employees to make better, faster decisions “closer to the customer” or within the business process.

## E-Learning Toolkit

### Phase 1: Planning

The planning phase involves the development of a team, an assessment of organizational, learner and technological needs and capacity, and the development of an e-learning model.

Steps	Actions Required	Your Organization's Status
1. Develop your team		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
2. Assess organizational needs		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
3. Define your learners' needs and expectations		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
4. Understand how the e-learning process is different from other learning delivery methods		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
5. Define the work processes to be involved in e-learning		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
6. Assess and leverage existing workplace information and communications technologies		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
7. Define your budget (How much money do you have to spend?)		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
8. Get a seat at the information technology systems table		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
9. Define your model of e-learning (vendor-based, in-house, etc.)		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete

## Phase 2: Building

The building phase involves building and developing the e-learning solution plans from the Phase 1 planning tool.

Steps	Actions Required	Your Organization's Status
1. Develop your ability to assess the vendor market and products		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
2. Research e-learning options by content, technology and service		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
3. Develop measures		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
4. Involve employees in content development		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
5. Repurpose content with caution		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
6. Leverage equipment supplier training		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
7. Partner with other organizations on non-proprietary e-learning		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
8. Don't bite off more than you can chew		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete



### Phase 3: Integration

The integration phase involves communicating, establishing, using and measuring an e-learning solution.

Steps	Actions Required	Your Organization's Status
1. Integrate, don't implement		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
2. Develop computer literacy or e-literacy		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
3. Provide adequate ICTs		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
4. Train the trainers		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
5. Track, link and measure		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
6. Provide time to learn		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
7. Develop mechanisms for content management and updating		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
8. Communicate the e-learning solution to managers and employees		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
9. Build e-learning communities		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete

### Phase 4: Improvement

The improvement phase involves evaluation of the e-learning solution and integration of new technologies and changing business and learner needs.

Steps	Actions Required	Your Organization's Status
1. Check the collected data and improve key processes		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
2. Assess and integrate new technologies		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete
3. Scale up or out!		<input type="checkbox"/> Incomplete <input type="checkbox"/> Complete

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- 1 Colleen McCloy and Ellen H. Julian, *Using the Internet/Intranet to Deliver Training Services to the Canadian Market*, Report W18623 (Toronto: International Data Corporation, December 1998) <www.itresearch.com>.
  - 2 This model is based on the work of the Organizational Effectiveness Group at The Conference Board of Canada. In particular, see Catharine G. Johnston and Mark J. Daniel, *Setting the Direction: Management by Planning*, Detailed Findings 108-93 (Ottawa: The Conference Board of Canada, 1993).
  - 3 Van Buren, *Mainstreaming Learning Technologies*, ASTD.
  - 4 Deborah Schreiber argues that "the most effective strategy for meeting the needs of distance education and training is to employ a variety of forms of instructional technology and electronically mediated instruction." Schreiber in Schreiber and Berge, eds., *Distance Training*, p. 17.
  - 5 The OECD cautions that quality should be maintained while meeting the rising demand for e-learning, especially given the potential of e-learning to enhance life-long learning. "The challenge, in this era of expanding, deepening and diversifying demand for learning over a lifetime, is how best to meet the volume demand while ensuring that the nature and types of learning respond effectively to needs." *Education Policy Analysis*, 1999 Edition, p. 5.
  - 6 Van Buren, *Mainstreaming Learning Technologies*, ASTD.
  - 7 Koonce, "Where Technology and Training Meet," ASTD.
  - 8 Office of Partnerships for Advanced Skills, *The Effectiveness of Learning Technologies: The Costs and Effectiveness of Technology-Based Approaches to Teaching and Learning* (Toronto, 1998), p. 3.
  - 9 See the appendix to Murray and Bloom, *Solutions for Employers* (The Conference Board of Canada, 2000) for a discussion of approaches to adult learning.
  - 10 Ted Carpenter-Smith, *Technology-Based Training: Global Strategies for Learning* (Houston: American Productivity & Quality Center, 1999).
  - 11 Malcolm Roberts, Ellen Bear, Diane Blair and Ian MacNeil, Bank of Montreal Institute for Learning, site visit, Toronto, Dec. 6, 2000.
  - 12 Site visits and interviews, Bell Canada Enterprises, Montreal, September 2000.
  - 13 Site visits and interviews, Aliant, Halifax, November 2000.
  - 14 Koonce, "Where Technology and Training Meet," ASTD; Masie, "Seizing Your Intranet," p. 51.
  - 15 Theresa Minton-Eversole, "Roger Schank Talks Training," *Technical Training*, ASTD (www.astd.org/CMS/template\_1.html?articleid=11235). See also Roger Schank, *Virtual Learning: A Revolutionary Approach to Building a Highly Skilled Workforce* (New York: McGraw-Hill, 1997).
  - 16 Koonce, "Where Technology and Training Meet," ASTD.
  - 17 George Piskurich and Ethan S. Sanders, *ASTD Models for Learning Technologies: Roles, Competencies & Output* (www.astd.org).
  - 18 These groups are developing specifications for e-learning that will be submitted to an official sanctioning body such as the International Organization for Standardization.
  - 19 Schreiber in Schreiber and Berge, eds., *Distance Training*, p. 395.
  - 20 Ibid., p. 17.
  - 21 Schreiber echoes this sentiment in Schreiber and Berge, p. 398.
  - 22 Minton-Eversole, *Roger Schank Talks Training* (www.astd.org).
  - 23 Joan MacKenzie, interview, Dec. 6, 2000.
  - 24 Consultation, Montreal, Nov. 20, 2000.
  - 25 Souque, *Focus on Competencies*.
  - 26 Interview and site visit, Canadian Pacific, Jan. 26, 2001.
  - 27 Interview, Air Canada, Halifax, November 2000.
  - 28 Malcolm Roberts et al., Bank of Montreal Institute for Learning.
  - 29 For more on knowledge management, see Thomas H. Davenport and Laurence Prusak, *Working Knowledge: How Organizations Manage What They Know* (Cambridge: Harvard Business School Press, 1997) and Nancy M. Dixon, *Common Knowledge: How Companies Thrive by Sharing What They Know* (Cambridge: Harvard Business School Press, 2000).
  - 30 The Conference Board, Inc. further notes that e-learning "goes beyond traditional knowledge management parameters by focusing on individual and organizational capabilities, and utilizing tools to explicitly link learning to performance metrics." Todd Kulik, *Knowledge Management: Becoming an E-Learning Organization*, R-1283-00-ch (New York: The Conference Board, Inc., 2000), p. 5.
  - 31 For more on learning organizations, see Peter Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization* (New York: Doubleday, 1994).

