

Stahmer, A.E. (1995). Learners in the workplace. In J.M. Roberts and E.M. Keough (Eds.), *Why the information highway: Lessons from open and distance learning* (pp. 41-59). Toronto: Trifolium Books Inc.

Learners in the Workplace

ANNA E. STAHMER

This chapter focusses on open and distance learning in the workplace. It sets the stage by looking at trends in learner characteristics and needs, by examining the providers of this training, and by situating workplace training in terms of expenditure patterns. On the basis of survey information and case studies, the chapter then identifies the status and trends of open and distance learning and the use of technology in workplace training (Conference Board of Canada [Conference Board], 1991, 1992, 1993). The implications of these trends are discussed from the perspective of workplace learning systems, the organizations, the people in the system, and budgeting and costs. The chapter concludes with reflections on steps to accelerate open and distance learning that is accessible to a wide range of adult learners, in small or large organizations.

Training in the Workplace

A Look at Trends

Increasing numbers of adults will need access to learning opportunities and continuing training in order to do their jobs, and to be ready to adapt to changes in their work. The fact that these learners are working adults establishes the parameters for ways in which this learning should be conceived and delivered. Advances in learning technologies and the proliferation of technologies in the workplace provide a certain synergy with the needs of adult learners, which is being recognized in the corporate world. A cursory glance at the providers of workplace training will draw a picture of the supply side and how it is poised to deliver open and distance learning. Lastly, and very importantly, the financing of such training is a vital factor in the use of open and distance learning in the workplace.

Who Are the Learners?

The characteristics of future adult learners, the reasons why they need access to learning, and the conditions under which they must find such access encompass a large group of people who will greatly benefit from open and distance learning. These learners typically include:

- Working adults who usually have family responsibilities. For example, in the Toronto area, almost 70 percent of women with children under 16 were in the labour force in the late 1980s (Social Planning Council, 1988).
- Older workers. Demographic projections show that, contrary to traditional patterns, youth can no longer be expected to provide the new skills needed by the labour force.

- People who are currently in the workforce and who will need to upgrade their skills and knowledge (Moses, 1991). It is reported that most adult Canadians may change careers and jobs every five years (Advisory Council on Adjustment [Advisory Council], 1989).
- Workers who need higher levels of skills within existing occupations. Use of sophisticated technologies in the workplace will mean that, by the year 2000, over 64 percent of jobs will require 13+ years of education. However, one in four Canadian adults is reportedly functionally illiterate, and 30 percent of Canada's young people leave school before they achieve a high school diploma (Advisory Council, 1989).
- Highly skilled professionals, such as engineers or technologists. These workers require continuing access to new knowledge and skills, because the half-life of knowledge in technological fields can be as short as three years.
- Managers and supervisors who need new organizational skills as a result of changed work and business environments.
- Workers and professionals at all levels who are looking for career advancement.
- Employees of small firms. Most firms in Canada are small. Only 37 percent have formal training programs, and only 13 percent have a training budget. In contrast, nearly all large firms (1000+ employees) and 64 percent of medium-sized firms (100-999 employees) have training programs.

What Is Important to These Learners or Their Employers?

Workplace trainers and trainees indicate that learning opportunities should exhibit some of the following characteristics to be suitable to this group of adults, who have family and other commitments:

- provide convenient access, in terms of place and time;
- deliver flexible and self-paced learning to allow for differences in learning styles;
- be modular in design, so that learning can be integrated with work and family obligations;
- be curriculum based, or progression oriented, to avoid duplication or knowledge gaps;
- provide some form of certification or accreditation;
- support learners in pursuing a personal continuous learning plan;
- use work environments and adult learning principles as reference points; and
- be time efficient to reduce costs of trainee wages,¹ or to manage the investment of time required by individual learners.

Open and distance learning systems exhibit many of these characteristics.

What Are the Sources for Workplace Training?