## Conclusion

The most successful countries of the 21st century will focus on lifelong learning, and the most innovative will use e-learning to do so. A well-trained labour force that consistently learns new skills is able to drive economic prosperity to new heights. E-learning is a tool that enables employers to ensure that their employees gain new skills. E-learning will be the tool of choice for 21st century employees who need access to flexible, just-in-time learning systems.

- Leading organizations use e-learning.
- E-learning will alter the measurement of learning.
- E-learning will provide a means to recognize and accredit prior learning.
- E-learning is a key means to deliver lifelong learning and cultivate a culture of innovation.
- An e-proficiency will develop around the capacity to learn and improve performance through e-learning.
- E-learning is a method for organizations to partner for lifelong learning.
- E-learning expands national productivity and innovation.

### E-Learning Stimulates Lifelong Learning

The report outlining the results of Statistics Canada's Adult Education and Training Survey argues that a greater use of new technologies in the delivery of education and training is key to reducing or eliminating training barriers.<sup>1</sup> E-learning can contribute significantly to creating a lifelong learning culture and can make education and training more accessible to everybody, whatever their place of residence, their age or their employment status.

E-learning can be combined with human mediation to greatly heighten the learning gains of workers.

While e-learning can't and won't replace human-mediated learning, it is an excellent complement to it, and sometimes it is the best means for employees to learn. In many cases, e-learning can be combined with human mediation to boost the learning gains of workers. E-learning can also fill special needs, for example in work environments where more traditional forms of learning are not appropriate or where geography limits training.<sup>2</sup>

As an added benefit, e-learning builds knowledge in a way that accommodates changing learning, living and working patterns. As Betcherman et al. suggest, "new

participation patterns are altering the rhythms of learning and working...requir[ing] *more flexibility in terms of both delivery methods and when people can access training*" [italics theirs].<sup>3</sup>

This report has offered a look at the current situation in Canada and provided employers with a toolkit for developing their own e-learning strategies and solutions. It has stressed the importance of e-learning as a method for delivering learning in the workplace and beyond.

Employers can take further action to:

- share the content, applications and ideas they have developed for e-learning in their organization with other organizations;
- foster a culture that integrates and supports learning as a necessary and essential part of daily work;
- partner with educators and other stakeholders to develop and share community-based e-learning solutions that build the local labour market skills base;
- work with unions to develop programs and content for employee training;
- develop sectoral partnerships related to non-proprietary learning needs; and
- develop e-learning solutions that target employees with lower literacy skills.

The federal government also has important options to consider regarding the development and use of e-learning in the following policy areas:

- supporting the integration of e-learning into labour market transition issues, especially those related to skills development and lifelong learning, basic workplace education and the school-to-work transition;
- supporting the development of e-literacy standards and programs;
- supporting the development of basic literacy and workplace literacy programs and policies delivered through and capitalizing on the unique benefits of e-learning;
- leading the development of a holistic system of gaining credentials through e-learning;
- developing portable and recognized learning that can be delivered through e-learning;
- continuing to improve access to ICTs to provide learning opportunities to all Canadians;
- maintaining support for the development of the national technical infrastructure for e-learning, including broadband initiatives such as CANARIE;
- communicating the connections among ICTs, lifelong learning and e-learning;

- working with provincial and territorial governments to ensure the development of an e-literate population; and
- supporting the development and sharing of Canadian content.

Learning is a process that transcends work, home or school. It can happen anywhere and is essential to our personal development. Learning is also critical to our ability to adapt and compete, especially in the digital economy. Learning is key to productivity, competitiveness and prosperity. E-learning blends the technology that pervades our work with the constant skill upgrading needed to work with technology.

### E-Learning Stimulates Learning Organizations

E-learning has the potential to change how organizations and employees learn, and how they share and increase knowledge. The growth in e-learning parallels the trend away from training to lifelong learning, the trend toward learning organizations and the growing use of technology at work and at home.

With learning interventions shortened to a just-in-time, modular, need-to-know framework, the measurement of learning will change from the total number of hours spent learning to specific outcomes. Indeed, this will become the only way to measure e-learning in a way that matters.

Technology  
is just an  
enabler...  
e-learning is  
valuable as  
a process.

E-learning introduces a future where measuring time becomes more meaningless and measuring outcomes becomes more important. This trend, combined with the ease of certification through e-learning systems, will also facilitate customized learning and provide for recognition of learning through assessment and evaluation.

These trends are not exclusive to the workplace.

Educators will be dealing with the impact of e-learning on learning content, testing and certification.

The employers surveyed for this report, and the employers and employees who participated in our related research, are breaking new ground and taking the risks that are required for improvement and innovation. In fact, here is one of the most interesting and yet unknown aspects of e-learning. When talking about e-learning and information and communications technologies in the economy, there is a tendency to presume that technology is the driver. But ultimately, for both employer and employee, technology is just an enabler. The value of e-learning is based on more than its outcomes; e-learning is valuable as a process.

Combining knowledge and technology with their common sense and intuition, the new learners are not just acquiring new skills, they are learning about learning. The implications for individual and organizational performance in the future are profound.

1 Bérubé et al., *Adult Education and Training Survey*, p. 99.

2 *Technological and Organizational Change* (HRDC, 1996), p. 50.

3 Betcherman et al., *Barriers*, p. 4.

## Glossary of E-Learning Terms

**Analog:** A signal that is received in the same form as it is transmitted, while the amplitude and frequency may vary.

**Asynchronous:** Communication in which interaction between parties does not take place at the same time.

**Asynchronous Transmission Mode (ATM):** A method of sending data in irregular time intervals using a code such as ASCII. ATM allows most modern computers to communicate with one another easily.

**Bandwidth:** Information-carrying capacity of a communication channel. The greater the bandwidth, the greater the carrying capacity. Often used in reference to Internet access.

**Broadband:** A transmission technique using a wide range of frequencies, which permits messages to be communicated simultaneously.

**Browser:** Software that allows you to find and see information on the Internet.

**CANARIE:** Canada's advanced Internet development organization, a not-for-profit corporation supported by its members, project partners and the federal government.

**Chat (Internet Relay Chat or IRC):** Chatting is real-time, interactive on-line conversations on the Internet, allowing Internet users to join theme discussions or post comments on their screen at the same time as other participants. Chatting can also include communication in virtual reality environments using avatars (the virtual representation of the user by a 2D or 3D character).

**Compressed Video:** Video signals that are downsized to allow travel along a smaller carrier.

**Computer-Assisted Instruction (CAI):** Teaching process in which a computer is used to enhance the learning environment by assisting students in gaining mastery over a specific skill.

**Desktop Videoconferencing:** Videoconferencing on a personal computer.

**Dial-up Teleconference:** Using public telephone lines for communications links among several locations.

**Digital:** An electrical signal that varies in discrete steps in voltage, frequency, amplitude, location, etc. Digital signals can be transmitted faster and more accurately than analog signals.

**Distance Education:** The process of providing instruction when students and instructors are separated by physical distance, involving technology, often in tandem with face-to-face communication.