Broadly speaking, six different sources offer formal workplace training. The list includes:

- In-house training departments, which account for the majority of training expenditures in larger companies, and which are increasingly sophisticated in their use of technologies for this purpose.
- In-house training departments in large companies that are set up as revenue centres, and sell their generic courses to other companies.
- Colleges and universities with services ranging from company-specific contract training to continuing education and part-time studies. They are increasingly looking at technologies to support their work.²
- Not-for-profit organizations or school boards, which are principally active in the areas of adult basic education. The use of technologies by these groups is not extensive, but increasing.
- Professional and trade associations, some of which are known to make active use of training technologies.
- Commercial courseware and training providers, a few of whom are very sophisticated in the development and use of technology-based training.

These providers co-operate with each other, through, for example, contractual arrangements, as well as with other organizations, such as provincial education communication authorities. They also purchase off-the-shelf training technology products, or subscribe to teleconference services from other suppliers. Of this list of providers, company in-house training departments may well be the most active users of technology, and of open and distance learning techniques. Their flexibility in budgeting and ability to address cost issues squarely may be principal reasons for this.

What Are the Sources of Financing?

Numerous studies and reports outline the need for continuous adult, professional, and workplace training to maintain national prosperity. The need is expressed in sectors as diverse as textile manufacturing, trucking, software, or mining, and for employees ranging from customer service and tradespeople to technologists and professionals such as engineers.

There is little agreement, however, on how such continuous learning should be funded. Governments and employers have traditionally carried a large part of training costs. However, the numbers of adult learners needing continuous upgrading of knowledge are rising. The future scope of workplace learning needs may require new approaches to financing. Engineering professional associations, for example, recognize this factor and point to the responsibility of the individual to self-finance continuous learning. However, some observers believe that funds can be found from existing sources, and that traditional training systems must be reengineered to respond to the need (Association of Community Colleges of Canada [ACCCI, 1993, p. Cxvii).

Overall, annual expenditures for formal training are estimated at CD \$8.6 billion, comprising of \$3.8 billion by the federal government, \$3.6 billion by employers, and \$1.2 billion by the provincial governments ("Learning for work," 1993). Often, more than one source of funds is used to finance a given training opportunity. At present, governments typically concentrate their financial support on

training of disadvantaged groups, who may be undereducated, unemployed, or in need of job-entry skills or reskilling, and on initiatives targetted toward training employees in small and medium-sized enterprises. Other workplace-related training is the responsibility of employers.

According to many studies, the need for continuous workplace training exists. However, financing formulas are yet to be found to allow large-scale implementation of solutions. Therefore, while technologies and open and distance learning can make enormous contributions to satisfying growing workplace training needs, systemic solutions will have be found, and funding issues will need to be resolved (ACCC, 1993, p. Cxix).

Distance Education and Open Learning in the Workplace

This section will describe the technologies, and open and distance learning approaches, used in workplace training. It draws on three surveys of corporate training expenditures and policies conducted by the Conference Board of Canada, and on examples of workplace training applications reported by the Training Technology Moniton.³

Expenditures on Technology and Distance Learning

The 1991 Conference Board survey indicates that Canadian companies may allocate as much as five percent of their training expenditures to technologies and further, that this percentage may double every two years. Assuming that all funding sources described in the previous section invest a similar percentage in technology support, annual expenditures could be as high as \$180 to \$430 million, and growing.

Technologies Used in the Delivery of Training

The same survey shows that slightly more than 10 percent of companies interviewed use one or a combination of the following: CD-ROM, videos, audio- and videoconferences, computer-aided instruction, and distance learning. This figure is expected to double within two years (Conference Board, 1991, p. 19).

In its 1993 survey, the Conference Board finds that 36 percent of the respondents use distance learning in the delivery of their training⁴ (p. 16). The survey also finds that larger organizations are more likely than smaller companies to use such technologies. The former are likely to be geographically more dispersed and to have sufficient capital acquisition budgets to mount the programs.

We suspect that a major push for the growth in the use of training technologies, and of open and distance learning, has come from the expansion of corporate computer systems, which were installed initially for operational applications. This increase in the installed base is also generating interest in electronic performance support systems (EPSS), which enhance computer-based work with four major functions, one of which is training. Under the training function, EPSS can:

- be the librarian to help find answers quickly;
- be the advisor, giving guidance and expert advice;
- be the instructor, providing on-demand training; and

- be the "dofer," doing routine work and letting the employee concentrate on more important tasks.