**Distance Learning:** The desired outcome of distance education.

**Electronic Mail (E-mail):** Messages sent from one computer user to another.

**Facsimile (Fax):** System used to transmit textual or graphical images over standard telephone lines.

**File Transfer Protocol (FTP):** A protocol that allows files to be moved from a distant computer to a local computer using a network like the Internet.

**Fully Interactive Video:** Two sites interact with audio and video as if they were located in the same place (two-way interactive video).

**Interactive Communication:** Interactive communication brings people together, speeds up information dissemination and learning processes, and enables users to interact in real time without distance being an obstacle. Today, two people can develop a product from opposite ends of a continent, benefit from a person's expertise even though they are thousands of kilometres away from that person, use multimedia elements such as sound, video or fixed image and text, share software and much more.

**Interactive Media:** Frequency assignment that allows for a two-way interaction or exchange of information.

**Internet, Intranet and Extranet:** The Internet (Inter Network) is the “mother of all networks.” It is an immense computer and telecommunications network that spans the globe. Started by the American military in 1969, as ARPANET, and quickly expanded for use by universities. In 2000, over 80 million Internet users had access to the Net to communicate (by electronic mail), access and download information and files, exchange data files (FTP), publish information (World Wide Web), stage videoconferences and much more.

Intranets are smaller and more secure versions of the Internet—private internal networks used within an institution or business. Extranets are the gateway to an intranet; remote users can use a network (Internet, dedicated lines, telephone lines, etc.) to access the intranet securely.

**Listserv:** An e-mail program that automatically sends messages to all subscribers, creating an on-line discussion.

**Local Area Network (LAN):** Two or more local computers that are physically connected.

**Modem:** Equipment that allows computers to interact with one another via telephone lines by converting digital signals to analog for transmission along analog lines.

**Multimedia:** Any document that uses multiple forms of communication, such as text, audio and video.

**Network:** A series of points in different locations connected by communication channels.

**On-line:** Active and prepared for operation. Also suggests access to a computer network.

**Streaming—Live Radio, Audio and Video:** This “continuous” broadcast mode, called streaming, can be found on the Internet and intranets to process data (display images or video, or play sounds or music) before they are fully downloaded or uploaded. The information is compressed at the source, usually in MPEG format, then decompressed by the user. Several users can simultaneously view or listen to the posted files. Streaming technology allows the user to listen to, view and even interact (while viewing or listening) with multimedia files. The streaming mode is essential for listening to conferences and radio or television programs live or in delayed broadcast, although the video broadcast quality is entirely dependent on the telecommunication network and the user’s hardware (modem, processor, etc.).

**Synchronous:** Communication in which interaction between participants is simultaneous.

**Telecommunication:** The science of information transport using wire, radio, optical or electromagnetic channels to transmit and receive signals for voice or data communications using electrical means.

**Telecommunication Network:** The interconnection of computers and communication technology. The Internet is a network of networked computers, a “highway” that enables various media and new telecommunication means to be displayed or broadcast.

**Teleconferencing:** Two-way electronic communications between two or more groups in separate locations via audio, video and/or computer systems.

**Videoconferencing and Desktop Videoconferencing:** Videoconferencing makes it possible for two or more people to communicate in real time. There is two-way sending and receiving of sound and images (video) from different locations. There are two kinds of videoconferencing: personal (or face-to-face) via personal computers, and group (person or persons talking to a group of persons) using a dedicated videoconference system via monitors or televisions. The basic system includes a monitor (television or computer screen), a camera, a microphone and speakers. Sounds and images are conveyed by the telephone network, by ISDN (Integrated Services Digital Network) lines or, more economically, by the Internet. Compression is required to transmit sound and video, because the digital format files are enormous in terms of data (bits).

**Video Teleconferencing:** A teleconference including two-way video.

**Virtual Reality and 3D Imaging:** The representation of real and imaginary objects or places, in computerized form, to create simulations. It is also known as “Web 3D.” Entire worlds are created in digital format and made available in video games, on CD-ROMs and on the Internet.

**World Wide Web (WWW):** Hypermedia system (digital data, audio, video and other media used as hypertext elements) that facilitates searches for information on the Internet. The information available on the Web is presented as Web pages; a set of Web pages constitutes a Web site. A Web page can contain text and still-frame images, animations, video, sounds, etc., and links to other pages. Those links allow users to explore information in a specific order (or randomly) and to interact with the contents of the Web page. Documents on the WWW are published in HTML (hypertext markup language) and other protocols (dynamic HTML, stream, Java, etc.).



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