A current dilemma is that trainers are not very familiar with EPSS development tools, and that training functions are either not always built into EPSS, or have only limited input from trainers (Technology in adult basic education," 1993).

Applications of Computer Software to the Training System

Data on current or planned applications show that course design and delivery are only two of the applications envisaged for computers in workplace training. Administration, evaluation, and planning functions may depend on computer software more heavily than delivery. Course registration, course catalogues, and skills inventions are anticipated to be the most extensive uses of computer software In training. The percentages of companies that reported they expected to use software for these purposes were 43%, 34%, and 32%, respectively. Over the two-year projections covered by the survey, computer use was expected to grow for course delivery from 11% to 21%, for needs assessment from 60% to 38%, and for course design from 0 to 21% (Conference Board, 1991, p. 19).

Five Illustrations from Practice

1. IBM Manufacturing (Don Mills, Ontario)

IBM Manufacturing's Desktop University addresses both corporate training goals and employees' professional development goals, and combines both in-house and college training benefits. IBM needed to transfer more technical work to production employees, necessitating retraining and the creation of a new manufacturing career path. It chose to offer 25 courses at its in-house learning centre through classroom instruction, using off-the-shelf videotapes, videodiscs and CD-ROM courseware as resource materials. Forty percent of the training is self-paced, so that it is easily accessible to employees working on three different shifts. Two regional community colleges support the initiative, providing advanced courses, instructor support, tutorials, and counselling. Employees enrolled in the program register at the colleges and receive official transcripts from those institutions.

IBM's Desktop University illustrates the use of the installed infrastructure for job-specific training and for some generic professional development. With Desktop University, IBM employees use their desk computer to download courses of their choice and study at their convenience ("IBM manufacturing and colleges form partnership," 1993).

2. Prudential Insurance and Financial Services (New Jersey)

Prudential Insurance and Financial Services recently implemented the Prudential Learning System (PLS), which again illustrates an in-house application of open and distance learning. PLS combines print learning modules, videos and computer-based training with computer-based learning tests. The last are sent for analysis to a remote host computer. With PLS, feedback to the learner can be immediate: positive results are reinforced, and areas that need additional review are identified. Since the hardware platform is portable, learners can use these modules at their place of work or at home. Courseware consists of new, off-the-shelf or existing materials for preemployment candidates and sales

representatives. It covers candidate orientation and a range of skills that representatives need ("Insurance companies install a training infrastructure," 1994).

3. Irving Forestry Products (St. John, New Brunswick)

Irving Forestry Products Division uses open and distance learning techniques and technologies to provide job-specific training as well as broader professional development opportunities. It does so through in-house and public sector course offerings. The company employs interactive videodisc, CD-ROM, and other computer-based training tools for a range of training activities. Employees may get access to TéléEducation NB TeleEducation courses directly from the corporate premises, through a network site situated within the plant (Holmes, 1994).

4. SkillPlan/ Open Learning Agency (British Columbia)

SkillPlan (British Columbia Construction Skills Improvement Council) and the Open Learning Agency (OLA) of British Columbia have combined forces to provide learning opportunities for adult tradespeople whose work schedules are heavily seasonal. Jointly, they have developed and offered customized computer-based training programs for construction workers at Loa's workplace training centre. The goal is to upgrade basic skills of workers, many of whom are technically skilled journeymen and apprentices. Access to a traditional semester-based learning system is difficult for this highly mobile workforce, and individualized learning is therefore considered important ("Technology in adult basic education," 1993).

5. The Training Group (Edmonton, Alberta)

The Training Group provides a number of examples of applications of electronic performance support systems (EPSS), most of which have been undertaken with energy and petrochemical companies. Using EPSS, workers can get access to the 'library side' of the system on the job: for example, conduct an on-line search for information on products, ISO 9000 or safety procedures. These same data files can also be obtained from the "learning side" for individualized training. One petrochemical company is using the EPSS at 23 sites intentionally ("Technology in adult basic education," 1993).

Analysis

The trend and survey data identified in the preceding sections lead to reflections on their implications for workplace training as we know it. They have implications for the learning system, for the organization of learning, for the Jobs of trainers, and for financing and budgeting. These issues are reviewed in the following sections.

Implications for the Workplace Learning System

Learning systems that deliver workplace learning will change. Future systems will include the following features:

- Continued growth of open and distance learning technologies, leading to use of new kinds of facilities, such as desktop computers.
- Increasingly "intelligent" applications of technologies, such as EPSS. EPSS present special challenges to the training community. Some fear that they may lead to a general deskilling of the workforce.
- Changed modes of operation of training services as we now know them. Limited hours of operation, fixed entry and exit times, access to learning based on formal prior learning, and budgeting based on learner contact-hours may become things of the past.
- Increased use of computer and multimedia technologies in learning centres in the workplace.
- Increased use of learning centres as common or shared facilities. As a result, a broad spectrum of adult learners will be able to access learning opportunities, especially employees from small and medium-sized enterprises and self-employed individuals. These shared facilities will operate very differently from most of today's learning centres.

A scan of current effective learning centres illustrates the types of facilities and services such centres may offer.

- Multimedia terminals, PCs and networked PCs local area networks or LANs). The ratio between hardware and number of learners will depend on the learning activity.
- External video and Telephone connections and computer communications modems, for audio-, video-, or computer conferencing, and access to learning and technical databases.
- Student management software that will allow students access to their learning files through a personal identification number.
- Personal learning "profiles" that will identify previous mastery of subjects and skills, serving as the basis for a personal learning path.
- Television or cable service.
- Library services for courseware and other books.
- Separate areas for individual and group work.
- Tutors at a ratio from 1:20 to 1:80 learners, depending on the type of learning activity.
- Operating and maintenance staff.
- Operating, staffing, and scheduling procedures that allow learners to use the facilities when convenient for them.

Implications for the Organization of Workplace Learning

On one side, we see a model of workplace learning that brings learning much closer to line and business functions. For example, the Conference Board reports that over 40 percent of companies are moving away from seeing training as an expense (1993, p. 13). They use some form of transfer pricing to ensure that line departments are aware of the real costs of training, and to make decisions more strategic. Also, in-house training products are being marketed externally, and technology-based products are especially suitable here. On the other side, evidence suggests that corporate training departments see workplace training as more than a way of serving corporate goals. As was evident in the examples, some companies help employees to establish and pursue individual and personal development goals. Some observers feel this shift in the functions and roles of training divisions will increase technology-based and self-directed learning. Others see the shift as a likely result of it (Conference Board, 1992, p. 6).

Practical implications of this shift in function can be seen in the Conference Board findings that 45 percent of training staff work at the operating divisions level, compared to 30 percent a few years ago. Evidence suggests that operating and training divisions are beginning to work together in the following areas:

- defining training content and delivery methods;
- delivering training; and
- evaluating training.

Observers expect that closer co-operation between the departments will result in more emphasis on the evaluation of impact or results. They further expect that impact evaluation will give a major boost to workplace training-and will also ensure that training meets business needs. Conference Board survey results show that impact evaluation has remained relatively stable at five percent of reporting companies, but that trainers expect an impact evaluation to be used in future by as many as 70 percent of the companies.

Implications for Learners, Trainers, and Supervisors

Emerging models of open and distance learning and their use of technologies will put new demands on learners as well as on trainers and supervisors.

Many adult learners will be new to defining or taking responsibility for their own continuing learning. Adults enjoy using technology-based training. They often prefer the flexibility and privacy of such models compared to traditional modes of delivery. However, the same flexibility will most benefit those who can learn independently. The necessary skills, including certain motivational and psychological attitudes, will have to be learned by many. Tutorial support from trainers, colleagues, or external sources will be essential to help learners achieve this end.

However, tutoring and other open and distance learning skills are rarely the strength of today's trainers. Most come from a background that emphasizes the development and delivery of learning materials. Alternatively, they may come from line jobs, where knowledge of content is their strength. Trainers have rarely been exposed to tutoring, counselling by Telephone or e-mail, or management of learner files through computer analysis-skills essential for effective support of technology-based learning systems. Other roles required of trainers in this new arena may include proficiency in the use of distance learning techniques, in working as part of a materials development team, or in assisting employees to define personal development plans.

Supervisors and peer groups will also have important responsibilities in open and distance learning systems at the workplace. Many tasks such as tutoring, scheduling, testing, or logging learner progress will move to line departments and to peers and supervisors. Larger companies may be able to move some of these tasks—for example, scheduling—to computer support networks, thus putting less of this burden on supervisors and peers.

Few formal opportunities exist to acquire these "new" skills. However, where firms (and educational systems) have introduced training technologies in a systematic fashion, staff typically learn the necessary skills through experience and, over time, become supportive of the change.

Implications for Financing and Budgeting

Present financing and budgeting approaches to training are often disincentives to the adoption of open and distance learning and to the use of training technologies. Five factors seem critical.

- Training is normally purchased-or reimbursed internally- on the basis of hours of training provided. Evidence of this approach to financing can be found in government programs as well as In private firms. Since technology-based training often requires less time to produce the same level of mastery, the training department or training provider may not generate as much revenue as with conventional methods.
- It is almost impossible to quantify independent learning under existing budget formulas.
- Training budgets typically operate on an annual cycle, which makes economic justification over several years difficult. The economic behaviour of training technologies, however, is characterized by high front-end costs, but lower per-learner costs with frequent use. In one company, for example, the break-even point between the classroom and a sophisticated multimedia training package was around 2000 learners. The company forecasted that this number would be reached in about two years, and that a total of 4000 learners would need to be trained with the package over five years. Thus, the outlay of significant funds at the front end helped to reduce the trainee costs over time.
- General financial constraints in governments and in many industry sectors do not make the prospect of new funds for workplace training a very promising one. It can be expected that the necessary funds will have to come from reallocations of existing funds, or from new funding sources and new business opportunities.
- Data on usage, cost, and pricing for the new Generation of learning technologies are limited. Few economic assessments have been undertaken. For example, the economic behaviour of learning packages that use computer conferencing for peer tutoring, or that allow learners access to databases to suit their personal learning needs, is different from the economic behaviour of the use of stand-alone technologies, such as books, CD-i, and videos. Usage and related costs of these types of learning are still open ended. Heavy usage by learners of communications links-to gain access to tutors and databases, for example-may prove costly for a training department.

Where to Go from Here

The move toward open and distance learning will not remain an option for trainers to choose or to reject. It will become a reality as a result of pressure from learners themselves. Thus, the universe of

learning is in the process of change. Technology-based tools are gaining increasing importance in the process, or possibly are a cause of it.

Further, the provision of adult and workplace learning is becoming competitive. New players, such as venture capital firms, commercial training firms, and Telephone companies are entering areas that were once the domain of the public sector or of in-house training departments. They enter it as financiers and as suppliers of courses or infrastructure. It will take the combined efforts of the traditional and the new players to bring about the kind of learning systems that working adults will need in the future. It is evident that new operating rules will be necessary to bring the players together.

What to Do about the Hardware Infrastructure

In terms of the hardware infrastructure, training applications will filter into many operational corporate training applications with expert systems or EPPS training software. In addition, shared learning centres may be a cost-effective basis to provide a learning system for the majority of adults who work in small and medium-sized firms- that is, in firms that do not have the economies of scale to justify the in-house investment. These learning centres can operate out of a school, another public facility, a commercial site, or a company facility (for larger firms).

However, the funds required to establish sufficient numbers of learning centres go well beyond the capabilities of public funding-and often beyond the capability of an individual corporate training department. The financing, establishment, and operation of learner centres could become a new business opportunity for private companies- in co-operation with, or on behalf of, public sector interests.

Steps that will accelerate the establishment of learning centres include:

- Implementation of policies that will make it attractive for private interests to invest in learning centres. For example, partnerships should be encouraged in which the public sector defines and accredits the learning and the private sector invests in, and operates, learning centres for a fee.
- Purchase of technology-based training services from such centres by large companies or governments. Already a number of companies are main clients of the few currently operating commercial centres. Where learner numbers warrant, the learning centre operator may set up the hardware infrastructure directly at the customer's premises. This will free customers from the need to purchase, operate, maintain, and upgrade the equipment themselves.

What to Do about Materials and Learning Resources

Present practices in design and development of learning materials need to be analyzed and reengineered to suit the future.

The following recommendations could ensure the production and availability of quality and affordable materials:

- Trainers, teachers, and instructors need to become proficient in software applications such as EPSS. Their absence from teams that develop such operational support applications leaves the design of instructional and tutorial functions of EPSS, for example, without appropriate pedagogical input.
- Planned courses in large companies and in the public education sector could be assessed to see whether they might be developed for delivery by alternative delivery systems. This will open

courses to learners in small and medium-sized enterprises, or self-employed people, who otherwise might not be served at all.

- Each new training module in larger firms, or governments, should be reviewed from the same perspective. These large users should finance the development of such units, use them in-house, and recoup investments through rentals or sales. Such an approach would further widen the pool of available Materials.
- Materials development should be contracted more consistently to commercial producers. This should occur in close co-operation with content experts, teachers, or trainers from the public and private sectors. The advantages of such arrangements would be that commercial producers will end up with the production volume to warrant investments in high-end production hardware and software. They also will have the flow of work to engage sufficient numbers of qualified full-time staff to develop multimedia materials in a cost-effective manner. Most importantly, they have an obvious interest in marketing successful products that will pay royalties to the initial investors, thereby offering a new source of funds.
- Change purchasing rules for training from the time-based to a mastery-based premise.

Conclusions

Technology-based open and distance learning is making rapid inroads into workplace learning. Barriers stem less from pedagogical or technical matters than from issues related to funding and to the absence of appropriate models on which to base the reengineering process.

Endnotes

1. According to the Canadian Bankers' Association, trainee wages accounted for 26 percent of total training expenditures by the major Canadian banks in 1992.
2. Some observers expect that demands from the workplace market will, for example, push colleges to become increasingly active users of technologies when they provide workplace training (personal discussions by Stahmer with participants in a Delphi study forecasting the use of training technologies in the college system).
3. The Training *Technology Monitor* is a subscription-based newsletter, published eight times per year in Toronto since 1993. It reports on matters related to the development and application of technologies in workplace training.
4. The definition of distance learning used in the 1993 survey encompasses a number of the categories used in the earlier surveys. The Conference Board states (p. 15), "Distance learning refers to teaching and learning situations in which the instructor and learner(s) are geographically separated and rely on electronic devices and print materials for instructional delivery."

References

Advisory Council on Adjustment. (1989). *Adjusting to win*. Ottawa: Industry, Science & Technology Canada.

Association of Community Colleges of Canada. (1993). *Human resource study of the Canadian community colleges and Institute sector (report and appendices)*. Ottawa: Author

Conference Board of Canada. (1991). *Training and development 1990: Expenditures and policies*. Ottawa: Author.

Conference Board of Canada. (1992). *Training and development 1991: Expenditures and policies*. Ottawa: Author.

Conference Board of Canada. (1994). *Training and Development 1993: Policies, practices and expenditures*. Ottawa: Author.

Holmes, D. (1994). *Personal communications*. Irving's Training & Development Division.

IBM manufacturing and colleges form partnership. (1993). *Training Technology Monitor*, 1(1), 1-3.

Insurance companies install a training infrastructure. (1994). *Training Technology Monitor*, 2(8), 1-3.

Is PSS the future? (1993). *Training Technology Monitor*, 1(2), 1-2.

Learning for work. (1993, August 7). *Globe and Mail*.

Moses, J. (1991). *Speaking notes on Canadian labour market Trends*. Ottawa: employment & Immigration Canada, Labour Market Outlook & Structural Analysis Division.

Social Planning Council of Metropolitan Toronto. (1989). *Target on training: Meeting workers' needs in a changing economy*. Toronto: Author.

Technology in adult basic education. (1993). *Training Technology Monitor* 1(2), 6.